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TETRA TECH

March 27, 2008

Commander
Naval Facilities Engineering Command, Southeast
ATTN: Ms. Helen Lockard, P.E., Code OPG6
PO Box 30, Bldg 103
NAS Jacksonville
Jacksonville, FL 32212-0030

Reference: **CLEAN Contract N62467-04-D-0055**
Contract Task Order No. 0023

Subject: **Transmittal of Final Incinerator Site Work Plan, Health and Safety Plan and Munitions and Explosives of Concern Work Plan**
Naval Air Landing Field Cabaniss
Corpus Christi, Texas

Dear Ms. Lockard:

Please find enclosed two copies of the Final Work Plan [including the Field Sampling Plan and Quality Assurance Project Plan (QAPP)], the Health and Safety Plan, and the Munitions and Explosives of Concern (MEC) Work Plan for the Incinerator Disposal Site at Naval Air Landing Field (NALF) Cabaniss, Corpus Christi, Texas. The Final Work Plan addresses the regulators and Navy's comments to the Draft Work Plan.

In addition, three hard copies of the Work Plan are being provided to regulatory agencies for their records. TtNUS will coordinate with installation personnel to access the site and begin the field investigation activities.

Should you have any questions or require additional information regarding these reports, please feel free to contact me at (832) 251-6023.

Very truly yours,

G. Kenneth Grim, Jr., P.G.
Task Order Manager

Enclosure

c: Mr. C. Siegel, TCEQ, Austin, TX (2 copies)
Mr. R. Mayer, EPA, Dallas, TX (1 copy)
Mr. G. LeFlore, NAS Corpus Christi, TX (1 copy)
Mr. H. Resides, NAS Corpus Christi, TX (1 copy)
Mr. M. Perry, TtNUS, Pittsburgh, PA (1 electronic copy)
File 112G00356 (1 electronic copy)

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4328s

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 1
March 2008

INCINERATOR DISPOSAL SITE

1. WORK PLAN
A.1 Field Sampling Plan
A.2 Quality Assurance Project Plan
2. MEC WORK PLAN
3. HEALTH AND SAFETY PLAN

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

NAVFAC
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TETRA TECH NUS, Inc.

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 1
March 2008

Work Plan
for the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

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Naval Facilities Engineering Command
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Jacksonville, Florida 32212

TETRA TECH NUS, Inc.

REVISION 1
March 2008

WORK PLAN
FOR THE
INCINERATOR DISPOSAL SITE

NAVAL AUXILIARY LANDING FIELD CABANISS
CORPUS CHRISTI, TEXAS

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

Submitted by:
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CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 0023

March 2008

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WORK PLAN
Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

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WORK PLAN
Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

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A.2 Quality Assurance Project Plan
B Scope of Work, April 6, 2006
C Project and Data Quality Objectives Summary

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WORK PLAN
Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

ABBREVIATIONS AND ACRONYMS

AICUZ	Air Installation Compatible Use Zone
APAR	Affected Property Assessment Report
bgs	below ground surface
c-PCL	Critical Protective Concentration Level
CAD	Cartridge Actuated Device
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
COC	Chemical of Concern
CSM	Conceptual Site Mode
CTO	Contact Task Order
DERP	Defense Environmental Restoration Program
DO	Dissolved Oxygen
DPT	Direct-push Technology
DQO	Data Quality Objective
e.g.	For example
°F	Degrees Fahrenheit
FSP	Field Sampling Plan
GPS	Global Positioning System
GSA	General Services Administration
HASP	Health and Safety Plan
i.e.	That is
IAS	Initial Assessment Study
NAAS	Naval Auxiliary Air Station
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NASCC	Naval Air Station Corpus Christi
NAVFAC SE	Naval Facilities Engineering Command Southeast
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
Mm	Millimeter
MSL	Mean Sea Level
OE	Ordnance and Explosives
OLF	Outlying Field
ORP	Oxidation-Reduction Potential
PA	Preliminary Assessment
PAD	Propellant Actuated Device
PAH	Polyaromatic Hydrocarbons
PARRCS	Precision, accuracy, representativeness, completeness, comparability, sensitivity
PCL	Protective Concentration Level
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RG	Regulations
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SI	Site Inspection
SOW	Scope of Work, dated April 19, 2006
TAC	Texas Administrative Code

WORK PLAN
Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

ABBREVIATIONS AND ACRONYMS (Continued)

TAL	Target Analyte List
TCEQ	Texas Commission on Environmental Quality
TCL	Target Compound List
TRRP	Texas Risk Reduction Program
TtNUS	Tetra Tech NUS, Inc.
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WP	Work Plan
WWII	World War II
XRF	X-ray Fluorescence

1.0 INTRODUCTION AND PURPOSE

Tetra Tech NUS, Inc. (TtNUS) has been contracted by the Department of the Navy, Naval Facilities Engineering Command SOUTHEAST (NAVFAC SE) to perform a time critical removal action work plan (WP) of Munitions and Explosives of Concern (MEC), a site inspection (SI), and associated reporting for the former Incinerator Disposal Site located at Naval Auxiliary Landing Field (NALF) Cabaniss, Corpus Christi, Texas. Figure 1-1 shows the general location of NALF Cabaniss and the location of the former Incinerator Disposal Site at NALF Cabaniss. This work will be performed under Contract Task Order (CTO) No. 0023 under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract No. N62467-04-D-0055.

This Work Plan presents the proposed SI investigative, sampling, and analytical activities to support this investigation. The MEC WP removal activities are discussed under separate cover.

1.1 PROJECT OVERVIEW

A SI will be conducted to determine the presence, nature and extent of contamination present in surface water, soil and sediment at the former Incinerator Disposal Site. Groundwater samples will also be collected for water quality classification purposes. The SI will consist of the collection of surface soil samples, drilling of soil borings, collection of subsurface soil samples and collection and laboratory analysis of soil samples. The field activities will include installation of temporary groundwater monitoring, collection and laboratory analysis of groundwater samples and surface water/sediment samples, land surveying of sample locations and reporting of results. Additional concurrent field activities to support the SI of two known MEC sites include MEC avoidances and geophysical survey activities. These supporting field activities are further described in the MEC WP (TtNUS, 2007).

1.2 WORK PLAN OVERVIEW

This WP describes the overall technical approach to executing the SI. The WP contains a summary of available environmental information, conceptual site models, description of investigation objectives and activities, and evaluation and reporting requirements.

This WP contains the following sections:

1.0 – Introduction
2.0 – Project Background and Physical Setting

3.0 – Area of Investigation
4.0 – Regulatory Criteria
5.0 – Conceptual Site Model
6.0 – Investigation Objectives and Activities
7.0 – Evaluation and Reporting
8.0 – Schedule
9.0 – References

The SI to be performed at the NALF Cabaniss will be conducted in accordance with the procedures outlined in this WP. Additional documents related to the WP that will be used to perform the SI and MEC time critical removal action and SI support WP at NALF Cabaniss are as follows:

- Sampling and Analysis Plan (SAP) (Attachment A), this document contains the Field Sampling Plan (FSP) (Attachment A.1) and Quality Assurance Project Plan (QAPP) (Attachment A.2). The FSP contains a description of field data collection activities, drilling and sampling procedures and field quality control procedures. The QAPP contains information on the analytical methods and quality assurance (QA) quality control / (QC) procedures used to analyze and manage the data.

- Health and Safety Plan (HASP) (under separate cover TtNUS, 2006), this document details activities and procedures to be followed to ensure that SI-related field activities are conducted in a manner that is protective of on-site workers and the surrounding community.

- MEC WP (under separate cover TtNUS, 2007), this document contains a description of munitions clearance and avoidance activities, procedures and MEC field quality control procedures. This document outlines the field data collection methods, and field QA/QC procedures (e.g., geophysical prove-out activities) that will be used to collect, interpret, and manage the data, and details activities and procedures to be followed to ensure that MEC and geophysical survey-related field activities are conducted in a manner that is protective of on-site workers and the surrounding community.

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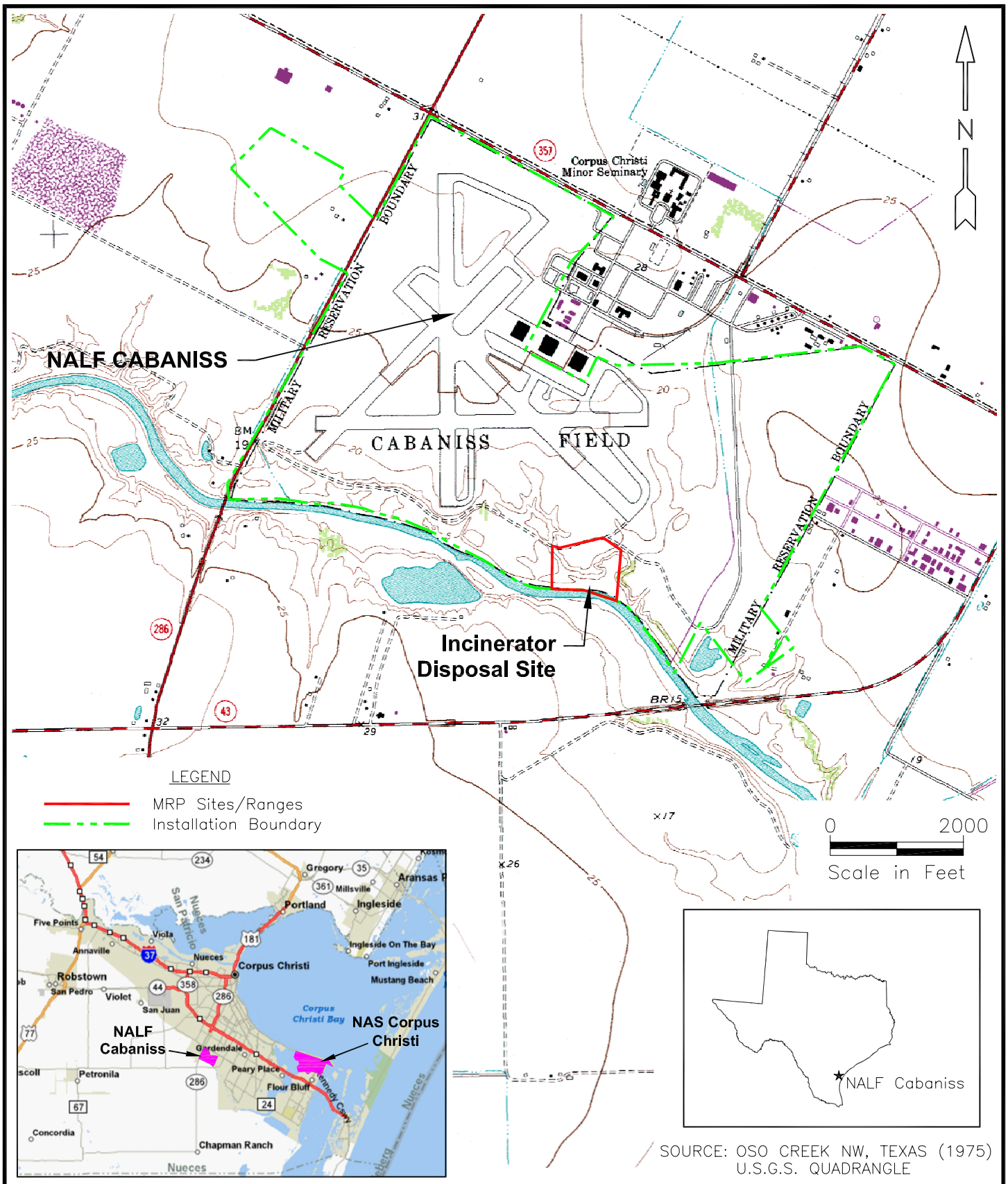

DRAWN BY JF DATE 6/29/06	NAVFAC	AREA LOCATION MAP INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
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2.0 PROJECT BACKGROUND AND PHYSICAL SETTING

The following sections provide a brief description of the project background and physical setting along with a summary of previous relevant investigations completed at the former Incinerator Disposal Site at NALF Cabaniss. Figure 1-1 shows the general location of NALF Cabaniss and the location of the former Incinerator Disposal Site at NALF Cabaniss.

2.1 FACILITY LOCATION

NALF Cabaniss is located on the eastern side of Nueces County, Texas, and lies approximately eight miles west of Naval Air Station Corpus Christi (NASCC). The installation is immediately bounded on the east by Brezina Road, on the north by Ayers Street and FM 286, to the west by Saratoga Road, and to the south by Oso Creek. The installation encompasses a total of 923 acres and lies just outside the corporate bounds of the City of Corpus Christi. The installation boundary area includes Air Installation Compatible Use Zone (AICUZ) lands that extend northwest and southeast from the main acreage of the installation. These AICUZ lands are Navy property acquired to encompass noise zones and Accident Potential Zones in the event an accident were to occur on approach to or departing from the runways at NALF Cabaniss. NALF Cabaniss is bounded to the south by Oso Creek, a perennial water body that ultimately flows into Oso Bay. Beyond Oso Creek are agricultural and industrial properties. The area east of the installation is comprised of mixed agricultural, industrial, and residential areas. North of the current boundary are former buildings and recreational areas that were once a part of the installation. These areas were transferred to the General Services Administration (GSA) for disposal in 1958, and are now the property of the local school district. Residential zones lie beyond these buildings to the north. A former landfill is located directly west of the installation.

2.2 FACILITY DESCRIPTION AND HISTORY

NALF Cabaniss is an outlying field (OLF) with the current primary role of supporting Naval air training operations originating from NASCC. NASCC, home to the Chief of Naval Air Training, maintains and operates facilities and provides services and material to support the operations of the aviation facilities of the Naval Air Training Command and other tenant activities. The general command assignment is pilot training, primarily focusing on primary and intermediate flight maneuvering and traffic pattern operations.

NALF Cabaniss is located eight miles west of NASCC. The installation occupies 923 acres and was originally constructed with four 5,000-foot runways. Only two runways, oriented in north/south and

northwest/southeast directions are presently active and maintained. Training Air Wing FOUR, based at the main installation, performs touch-and-go landing training between the main installation, NALF Cabaniss, and NALF Waldron, three miles south of NASCC. The airfield is lighted, to allow for night flight training, and daylight training.

NALF Cabaniss is covered with tall grasses, shrubs, trees, and other low-lying vegetation. Grasses and other vegetation near the operational runways are maintained through periodic mowing in support of flight training operations.

In December 1938, the Navy recommended the Flour Bluff area south of Corpus Christi Bay as a potential site for the construction of a new aviation training station. The Flour Bluff area was selected due to the sparse population, the favorable location, and the potential for year-round flight operations. Additionally, the City of Corpus Christi offered to donate the land required for the installation and to compensate the 100 families and residents for relocation. The installation received Congressional approval, and an appropriations bill was signed on June 13, 1940, authorizing construction of NASCC and 25 OLFs to support the main installation. Construction began June 30, 1940, and the installation was officially commissioned on March 12, 1941.

Naval Auxiliary Air Station (NAAS) Cabaniss Field was originally commissioned on July 9, 1941, in honor of Commander Robert W. Cabaniss, Naval Aviator No. 36, a World War I veteran killed in a plane crash in 1927. NAAS Cabaniss Field was established for the purpose of intermediate and advanced flight training for Naval aviators. As an auxiliary station, NAAS Cabaniss Field was outfitted with landing fields, runways, hangers, shops, barracks, a mess hall, and a recreational center. Flight instruction at NASCC began on April 1, 1941. Cadets performed their initial flight training on the N3N “Yellow Peril” trainer aircraft. Flight training was then broken down into specific divisions, including primary, basic, instrument, and advanced flight classes. With the December 1941 attack on Pearl Harbor, flight training efforts were doubled from 300 cadets per month to 600 cadets per month by utilizing the auxiliary fields. Following primary and instrument training, cadets were assigned to other types of advanced training, depending on their performance through the first two stages of training. The advanced aerial training was performed at the auxiliary fields. With the main installation and the six auxiliary fields, NASCC became the Navy’s largest air training center during World War II (WWII). Following the conclusion of WWII, NASCC’s mission was reduced to include only primary and instrument flight training. As a result, NAAS Cabaniss Field was temporarily decommissioned (1947), along with Naval Air Station (NAS) Kingsville, NAAS Rodd, and NAAS Waldron. The start of the Korean War in 1950 marked an increase in flight training at NASCC. NAS Kingsville, NAAS Cabaniss, and NAAS Chase Fields were also re-opened to support the increased training mission. In 1958, NAAS Cabaniss Field was converted from an auxiliary air station, which required personnel housing and support facilities, to an OLF, which required only the landing field

property. As a result, approximately 346 acres in the northern section of the installation were determined to be excess and given over to the GSA for disposal. This portion of the property was comprised mainly of administrative and housing facilities; there was no known use of munitions within this portion of the installation. The installation was commissioned as a NALF in June 1969. NALF Cabaniss is currently in use as an OLF for primary flight training out of NASCC. Current flight training includes touch-and go, night training, and other student training operations.

2.3 PREVIOUS INVESTIGATIONS

In 2005, Malcolm Pirnie, Inc. conducted a Preliminary Assessment (PA) of the former Incinerator Disposal Site at NALF Cabaniss. The PA summarized the history of munitions use for two former ranges at the NALF Cabaniss: the Skeet and Pistol Range and the Incinerator Disposal Site. The PA provided an assessment of the current conditions with respect to MEC and Munitions Constituents (MC). The PA provided the necessary information for Navy and regulatory decision-makers to: 1) eliminate from further consideration those MEC sites that pose minimal or no threat to public health or the environment; 2) differentiate MEC sites that may not require further munitions response actions from those that will require further investigation and/or munitions response actions; 3) determine if an imminent explosives safety hazard from MEC is present that warrants an accelerated response action; and 4) determine if an imminent hazard from MC to human health or the environment is present and warrants an accelerated response action.

The PA concluded that based upon historical operations and visual observations made at the site, MEC and MC were confirmed at two discrete locations at the site. Due to the observation of multiple areas of thermally treated munitions scrap at the site, it is possible that similar areas of munitions scrap may be present. Therefore, MEC and MC are suspected to be present at other locations within the site.

2.4 PHYSICAL SETTING

The general topography of the mainland areas of Nueces County around Corpus Christi Bay can be described as a low-lying coastal area consisting of flat coastal prairies, chaparral pastures, and farmland. Elevations range between 15 and 30 feet above mean sea level (MSL). The topographic profile of NALF Cabaniss is generally flat with a mean elevation of 30 feet above MSL, with some steep downward slopes near Oso Creek.

The climate at NALF Cabaniss is a moderate to semi-tropical marine climate with hot, humid, breezy summers and mild winters. The wind direction is predominantly from the southeast during the warmer months and from the northwest and north during periods of higher pressure and cold fronts during cooler

months. Average low and high temperatures are 42 degrees Fahrenheit (°F) (January) and 86°F (July), respectively. The number of clear days averages 114 days per year. Annually, there are more than 100 days of high temperatures of 90°F or higher and fewer than seven days of low temperatures at or below 32°F. Annual rainfall average is 34 inches.

The coastal plain of the Corpus Christi area is underlain by Pleistocene river, delta, and shoreline sediments deposited during the interglacial periods. NALF Cabaniss is underlain by the Beaumont Formation, characterized by barrier islands and beach deposits composed of fine grained sands. Numerous pimple mounds and poorly defined relic beach ridges characterize the land surface. Locally active sand dunes are present in undisturbed areas. The barrier island and beach deposits of the Beaumont Formation are typically less than 60 feet thick. Other stratigraphic units, in order of increasing age, include the Montgomery Formation, Lissie Formation, Willis Formation, and the Goliad Sand.

NALF Cabaniss is underlain by Victorian Association soils. The Victoria series soils are dark, clayey sand, calcareous, crumbly soils that are referred to as blackland. These soils are deep, nearly level, and have developed over clayey materials of the coastal terrace. The soils exhibit very slow internal drainage when wet and crack to depths of several feet when dry. Surface drainage from these soils flows into Oso Creek to the south of the installation.

Vegetation in the NALF Cabaniss area consists primarily of tall grasses and copses of shrubs, trees, and other low-lying vegetation. Original vegetation at the site likely consisted of mid- to tall grass in prairie grassland with minimal tree coverage. However, agricultural use and later development of the installation have left no native grasslands and natural vegetation; only disturbance-related species remain.

Freshwater and brackish water jurisdictional wetlands have been delineated at NALF Cabaniss, primarily concentrated at the southern end of the installation along Oso Creek. The wetlands at NALF Cabaniss cover a total area of 28.2 acres.

Surface water resources at NALF Cabaniss include open drainage ditches, which drain south and southeast into Oso Creek. The eastern-most drainage ditch intersects the Skeet and Pistol Range near the former locations of the armory and trap arcs. An abandoned drainage ditch was present west of the former range, but does not currently contain water. An unnamed pond associated with the former Sewage Disposal Plant is present 100 feet southeast of the NALF Cabaniss property.

The average depth to groundwater at NALF Cabaniss is six feet below ground surface (bgs). The site is underlain by low permeability clays, which cause the majority of precipitation to run-off with only a small percentage recharging the groundwater. The water table aquifer (six to 250 feet bgs) is predominantly

sandy material overlying a clay zone with low permeability. Regional groundwater flow in the Corpus Christi area is to the northeast; local flow paths at NALF Cabaniss are unknown. Artesian aquifers located 250 to 2,800 feet bgs in the Corpus Christi area are moderately to highly saline and, therefore, have limited potential use. Therefore, potable water for the NALF Cabaniss and the City of Corpus Christi is supplied from Lake Corpus Christi, 38 miles to the northwest.

3.0 AREA OF INVESTIGATION

The following sections provide a brief description of the area of concern at NALF Cabaniss. Information presented in this section is based on the following document:

"Final Preliminary Assessment, Naval Auxiliary Landing Field Cabaniss, Texas", Malcolm Pirnie, Inc., April 2005.

More information on the Incinerator Disposal Site can be found in the Emergency Response MEC WP, TtNUS (2007), under separate cover.

3.1 INCINERATOR DISPOSAL SITE

The Incinerator Disposal Site was located in the southern portion of the installation, 750 feet southwest of the eastern end of Runway 31 and bounded to the south by Oso Creek (Figure 1-1). Perimeter Road runs along the western and northern boundary of the site. The site is covered in dense vegetation, with open sections of wetlands on the south end near Oso Creek. The site was a former sanitary landfill that also contained a boiler used to incinerate confiscated drug material, small arms, and ordnance items. Though its exact dimensions are unknown, the site may have occupied approximately 17 acres.

NAAS Cabaniss station records from the 1940s indicate the presence of an armory next to the Skeet and Pistol Range and a small arms magazine in the northeast quadrant of the installation, east of the barracks. Based on the historical use of the range, the armory likely stored only small arms ammunition (e.g., 12-, 16-, and 20-gage and .410 caliber shot, .22 caliber, .38 caliber, .45 caliber, 9-millimeter [mm]). The armory associated with the Skeet and Pistol Range is no longer present at the installation, and the date of decommissioning is not known. The former small arms magazine remains in place in an open field east of a drainage canal on property no longer owned by the installation. During the April 2004 site visit, the data collection team visually inspected the building, which was locked and appeared to be empty.

A February 1984 Initial Assessment Study (IAS) for the Naval Energy and Environmental Support Activity indicated an aircraft de-arming area at the end of Runway 31 near the taxiway. The report indicates that the area was used to de-arm aircraft returning from training missions through the 1970s. No ordnance was disposed at this site; only munitions de-arming and transfer activities took place. This area is no longer used for de-arming operations. The same assessment study identified the Incinerator Disposal Site, located in a former sanitary landfill southwest of Runway 31, which was used to incinerate small

arms and ordnance items. The ultimate disposition of the ash and debris generated from the burning operations is not known.

There are no currently operating ordnance/munitions storage facilities at NALF Cabaniss.

Information regarding the Incinerator Disposal Site is generally limited. However, visual evidence at the Incinerator Disposal Site indicated the presence of munitions scrap.

The site was identified as a result of interviews and document reviews performed during the PA. Deputy Fire Chief Gonzalez indicated during the first site visit that munitions had been buried in or near an old sanitary landfill at NALF Cabaniss; fire crews working in the area were instructed to exercise caution when operating in these areas. He provided a map showing the general location of the landfill, but was not aware of the specific burial locations. Later, a review of the IAS for NASCC and the OLFs indicated that the Army had used an eight-foot long by five-foot diameter boiler for the incineration of “small ordnance items”, including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and “possibly 80 mm rockets” (likely 2.75-inch rockets) at a six-acre sanitary landfill facility.

The City of Corpus Christi also burned confiscated drug material in the boiler. The site was located in the same area indicated by Assistant Chief Gonzalez. The report concluded that operations at the site ceased by 1980 and that “burned remains of ordnance cover an area less than 200 square feet”. No confirmation study of the site was recommended in the IAS, “since only innocuous materials were disposed at this site and only limited residual was generated from ordnance burning”. This area of investigation was assumed to be approximately 17 acres (the approximate size of the former sanitary landfill) due to the unknown location of the boiler and the intent to investigate the boundaries of the former landfill. The boiler is located on the northern portion of the site, approximately 170 feet south of Perimeter Road in dense vegetation.

No property records were found describing the opening, operations, closure, or demolition of the sanitary landfill or incineration site. The period of use of the area for munitions incineration is unknown. A review of aerial photography for the area indicates the area of the site was disturbed as early as 1942, and an area was identified as “sanitary fill” as early as 1958 on the Master Shore Station Development Plan. No aerials or plans were available for the period during which the boiler was used. The site is not currently used for any military purpose, and the area is covered in dense vegetation. Land use in the area is designated as open space. Land use is not expected to change.

3.1.1 Visual Surveys at the Incinerator Disposal Site

During the visual survey performed as part of the PA, a magnetometer was used to surface sweep the walked area for ordnance avoidance purposes. The field team attempted to walk the perimeter of the site boundary, followed by transects across the middle of the site in an effort to locate the boiler and visually survey the maximum possible amount of interior area of the site. The dense trees and shrubs made passage through the area difficult. The visual survey for the Incinerator Disposal Site resulted in approximately 20 percent walked coverage and approximately 60 percent visual coverage of the former site. During the site walk, the following conditions were noted:

- The installation fence line along Perimeter Road near the site boundary was down.
- The Perimeter Road was covered in mid-sized grasses up to three feet in height.
- The area east and south of Perimeter Road and the installation fence was covered with dense shrub thickets and trees. Shrub thickets reached heights of up to eight feet. Trees creating a closed canopy exceeded 20 feet in height.
- A wetland area containing tall grasses and shrubs was present on the southern end of the site, near the edge of Oso Creek.
- An old culvert (possibly associated with a former road) and stagnant water were observed in the northeastern corner of the Incinerator Disposal Site, in dense vegetation.
- A metal ladder structure was located approximately 70 feet south of Perimeter Road in dense vegetation.
- The boiler was located approximately 100 feet south of the metal ladder, also in dense vegetation. The boiler was of cylindrical shape and contained a chimney structure extending out of the top with an opening at the end. The interior and exterior of the boiler were corroded. The boiler was found lying on its side with a large hole with jagged edges in the bottom.
- Some trees surrounding the boiler were charred on the trunk and on some low-hanging branches.

- Thermally treated munitions scrap was observed inside the boiler, as well as on the ground surface surrounding the boiler. These items included:

  - 7.62-mm small arms ammunition
  - 20-mm projectiles
  - 30-mm projectiles
  - 40-mm projectiles
  - 5-pound practice bombs
  - Flares/pyrotechnics (cartridge actuated device [CAD] and propellant actuated device [PAD])

- Thermally treated munitions scrap was also observed on the ground surface along the fence and tree line approximately 10 feet from Perimeter Road in an area approximately 450 feet west of the boiler. A significant number of metallic anomalies were detected using a magnetometer along Perimeter Road in this area. The specific munitions items observed at this location included:

  - 20-mm projectiles
  - 5-pound practice bombs
  - 2.75-inch rockets

- The site is currently not in use and has no military purpose.

An inspection of the metal ladder structure north of the boiler could not determine the function of the item; it may be excess military property that was deposited in the area. The boiler was found on its side with a large hole in the bottom, suggesting a possible explosion may have occurred within the boiler during incineration activities. Trunks and branches of trees surrounding the boiler were observed to be charred. If the structural damage to the boiler was caused by an explosion, it is possible the nearby trees were burned as a result.

Thermally treated munitions scrap was also observed on the ground surface along the downed installation fence and tree line approximately 10 feet from Perimeter Road, in an area approximately 450 feet west of the boiler. It is not known why these items are located at this distance from the boiler. The munitions scrap included thermally treated 20-mm projectiles, 5-pound practice bombs, and 2.75-inch rockets. One 20-mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed (in the judgment of the Unexploded Ordnance [UXO] Technicians present). A magnetometer used during the site walk for avoidance purposes indicated several metallic anomalies along Perimeter Road. The anomalies may indicate the presence of buried metallic items beneath the grass road.

Non-hazardous munitions scrap, including thermally treated rocket base plates and fins, were observed at the site. Rocket base plates were observed within the boiler. Rocket fins were observed in the group of munitions scrap near Perimeter Road. The presence of the split 20-mm projectile containing Explosive D compound indicates that MEC are present at the Incinerator Disposal Site. Additionally, the presence of munitions scrap suggests that other MEC may be present at the site.

Based on the information obtained during the data collection process (e.g., interviews, records search) and observations made during the visual survey, no special consideration munitions are known or suspected to have been used at the site. Therefore, the Incinerator Disposal Site is not suspected to contain items such as chemical warfare materiel filled munitions, electrically-fuzzed munitions, or depleted uranium associated munitions.

TtNUS performed a site walk on June 21, 2006, to support this site investigation, MEC WP effort. The known MEC areas were located and the general site conditions noted for project planning purposes.

3.1.2 Known or Suspected MEC Areas

The Incinerator Disposal site has been subdivided and categorized into one of three levels of MEC presence including: known MEC areas, suspect MEC areas, and areas where no evidence exists to indicate that MEC are present or suspected.

MEC were confirmed in both the boiler location and the ground surface just off Perimeter Road and the installation fence line, as shown in Figure 3-1. The total combined acreage of these areas is approximately 0.4 acres.

The Initial Assessment Study of February 1984 identified IR Site 11, Cabaniss Sanitary Landfill, which was located near the south end of Runway 31 at NALF Cabaniss. The landfill covers approximately six acres and was primarily used for disposal of sanitary wastes generated at NALF Cabaniss. The landfill also received debris disposed of by the City of Corpus Christi resulting from Hurricane Celia. In addition to sanitary waste, the City of Corpus Christi and the Army used a portion of the site until approximately 1980 for incineration of confiscated drug material and burning small ordnance. A boiler, eight feet long by five-feet in diameter, was located at the site and modified to handle burning of 30 and 50 caliber ammunition, old flares, explosive cartridges from ejection seats and possibly 80 mm rockets. At some point during repair of the Patrol Road, the boiler was pushed over the bank toward Oso Creek. The site affected by incineration operations covered less than 200 square feet. Only small quantities of non-hazardous ash were generated from the boiler operations.

Since no hazardous materials were reportedly disposed at this site and only limited ordnance burning operations were conducted and little residual generated, no confirmation study was recommended for this site in the IAS. Due to the recommendations of the IAS, there is no remaining work planned for the landfill portion of this site. However, the work programmed under the Munitions Response Program should cover the portion of the site where incineration activities occurred.

Very little else is known about the operation of the Incinerator Disposal Site, including period of operation, frequency of incineration of munitions items, potential for buried or abandoned munitions items, and whether any closure activities were performed. Additionally, there is uncertainty as to how the group of thermally treated munitions scrap reached the area just off of Perimeter Road, a distance of 450 feet. The immediate areas surrounding the two locations of munitions scrap and the land between both locations are suspected to contain MEC, due to the finding of MEC in the area and the unknown operations of the site. The total acreage suspected to contain MEC is approximately three acres (see Figure 3-1).

3.1.3 Areas Not Suspected to Contain MEC

Based on available documents, conversations with NASCC Environmental Division personnel, and the site walk of the 17-acre area, it was concluded that no areas other than the boiler location, the ground surface just off Perimeter Road, and the land between these two locations were suspected to contain MEC.

A SI will be conducted to determine the presence and nature of soil and surface water contamination present at the former Incinerator Disposal Site. The SI will consist of the collection and laboratory analysis of soil, surface water and sediment samples; land surveying of sample locations; and reporting of results.

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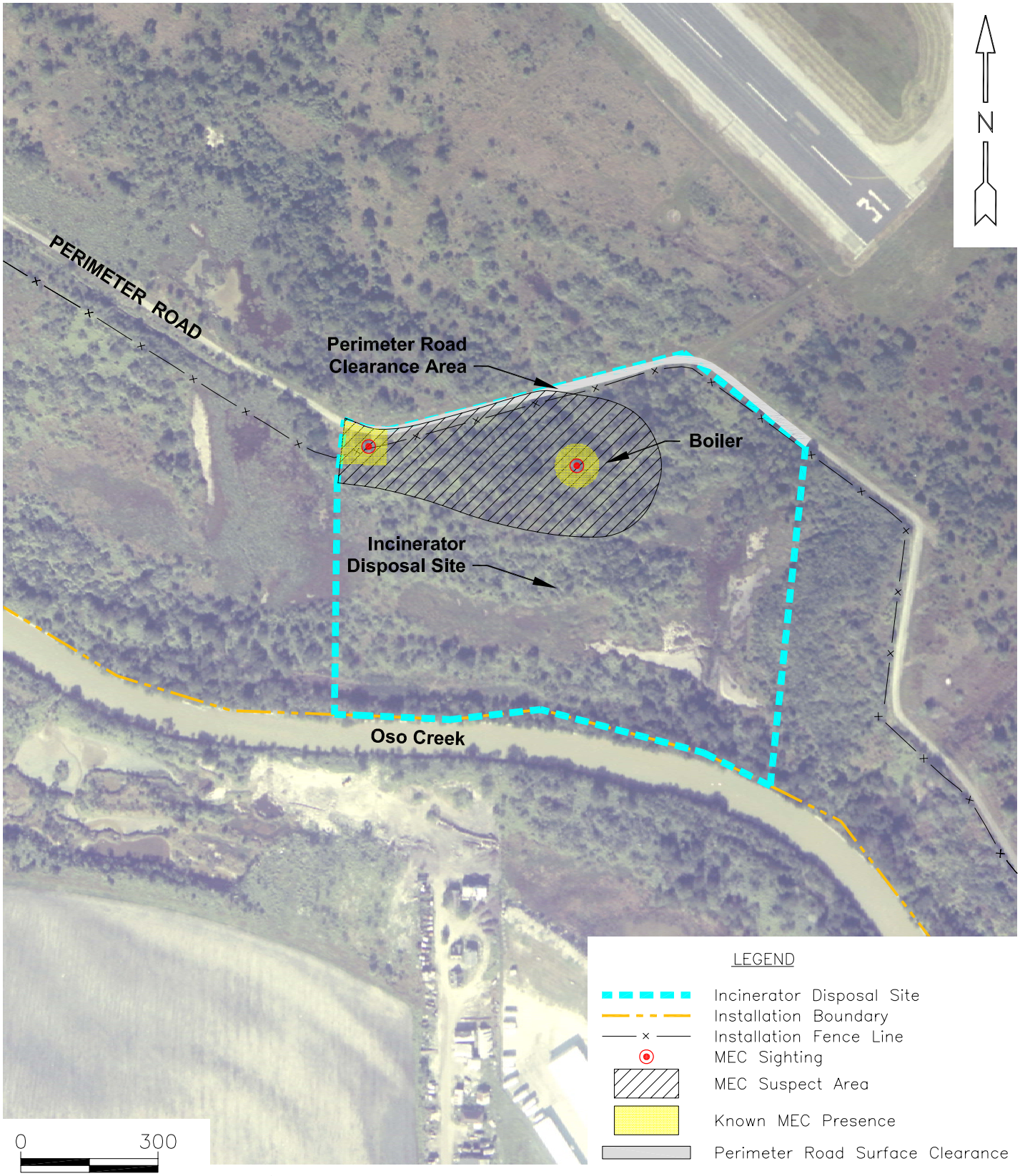

LEGEND

- Incinerator Disposal Site
- Installation Boundary
- Installation Fence Line
- MEC Sighting
- MEC Suspect Area
- Known MEC Presence
- Perimeter Road Surface Clearance

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF	DATE 7/05/06	KNOWN MEC LOCATIONS INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB	DATE 7/05/06		OWNER NO. 0023
REVISED BY --	DATE ------		APPROVED BY / DATE
SCALE AS NOTED	NAVFAC		DRAWING NO. FIGURE 3-1 / REV. 0

4.0 REGULATORY CRITERIA

The SI falls under the Defense Environmental Restoration Program (DERP). The SI will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121; Executive Order 12580; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Analytical results of soil, surface water and sediment samples will be compared to Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Residential or Industrial/Commercial Protective Concentration Levels (PCLs). Under the TRRP regulations, the Tier 1 PCLs are designed to be protective of human health. These PCLs represent the concentration of a chemical of concern (COC) that can remain within the source medium and not result in levels that exceed the applicable human health risk-based exposure limit or ecological protective concentration level at the point of exposure for that exposure pathway. The Critical PCL (c-PCL) is defined as the lowest PCL for a COC within a source medium determined from all of the applicable human health exposure pathways.

Analytical results will be reported as required by NAVY policy and will comply with TRRP guidelines in accordance with 30 Texas Administration Code (TAC) 350 (see RG-366/TRRP-13).

Evaluation of analytical results to TRRP Tier 2 or Tier 3 PCLs or completion of a Tier 1 Ecological Checklist is not included in the Statement of Work (SOW) for this SI. Preparation of an Affected Property Assessment Report (APAR) is not included in the SOW for this SI.

5.0 CONCEPTUAL SITE MODEL

The following sections describe the conceptual site model (CSM) for the Incinerator Disposal Site and NALF Cabaniss. This information was obtained from the PA (Malcolm Pirnie, 2005). For more detailed information of the development if the CSM, refer to the PA.

As stated in Section 4.0, analytical results from the Incinerator Disposal Site will be compared to TRRP Tier 1 Residential PCLs. If analytical results exceed the respective Tier 1 PCL values, calculation of Tier 2 or Tier 3 PCL values may be warranted. A risk characterization (i.e., Tier 2 or Tier 3) is not included in the SOW for this SI. The following sections present the results of the initial CSM.

5.1 CSM DESCRIPTION

The Conceptual Site Model (CSM) was developed following guidance documents issued by the United States Environmental Protection Agency (USEPA) for hazardous waste sites and the United States Army Corps of Engineers (USACE) for ordnance and explosives (OE) sites. Guidance documents included the USACE's Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA/540/G-89/004) and the USACE CSM Guidance Development of Integrated Conceptual Site Models for Environmental Ordnance and Explosives (OE) Sites (February 2003).

The CSM is a description of the site and its environment based on existing knowledge. The CSM shows the possible sources of contaminants, illustrates possible pathways (or release mechanisms) to various receptors, and shows which receptors may potentially be affected by exposure to contaminants. In the development of the CSM, the full spectrum of possible pathways by which exposure to contaminants is theoretically possible was reduced to only those pathways which had a reasonable potential for occurrence or would result in a relatively consequential degree of exposure. For example, although it is possible to have direct contact with an organism impacted by site contaminants as a result of bio-uptake, the more likely consequential exposure route (i.e., risk) to humans by affected organisms would be ingestion of the impacted organisms.

The CSM describes the site and its environmental setting. The CSM presents information regarding: 1) MEC and/or MC known or suspected to be at the site; 2) current and future reasonably anticipated or proposed uses of the real property; and 3) actual, potentially complete, or incomplete exposure pathways that link them. The CSM is the basis for the risk evaluation, prioritization, and remediation cost estimate.

The CSM is presented in a series of information profiles that presents information about the site. The information profiles are included in Section 5.2.1 below.

5.2 PROFILE INFORMATION

Several types of information are relevant in preparing a CSM. Generally speaking, the information can be categorized into five "profile" types. These profile types include:

- Facility Profile – describes man-made features and potential sources at or near the site;
- Munitions/Release Profile – describes the movement and extent of the contaminant in the environment;
- Physical Profile – describes factors that may affect release, fate and transport, and access;
- Land Use and Exposure Profile – provides information used to identify and evaluate the applicable exposure scenarios, receptors, and receptor locations; and
- Ecological Profile – describes the natural habitat of the site and ecological receptors in those areas.

Information gathered from the profiles will be used to conduct a preliminary risk evaluation (i.e., pathway analysis for source-receptor interactions).

5.2.1 Site Profile

The former Incinerator Disposal Site is located on NALF Cabaniss, Corpus Christi, Nueces County, Texas. The Incinerator Disposal Site was located on the southern side of NALF Cabaniss and west of the former Skeet and Pistol Range. The site is approximately 17 acres in area and located approximately 750 feet southwest of Runway 31 and bounded to the south by Oso Creek.

The area where the Incinerator Disposal Site was located was not developed or used prior to construction of NALF Cabaniss in 1941. Following construction of the station in July 1941, Naval aviation cadets used the station for intermediate and advanced flight training. The site served as a sanitary landfill beginning in the 1950s. The landfill also received debris disposed by the City of Corpus Christi resulting from Hurricane Celia in 1970. Until 1980, the city of Corpus Christi and the Army used an eight-foot long five-foot diameter boiler for burning confiscated drug material and ordnance items. The site has no current military use.

The boiler was located on the northern portion of the site. The boiler and a metal ladder structure remain at the site. Neither is in an upright position, and the boiler has a hole in the bottom. A culvert (possibly associated with a former road) was observed in the northeastern corner of the Incinerator Disposal Site.

The site is bounded on the north by the Perimeter Road. Further north, a field with some pockets of dense vegetation separates Perimeter Road and Runway 31. To the south the site is bounded by Oso Creek; and beyond the creek lies a private industrial site. Continuous vegetation, including dense trees, is located on the eastern side of the site, and beyond the vegetation lays Perimeter Road and the former Skeet and Pistol Range. The site is bounded on the west by continuous vegetation, including wetlands.

NALF Cabaniss is fenced on the north, east, and west, with locked gates. The southern boundary is Oso Creek. Sections of the southern fence, which acts as the northern boundary of the site, are down. The most recent Master Plan includes the construction of a new fence surrounding NALF Cabaniss. Several times a day security personnel patrol Perimeter Road north of the site, by vehicle. However, as the site is in an unused portion of the installation, contains dense vegetation, and is not separately fenced, it is possible that trespassers could gain entry to the area.

5.2.2 Munitions Release Profile

The types of munitions that were thermally treated at the site include small arms, projectiles, practice bombs, flares, pyrotechnics and other small ordnance, such as: 7.62-mm small arms ammunition, 5-pound practice bombs, 2.75-inch rockets, 20-mm projectiles, 30-mm projectiles, 40-mm projectiles, Flares/pyrotechnics (PAD/CAD). During the PA, one 20-mm projectile appeared to be split open with Explosive D compound exposed, thus confirming the presence of MEC.

All munitions scrap observed were found on the surface. If an explosion occurred within the boiler during incineration operations, it is possible that ordnance items were thrown from the boiler and were deposited on the surface hundreds of feet from the boiler. As ordnance items were not fired or dropped at the site, a maximum penetration depth of six inches is expected. Maintenance activities (routine mowing) at Perimeter Road may have resulted in movement/redeposition of munitions scrap, MEC, or MC in the top one foot of soil.. However, based on the known prior use of the site as a landfill, it is also possible that residual ash, munitions scrap, or MEC were buried in the subsurface at the site.

Thermally treated munitions scrap was found in two separate areas: in and around the boiler and in an area approximately 450 feet west of the boiler just off of Perimeter Road. Approximately one-third of the boiler was filled with thermally treated munitions scrap. Munitions scrap was also observed in the area immediately surrounding the boiler. The area off of Perimeter Road had visible munitions scrap and fragments on and just below the surface. The area contained ten distinctive munitions scrap items within an approximately 100 square foot area. Numerous metallic anomalies were also detected on Perimeter Road north of this area. Munitions scrap included the items listed above, in addition to rocket base plates and fins.

While a number of specific munitions types were identified during the visual survey, other types of munitions could be present at the site. Therefore, a number of different MCs could be present. Based on this uncertainty, the primary MC of concern at this site could include: ammonium perchlorate, white phosphorus, black powder, Target Compound List (TCL) explosives, Target Analyte List (TAL) metals and polyaromatic hydrocarbons (PAH's).

Other possible MC of secondary concern may include: red phosphorus, PBXN-5 (Plastic-Bonded Molding Powder), zirconium, titanium, tungsten, boron, hexachlorobenzene, hexachloroethane, chlorates, chromates, dichromates, halocarbons, iodates, nitrates, and oxides (pyrotechnics); diphenylamine, ethyl centralite, n-nitroso-diphenylamine, nitrocellulose, nitroglycerine, nitroguanidine, and phthalates (gun propellants); and lead azide, lead styphnate, mercury fulminate, tetrazene, and diazodinitrophenol (primary explosives). Sampling of surface soils and groundwater at the site has not occurred.

Migration of MEC/MC may occur naturally through surface soil erosion or by human activities, including mowing. Exposed MC could be carried by surface runoff into Oso Creek. MC could also potentially leach slowly through soils to groundwater; however, the rate of infiltration through the soils would be limited due to the low permeability of the clayey soils. Future construction, excavation, and maintenance at the site could also be release mechanisms.

5.2.3 Physical Profile

The physical profile includes factors that affect fate and transport of the contaminants identified (e.g., soil type, surface water and groundwater characteristics, topography, etc.).

Climate

Corpus Christi is moderate to semi-tropical marine climate with hot, humid, breezy summers and mild winters. Average low and high temperatures are 42°F (January) and 86°F (July), respectively. Cold fronts, periodic thunderstorms, and hurricanes influence rainfall, which averages 34 inches annually.

Topography

The region is a low-lying coastal area with elevations between 15 and 30 feet above MSL. The site topography varies from flat near Perimeter Road to steep in areas near concrete disposal areas in the center and eastern sides of the former landfill. The site slopes steeply to the south near the center of the landfill and levels out near mud flats located 180 feet north of Oso Creek.

Geology

NALF Cabaniss is underlain by the Beaumont Formation, characterized by barrier islands and beach deposits composed of fine-grained sands. Numerous pimple mounds and poorly defined relic beach ridges characterize the land surface. Locally active sand dunes are present in undisturbed areas. The barrier island and beach deposits of the Beaumont Formation are typically less than 60 feet thick. Other stratigraphic units, in order of increasing age, include the Montgomery Formation, Lissie Formation, Willis Formation, and the Goliand Sand.

Soil

The Incinerator Disposal Site is underlain by Victorian Association soils. The Victoria series soils are dark, clayey sand, calcareous, crumbly soils that are referred to as blackland. These soils are deep, nearly level, and have developed over clayey materials of the coastal terrace. The soils exhibit very slow internal drainage when wet and crack to depths of several feet when dry.

Hydrogeology

The depth to groundwater at the site is not known, although groundwater in the area can be present approximately six feet bgs. The water table aquifer (six to 250 feet bgs) in the Corpus Christi region is predominantly sandy material overlying a clay zone with low permeability. Regional groundwater flow is to the northeast, although local flow paths near the Incinerator Disposal Site are unknown. The low permeability clays underlying NALF Cabaniss cause the majority of precipitation to run-off with only a small percentage recharging the shallow groundwater. Artesian aquifers underlying NALF Cabaniss (250 to 2,800 feet bgs) are moderately to highly saline and, therefore, have limited potential use. Potable water for the installation is supplied from Lake Corpus Christi, 38 miles to the northwest.

Hydrology

Oso Creek is the largest surface water body in the immediate area and lies directly south of NALF Cabaniss and the Incinerator Disposal Site. Rainfall at NALF Cabaniss is generally collected in storm drains and open drainage canals, which drain south and southeast into Oso Creek. The creek is approximately 85 feet wide with variable depth. An old culvert (possibly associated with a former road) and stagnant water were observed in the northeastern corner of the Incinerator Disposal Site. Runoff from the Incinerator Disposal Site drains south into a wetlands area and into Oso Creek.

Vegetation and Wetland Areas

The Perimeter Road and nearby areas are covered in tall grasses up to three feet in height. The area beyond Perimeter Road and the down fence line is a densely vegetated area dominated by trees exceeding 20 feet in height. Jurisdictional wetlands are present south and southeast of the boiler and west of the munitions scrap on Perimeter Road. These wetlands are considered ecologically sensitive areas.

5.2.4 Land Use and Exposure Profile

The Incinerator Disposal Site is closed and no longer in use. The land in the immediate vicinity of the site has no current use and is designated as open space. Land directly north of the site is used for airway operations (runways, radar towers).

Current activities at the site are limited to periodic non-intrusive maintenance (mowing) along Perimeter Road, security patrols conducted along Perimeter Road, and occasional wildlife and wetland surveys. No change in land use related activities are planned at the Incinerator Disposal Site.

Current and potential future human receptors include Navy personnel, including security personnel patrolling the area and Public Works personnel conducting environmental/ecological surveys; contractors performing grounds maintenance (mowing and vegetation removal); trespassers accessing the area; and visitors, including civilians fishing and swimming in Oso Creek to the south.

Potential future land use-related activities include the repair of the fence line surrounding NALF Cabaniss. According to the most recent Master Plan, the fence line is scheduled to be repaired in the future. Installation of a new fence could lead to intrusive activities near the munitions scrap located just off of Perimeter Road. If MEC are present in that location or in other areas along the old fence line near Perimeter Road, an explosive hazard could exist for construction workers. Likewise, if a fence is to be installed around the boiler area to restrict access to the site, then an explosive hazard for the fence installation could exist for construction workers.

NASCC is home to a combined workforce of approximately 4,430 military personnel and 8,060 civilian and contractor personnel. The only personnel utilized at NALF Cabaniss include Air Operations personnel in the control tower, Fire Department personnel, security personnel, and installation maintenance workers. Demographic data include the following from the U.S. Census:

- City of Corpus Christi:
  - Population (2000): 277,454
  - Population density (2000): 1,794 residents/square mile;

- Nueces County:
  - Population (2000): 313,645
  - opulation density (2000): 375 residents/square mile.

5.2.5 Ecological Profile

The Incinerator Disposal Site consists of densely vegetated areas of tall trees in the center of the site, with grasses and shrub thickets near Perimeter Road and south of the boiler area. The Honey Mesquite-Sugar Blackberry-Roosevelt Weed Woodland community is present at the site. This community is characterized as a deciduous woodland community. The jurisdictional wetlands on the southern end of the installation, some of which are found within the boundaries of the site, are considered ecologically sensitive areas. There are no federally listed threatened or endangered plant or animal species present at NALF Cabaniss or the Incinerator Disposal Area. The maritime pocket gopher, a species of concern at NASCC and NALF Waldron, is not present at NALF Cabaniss, due to the nature of the soils present (thick, clayey soils).

The current and anticipated future activities at the range (mowing) provide a low degree of disturbance of habitat and/or ecological receptors within the boundary of the Incinerator Disposal Site. The wetland areas are not likely disturbed by these activities.

There are no Federal endangered or threatened species at the site. There are also no State endangered species at the site. State threatened species known to inhabit the area include: Black Spotted Newt, South Texas Siren – large form, Sheep Frog, Texas Indigo Snake, Texas Tortoise, Scarlet Snake. Other ecological receptors include common fauna/flora such as large mammals (e.g., deer), small mammals, reptiles/amphibians, grassland birds, and fish in nearby surface waters.

Potential ecological receptors that may come into direct contact with MEC/MC are likely found in surface soil while foraging or burrowing. Receptors may also come into contact with MC that has been incorporated into the food chain (bio-accumulated in plants and small animals). MC may also be covered by present in sediments in Oso Creek

5.3 EXPOSURE PATHWAY ANALYSIS

A key element of the CSM is the exposure pathway analysis. For MEC, a complete or potentially complete exposure pathway must include the following components:

- A source (e.g., locations where MEC are expected to be found).
- Access (e.g., controlled or uncontrolled access, items on the surface or within the subsurface).

- An activity (e.g., non-intrusive grounds maintenance or intrusive construction).
- Receptors (e.g., Navy personnel, construction workers, recreational users or authorized visitors).

It is important to recognize that environmental mechanisms (e.g., erosion) and/or human intervention may result in the repositioning of MEC. For MC, a complete or potentially complete exposure pathway must include the following components:

- A source (e.g., locations where MC are expected to be found).
- An exposure medium (e.g., surface soil).
- An exposure route (e.g., dermal contact).
- Receptors (e.g., Navy personnel, construction workers, recreational users, or authorized visitors).

If the point of exposure is not at the same location as the source, the pathway may also include a release mechanism (e.g., volatilization) and a transport medium (e.g., air).

The potential interactions between the source and receptors are assessed differently between MEC and MC. For MC, interaction between the source and receptors involves a release mechanism for the MC, an exposure medium that contains the MC, and an exposure route that places the receptor into contact with the contaminated medium. For MEC, interaction between the potential receptors and an MEC source has two components. The receptor must have access to the source and must engage in some activity that results in contact with individual MEC items within the source area.

The presence of munitions scrap on the surface of the site and the known prior use of the site as a landfill indicate that the potential exists for MEC to be present in both surface and subsurface soil. Additionally, the 20-mm projectile found near Perimeter Road that appeared to contain exposed Explosive D compound confirms the presence of MEC at the site. Several exposure pathways to MEC are complete or potentially complete as shown on Figure 5-1. Complete pathways for MEC exposure are possible for Navy personnel (including security personnel conducting patrols along Perimeter Road and Public Works personnel conducting environmental/ecological surveys at the site). While these personnel are not constantly working in the areas suspected or known to contain MEC, operations may require them to enter the areas, thus establishing complete exposure pathways. However, the risk of MEC exposure to Navy personnel can be controlled by making personnel aware of the presence of MEC in the area.

Potentially complete pathways exist for contractors performing grounds maintenance (mowing and vegetation removal) near the site, and for trespassers who could potentially gain access to the site and move through the area. A complete pathway exists for ecological (biota) receptors that interact with MEC on the surface while digging or moving through the area. While the presence of MEC in subsurface soil is unconfirmed at this time,

the future installation of a new fence line surrounding NALF Cabaniss could represent intrusive operations performed by Navy personnel or contractors that could potentially disturb MEC. MEC are not suspected to be present in the surface water or sediments of Oso Creek.

Several exposure pathways for MC are potentially complete for various media at the Incinerator Disposal Site, as illustrated in Figure 5-2. Each media is described below.

Surface Soil

MC may be present in surface soil (0 – 2 feet) due to the presence of munitions scrap on the surface at the site. MC may have been mobilized by precipitation and migrated from the munitions items on the surface into the underlying soil. MC may also have been redistributed to other areas on or near the site by surface runoff generated by intense rainfall events. Potential receptors may include Navy personnel (such as security personnel patrolling the area near Perimeter Road and Public Works personnel conducting environmental or ecological surveys); contractors performing grounds maintenance (mowing and vegetation removal); and trespassers moving through the area. Ecological receptors (biota) may also contact (disturb, uncover, or remove) MC in surface soil at the site. Potentially complete exposure pathways exist for MC in surface soil through ingestion and dermal contact for both human and ecological receptors. Inhalation exposures are not anticipated due to the vegetative cover on the MC and the physical nature of the suspected MC at the site (e.g., do not contain volatile organic compounds). Surface soil also represents an exposure medium when considering plant/animal uptake for biota (including game such as deer). Ecological receptors may bio-accumulate the various types of MC that may be present at the site. Even though hunting is prohibited at NALF Cabaniss, human receptors consuming the affected biota are considered a potentially complete pathway, as trespassers could potentially enter the site to hunt due to the downed installation fence and remote area in which the site is located.

Subsurface Soil

Subsurface soil may represent an exposure medium due to MC from buried munitions scrap or due to migration from the surface into subsurface soil. It is possible that MC could be encountered by construction workers during installation of the new fence within the area containing munitions scrap, via the dermal, ingestion, and inhalation exposure routes. However, extensive exposure to MC is not anticipated as future large-scale use of the land is not anticipated. No buildings or other structures requiring extensive digging or earth moving operations are planned for this area.

Surface Water and Sediment

Surface runoff could carry MC from the site into the wetland areas to the south with eventual deposition into Oso Creek. Deposition of MC in Oso Creek sediments could provide routes of exposure for ecological receptors (uptake of MC in sediments by bottom-feeding fish) and human receptors ("visitors" fishing in Oso Creek and consuming fish that bio-accumulate MC). Additionally, potential receptors such as swimmers in Oso Creek could be exposed to MC via ingestion or dermal contact with surface water.

Groundwater

Groundwater impacts are not likely, as MC migration through the low permeability soils is likely limited. The shallow groundwater in the Corpus Christi area is typically moderately to high saline, and there are no known users of the shallow groundwater at the site and in nearby areas, eliminating groundwater dermal, ingestion, and inhalation exposures. While local groundwater flow patterns are unknown, it is likely that shallow groundwater beneath the site discharges into Oso Creek, where potential ecological and human receptors may be exposed. However, based on the nature of the soils, it is unlikely that contamination would migrate to groundwater, discharge to surface water, and subsequently be available to receptors. Therefore, groundwater exposure pathways are considered to be incomplete. The Incinerator Disposal Site was located on the southern end of the installation, north of Oso Creek. Two separate areas containing thermally treated munitions scrap were found at the site. Most of the munitions scrap was found within the overturned boiler structure or immediately adjacent to it in the north-central portion of the site.

Another section of munitions scrap was located next to Perimeter Road in the northwest corner of the site, including the MEC items. The site slopes steeply to the south near the center of the landfill and levels out near the mud flats on the eastern and southern ends of the site. Concrete debris is scattered in various areas across the site, including the area in which the boiler is located. Migration of MEC would occur through surface erosion caused by intense precipitation events. MC associated with munitions scrap could be present on surface soil at the two locations shown on the illustration. The major transport mechanism for MC at the range was surface runoff generated by precipitation events. MC likely migrated to down gradient surface soils and sediments and surface water in Oso Creek by surface runoff via direct runoff into the creek south of the site. Limited migration of MC may also have been occurred via infiltration through surface and subsurface soils, although this transport mechanism was likely limited by the slow drainage and low permeability of the underlying clay soils at the site. Once present in the creek, some MC could potentially partition to the aqueous phase and be subsequently transported by surface water flow. MC may also be covered in the sediments at the bottom of the creek.

5.4 SUMMARY

Based on the information presented in the PA and follow-on site visit by TtNUS, the Incinerator Disposal Site is located at a sanitary landfill in the southern portion of NALF Cabaniss. Incineration operations began at an unknown date and continued until approximately 1980. The city of Corpus Christi and the Army used an eight-foot long five-foot diameter boiler for the burning of confiscated drug material and ordnance items. There is no documentation describing maintenance, closure, or remediation activities that may have been performed at the site. Site reconnaissance indicated the presence of thermally treated munitions scrap inside and around the boiler, as well as on the ground surface in an area near Perimeter Road, 450 feet west of the boiler. One munitions scrap item appeared to contain exposed Explosive D compound, confirming the presence of MEC at the site. Based on historical operations and visual observations made at the site, MEC and MC are confirmed at these two discrete locations at the site. Due to the observation of multiple areas of thermally treated munitions scrap at the site, it is possible similar areas of munitions scrap may be present on the surface or potentially buried in the subsurface, as the site was once a sanitary landfill. Therefore, MEC and MC are suspected to be present at other locations within the site. The acreage of known MEC areas is approximately 0.4 acres, and the acreage suspected to contain MEC is approximately three acres. The site is not currently used for any military purpose. Security patrols are conducted periodically each day along Perimeter Road near the area of munitions scrap. Future use of the site is not expected to change.

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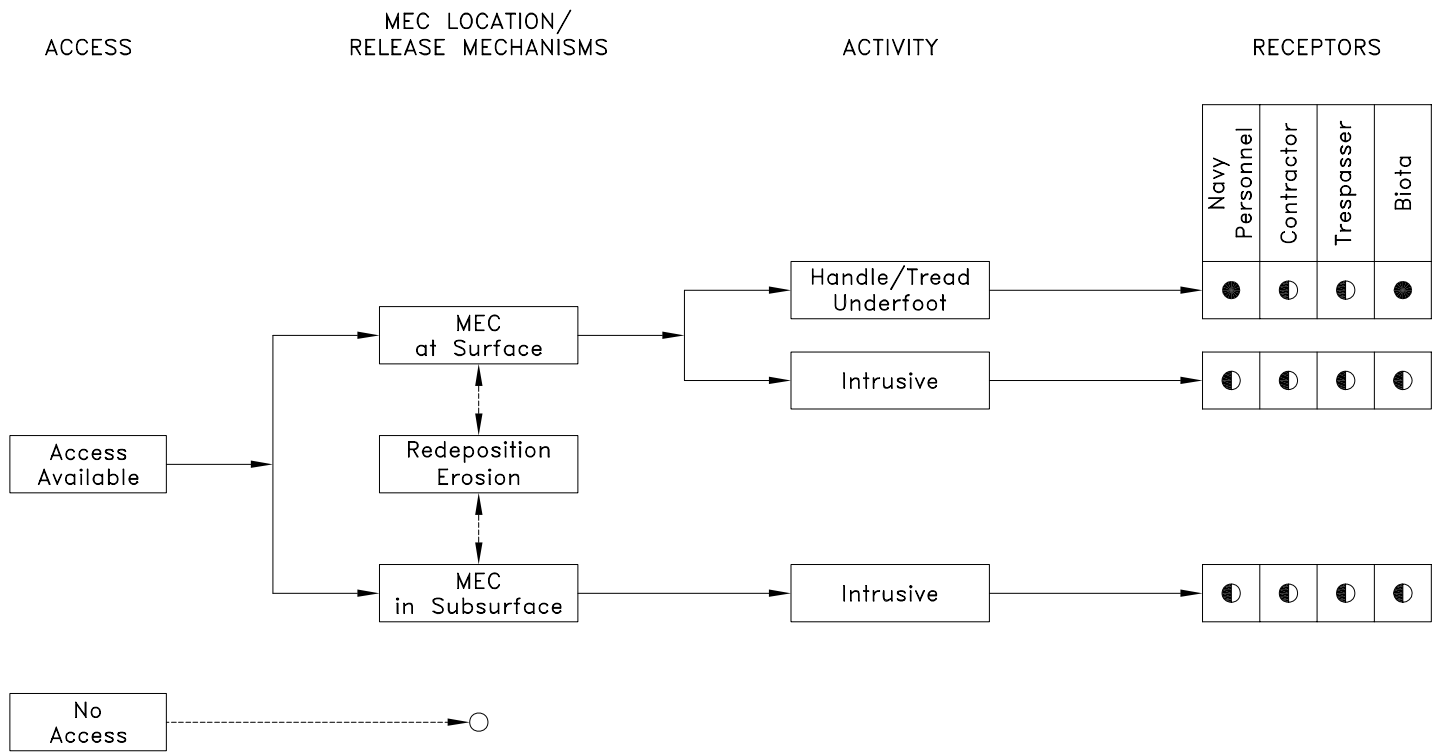

Reference: Malcolm Pirnie Preliminary Assessment, 2005.

LEGEND

- ● Complete Pathway
- ○ Incomplete Pathway
- ◐ Potentially Complete Pathway

DRAWN BY JF	DATE 10-25-06	CONCEPTUAL SITE MODEL MEC ACCESS EXPOSURE PATHWAY ANALYSIS INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 4283
CHECKED BY LB	DATE 10-25-06		OWNER NO. 0260
REVISED BY --	DATE ------		APPROVED BY / DATE
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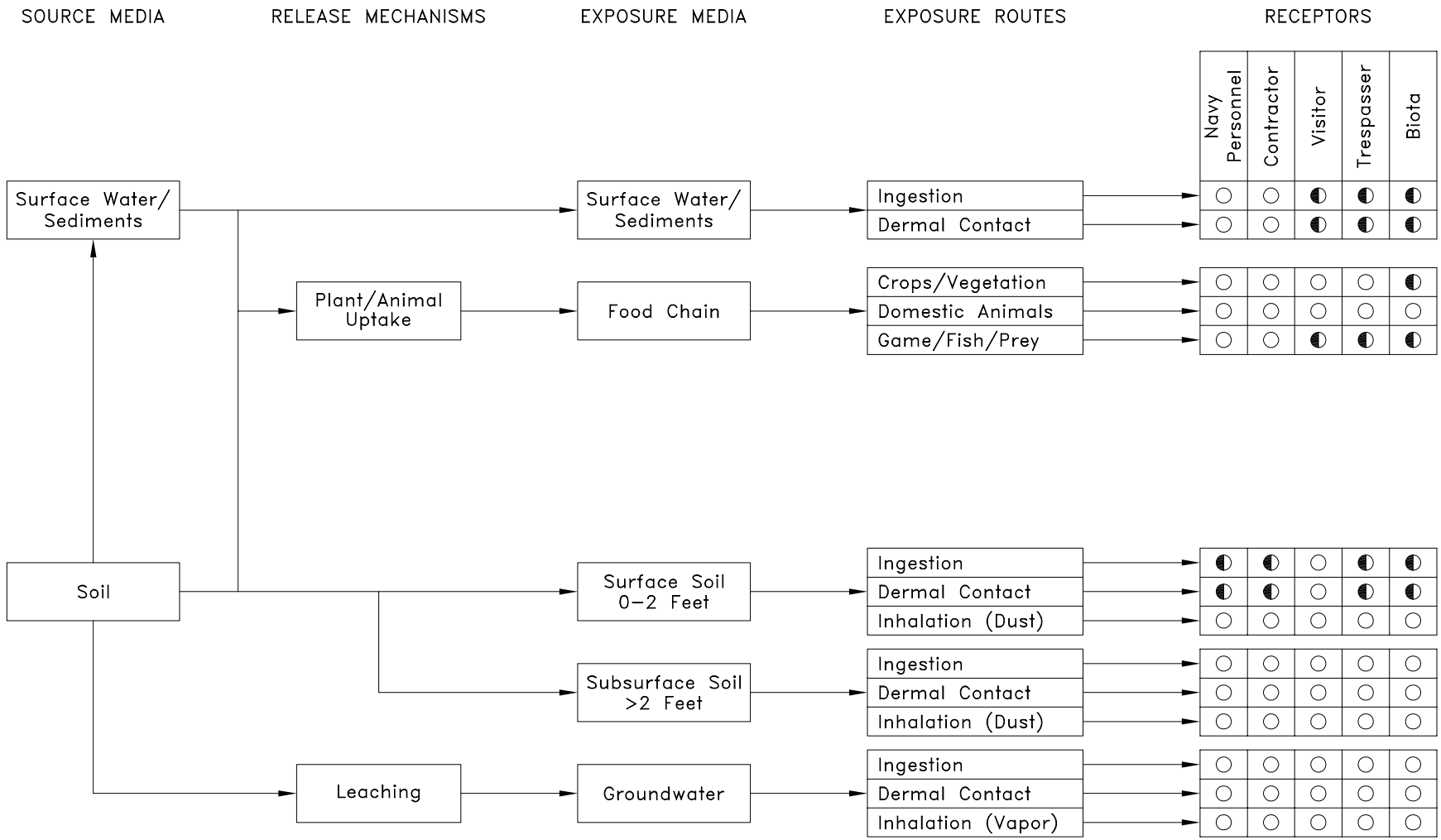

Reference: Malcolm Pirnie Preliminary Assessment, 2005.

LEGEND

- ● Complete Pathway
- ○ Incomplete Pathway
- ◐ Potentially Complete Pathway

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NAVFAC

CONCEPTUAL SITE MODEL
MC SOURCE MEDIA EXPOSURE PATHWAY ANALYSIS
INCINERATOR DISPOSAL SITE

NALF CABANISS, TEXAS

CONTRACT NO. 4283	
OWNER NO. 0260	
APPROVED BY	DATE
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6.0 INVESTIGATION OBJECTIVES AND ACTIVITIES

The following sections describe the objectives of the SI and describe the methodology by which they will be achieved. Additional specific details relating to each element of the investigation are provided in the SAP.

6.1 INVESTIGATION OBJECTIVES

Data collected during the SI will be used to meet the following objectives:

- Determine the presence and extent of MC contamination within soil, sediment, and surface water at the former Incinerator Disposal Site.
- Delineate the affected property boundaries of the site-specific COCs to TRRP Tier 1 Residential PCLs.
- Prepare a Site Investigation (SI) Report for submittal to the TCEQ.

The information necessary to achieve these objectives will be obtained in accordance with the investigation program described in the following sections. The program described is based on the NAVFAC SE SOW (dated April 19, 2006) and/or other guidance. A copy of the NAVFAC SE SOW is included as Attachment C.

The field activities to support the objectives of the NAVFAC SE SOW involve three phases, with specific goals for each phase:

Phase I - MEC Time Critical Removal Action/Detector-Aided Surface Sweep

- Complete a time critical removal action for safety at the known surface MEC sites to determine if further investigation is necessary.
- Provide sufficient data on surface MEC to assist in focusing further investigations (footprint reduction).
- Support other field activities (geophysical study and environmental sampling SI activities).

Phase II - Geophysical Study

- Determine if there is evidence of subsurface MEC that would warrant further investigation.

Phase III - Environmental Sampling (SI)

- Collect sufficient data to determine if off-site (Oso Creek) or on-site (Perimeter Road) receptors are protected from potential MC.

- Determine if surface soil and subsurface soil have been impacted by MC, and if further investigation is required.

- Determine if MC contamination migration from the boiler area has occurred.

Ammonium perchlorate, white phosphorus, black powder, Target Compound List (TCL) explosives, Target Analyte List (TAL) metals and PAH's (possibly present near the former boiler) are the primary MCs of concern at the Incinerator Disposal Site.

6.1.1 MEC Clearance

A time critical removal action activity and a UXO avoidance activity to support environmental sampling constitute the MEC clearance phase of the project. The time critical removal action will include a limited surface clearance of MEC to be conducted at the 17 acre Incinerator Disposal Site.

The time critical removal action will be completed along Perimeter Road to remove MEC hazards on the surface and allow Navy security patrols and ground keeping crews to operate safely in the area. The time critical removal action also includes the removal of hazards from known MEC items in the former boiler, and on the surface around the former boiler and at the known location 450 feet west of the boiler.

The UXO team will also conduct a limited surface sweep to collect data on the type and location of MEC at the remainder of the Incinerator Disposal Site area. No MEC will be moved or treated during this phase of the operation. This phase will be performed to the extent necessary to assist environmental field personnel in obtaining information to delineate boundaries of MEC, collect broad site information, assist environmental field personnel in the collection of samples from MC suspect areas, and to assess the risk/hazard posed by any surface MEC found at the site.

The MEC clearance activities are further detailed in the NALF Cabaniss Incinerator Disposal Site MEC WP (TtNUS, 2007), under separate cover.

6.1.2 Geophysical Study

The purpose of the Geophysical Study is to determine the location of subsurface anomalies identified as part of the surface sweep using geophysical methods, and determine if the anomalies are MEC.

The Geophysical Study activities are further detailed in Chapter 5 of the NALF Cabaniss Incinerator Site MEC WP (TtNUS, 2007), under separate cover.

6.1.3 Environmental Sampling

Environmental samples of soil, groundwater, surface water and sediment will be collected an analyzed to:

- Determine the presence and nature of MC contamination within soils at the former Incinerator Disposal Site.
- Determine the water quality classification of shallow groundwater at the former Incinerator Disposal Site.
- Determine the presence and nature of MC contamination within surface water (Oso Creek) at the former Incinerator Disposal Site.
- Determine the presence and nature of MC contamination within sediments (Oso Creek) at the former Incinerator Disposal Site.

Laboratory analyses of soil, surface water and sediment samples will confirm the presence or absence of MC at the former Incinerator Disposal Site. If MC is present, a Remedial Investigation (RI) and potentially a removal action may be necessary for MC at the site following the SI. Laboratory analyses of groundwater samples will be used to classify water quality the Incinerator Disposal Site.

The information necessary to achieve these objectives will be obtained in accordance with the investigatory program described in the FSP (see Attachment A.1) and other related WP documents.

The SI will consist of the drilling of soil borings, collection and laboratory analysis of surface and subsurface soil samples, installation of temporary groundwater monitoring wells, collection and laboratory

analysis of groundwater samples, collection and laboratory analysis of surface water and sediment samples, land surveying of sample locations and reporting of results.

6.2 PROJECT PLANNING

Project initiation followed issuance of the Notice to Proceed.

The project kick-off meeting was held at NASCC on June 21 through 23, 2006 and a site visit to the former Incinerator Disposal Site was conducted on June 21, 2006. Representatives from NAVFAC SE, NASCC, NALF Cabaniss, TCEQ and TtNUS met to review and discuss the proposed SI data quality objectives (DQOs), sampling approach, project organization, key party responsibilities, communication and reporting. Additionally, the type of work planned, the rationale for performing the work, the site history, previous investigations/reports, logistics, and site access were discussed. A copy of the project kick-off meeting summary and DQOs are included as Attachment C.

The following tasks have been completed prior to beginning the field activities for the SI:

- Review of existing data, investigations and reports.
- Development of a CSM.
- Preparation of a SI Work Plan, SAP and HASP.
- Preparation of MEC Work Plan.

Project planning will be considered complete when the SI WP is approved by NAVFAC SE and NASCC.

6.3 SPECIFIC FIELD INVESTIGATION ACTIVITIES

An overview of the field activities that will be performed as part of the SI at the former Incinerator Disposal Site is provided in the following subsections. The TRIAD approach has been used for project planning and field protocol development. The field investigation activities are generally described below and further detailed in the FSP.

6.3.1 Surface Water Sampling

Surface water samples will be collected from Oso Creek adjacent to the former Incinerator Disposal Site. Surface water samples will be collected to characterize present levels and the extent of site-related contaminants in the surface water.

Eight surface water samples will be collected adjacent to the site and two surface water background samples will be collected upstream of the site. Figure 6-1 depicts the proposed locations of the surface water samples.

Surface water samples will be analyzed for explosives, metals and perchlorate (see Table 6-1). The surface water sample locations will be recorded using a hand-held Global Positioning System (GPS) unit.

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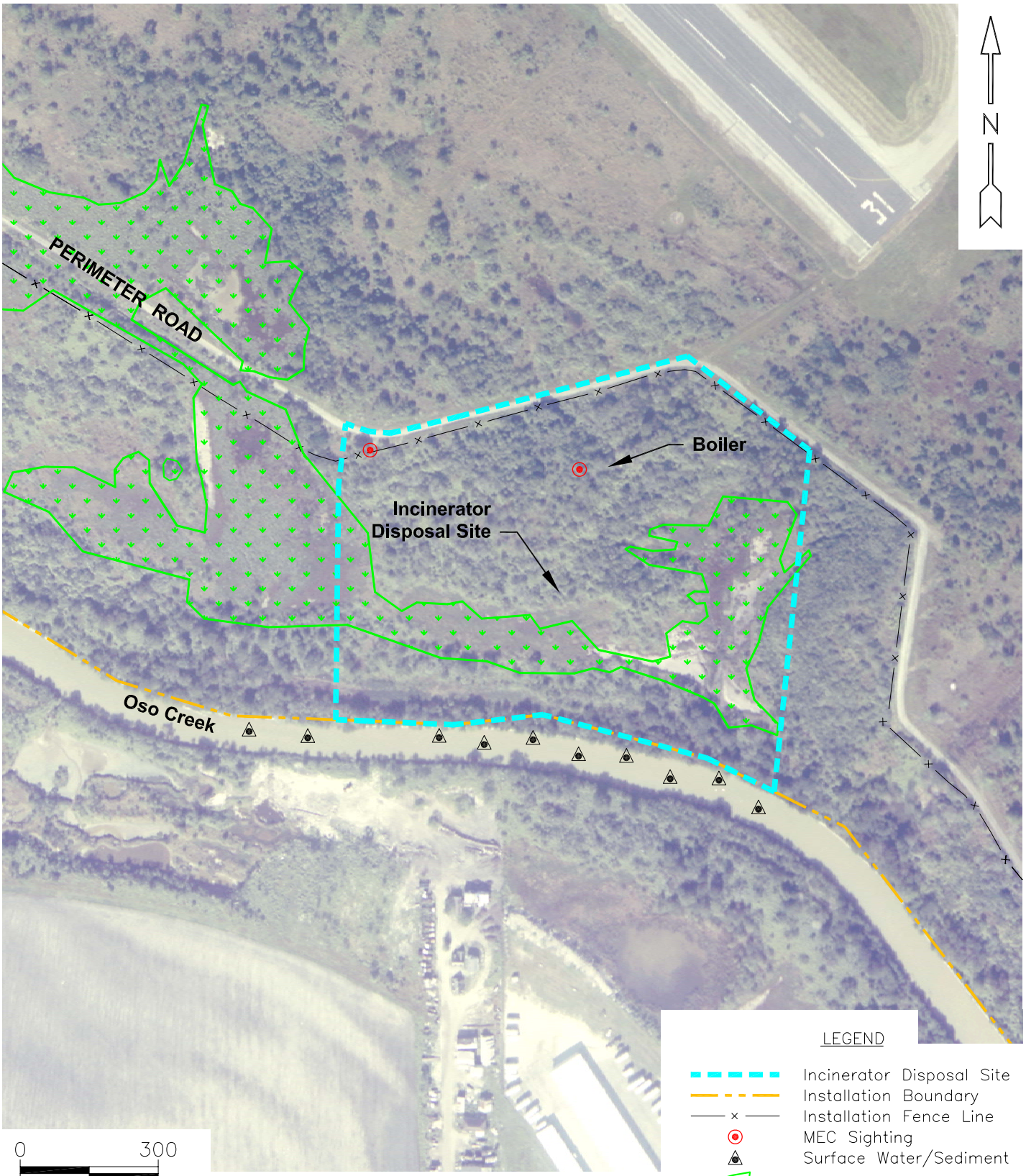

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF DATE 1/2/07		PROPOSED SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS INCINERATOR DISPOSAL SITE	CONTRACT NO. 0356
CHECKED BY BT DATE 1/2/07			OWNER NO. 0023
REVISED BY -- DATE ------		NALF CABANISS, TEXAS	APPROVED BY DATE
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TABLE 6-1

SAMPLE ANALYSIS SUMMARY
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS

Sample Identification	Depth (feet)	Explosives(1)	TAL Metals(2)	Perchlorate	Polyaromatic Hydrocarbons(3)	Total Dissolved Solids	pH	Fraction Organic Content (4)	Intrinsic Permeability	Effective Porosity	Field Parameters (5)
Surface Water	1 ft below water surface	X	X	X							X
Sediment	Upper 1 ft of sediment	X	X	X							
Surface Soil	0 - 0.5 ft Highest XRF Readings	X	X	X	X						
Groundwater	at water table					X					X
Geotechnical - Soil	highest headspace / at DPT Depth						X	X	X	X	

Notes:

TAL - target analyte list

DPT - Direct Push Technology

1. 1,3,5-Trinitrobenzene; 1,3-Dinitrobenzene; 2,4,6-Trinitrotoluene; 2,4-DA-6-NT; 2,4-Dinitrotoluene; 2,6-DA-4-NT; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3,5-DNA; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene; 4-Nitrotoluene; HMX; Nitrobenzene; RDX; Tetryl.
2. Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, silver, titanium, vanadium and zinc.
3. 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene
4. foc by analyses by Walkley Black method.
5. pH, conductivity, OPR, turbidity, dissolved oxygen, temperature

In addition, background surface water samples will be collected upstream of the former Incinerator Disposal Site to assess potential impacts from off-site and site related activities. Specifics of the surface water sampling are further detailed in the FSP.

6.3.2 Sediment Sampling

Sediment samples will be collected from Oso Creek adjacent to the former Incinerator Disposal Site Sediment samples will be collected to characterize present levels and the extent of site-related contaminants in the sediment.

Eight sediment samples will be collected adjacent to the site and two background sediment samples will be collected upstream of the site. Figure 6-1 depicts the proposed locations of the sediment samples. The sediment samples will be collected at the same locations as the surface water samples. Surface water samples will be collected prior to collection of the sediment samples.

The upper one-foot of sediment will be collected for laboratory analysis. According to TRRP-24, the prescribed point-of-exposure for sediment for human exposure is within the upper one-foot of sediment. This depth of sample will also target the aerobic layer since it represents more recent deposition, and is where most benthic fauna will occur. The biological active layer is frequently considered to be the upper four inches of sediment.

Sediment samples will be analyzed for explosives; metals and perchlorate (see Table 6-1). The sediment sample locations will be recorded using a hand-held GPS unit.

In addition, background sediment samples will be collected upstream of the former Incinerator Disposal Site to assess potential impacts from off-site related activities. Specifics of the sediment sampling are further described in the FSP (Attachment A.1.).

6.3.3 Surface Soil Sampling

Surface soil samples (0 – 6-inches) will be collected for laboratory analysis of MC from approximately 40 locations at the former Incinerator Disposal Site. The exact locations and the number of samples will be determined during field screening of the soils using the TRIAD approach and x-ray fluorescence (XRF) field screening. The goal is to focus the sampling on known MEC areas and newly found MEC areas discovered during the MEC clearance. UXO avoidance techniques will be utilized during the MC sampling. Members of the SI sampling team will be escorted by UXO personnel.

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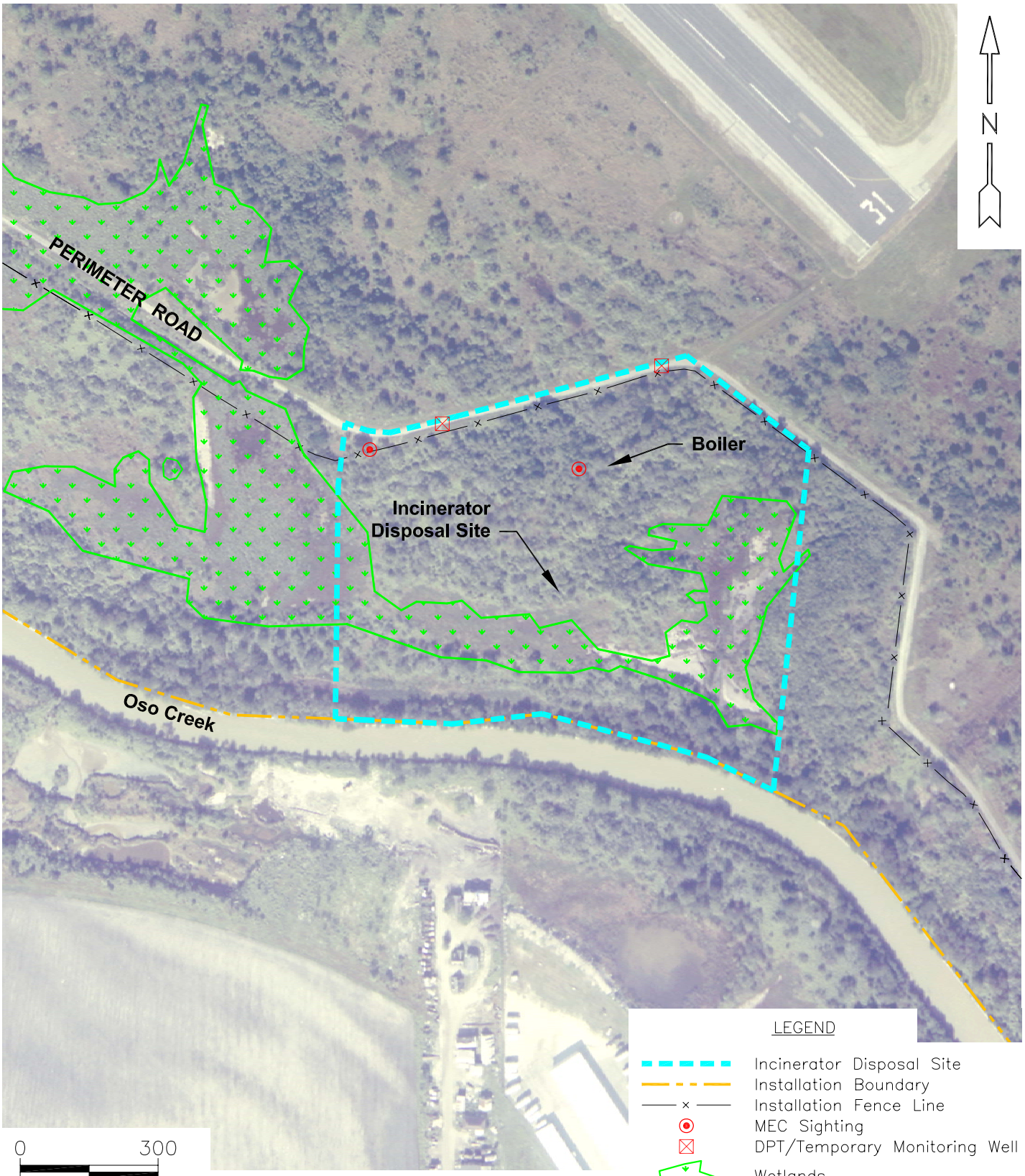

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF DATE 1/2/07	NAVFAC	PROPOSED DPT SOIL BORING AND TEMPORARY MONITORING WELL LOCATIONS INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY BT DATE 1/2/07			OWNER NO. 0023
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Two known locations of MEC have been identified at the former Incinerator Disposal Site. These locations are in and around the former boiler and on the ground surface near Perimeter Road approximately 450 feet west of the boiler. Area delineation for MEC is planned as part of the overall project to identify additional areas of MEC. The former Incinerator Disposal Site will be divided into transects and a detector aided surface sweep performed to locate MEC on the surface and to identify areas for follow-on geophysical mapping of subsurface anomalies. This MEC delineation and geophysical investigation will be conducted prior to the SI. Details of the MEC delineation and geophysical investigation are found in the MEC WP (TtNUS, 2007) under separate cover. Details of the MC Surface soil sampling are found in the FSP (Attachment A.1).

Surface soil samples will be analyzed for explosives, metals, perchlorate (at the source only), and PAHs (at the boiler location only) (see Table 6-1).

The surface soil sample locations will be recorded using a hand-held GPS unit. Specifics of the surface soil sampling are discussed in the FSP (Attachment A.1).

6.3.4 Subsurface Soil Sampling

Direct-push technology (DPT) drilling will be conducted via a hydraulically-powered direct-push machine for lithologic characterization of soils, geotechnical analysis, and to determine depth to the water table in and around the former Incinerator Disposal Site.

DPT soil borings will be installed at two locations as shown on Figure 6-2. For ease of access, the DPT soil borings will be located along the Perimeter Road. One soil sample for geotechnical analyses will be collected from each DPT soil boring. Soil samples collected for geotechnical analysis will be analyzed for pH, fraction organic content, intrinsic permeability and effective porosity. This information can be used for development of Tier 2 or 3 PCLs, if required.

The DPT sample locations will be recorded using a hand-held GPS unit. Specifics of the subsurface soil sampling are discussed in the FSP (Attachment A.1).

6.3.5 Groundwater Sampling

Temporary monitoring wells will be installed in each of the DPT soil borings drilled at the former Incinerator Disposal Site (see Section 6.3.4). Temporary monitor wells will allow for the collection of groundwater samples for laboratory analysis and to determine the depth of groundwater. The temporary

monitoring wells will be allowed to equilibrate overnight. If no measurable groundwater is present, the temporary monitoring wells will be plugged and abandoned.

Groundwater samples will be analyzed for total dissolved solids. Specifics of the groundwater sampling methodologies are discussed in the FSP.

7.0 EVALUATION AND REPORTING

The following sections describe the evaluation and reporting methodology for data generated during the proposed SI.

7.1 DATA REVIEW AND VALIDATION

Validation of data is a systematic process performed to assure that the data are adequate and accurate for their intended purpose. Analytical results will be validated and evaluated for usability by the TtNUS project chemist to ensure that data has been reported to meet and satisfy project DQOs and comply with TRRP rule 30 TAC 350 [Regulation (RG)-366/TRRP-13] guidelines. Elements of the data review and validation process include the following tasks:

- Assessment of measurement system calibration and verification of instrument calibration.
- Verification that quality control activities were performed and that quality control standards were met.
- Evaluation of data quality indicators: precision, accuracy, representativeness, completeness, comparability, sensitivity (PARRCS).
- Screening of data for outliers.
- Evaluation of data for technical credibility in consideration of site conditions.
- Review of field sample data records and chain-of-custody records to ensure that all requisite analytical procedures were performed.
- Verification of accuracy of intermediate calculations.
- Review of period of performance of analyses to ensure that holding times were met.

Additional information is located in the project specific QAPP, listed under separate cover (Attachment A.2).

7.2 AFTER ACTION REPORT

The results of the MEC removal action and clearance will be presented in an After Action Report which will contain the following:

- Description of the methods used to clear ordnance and remove MEC, including lessons learned and recommendations for future operations.
- Description and mapping of search grids established, MEC and munitions debris found, the boundaries of actual response activities, and any areas that were avoided.
- Description and location mapping of the results of Munitions Constituents (MC) sampling and laboratory analyses.
- Documentation pertaining to the results of QC sweeps, daily reporting, and geophysical mapping and investigation.
- Documentation/receipts of final disposition of munitions debris, explosives accountability, and photographs of major activities and MEC discoveries.

7.3 SITE INSPECTION REPORT

The results of the SI will be presented in a SI report which will contain the following:

- Detailed descriptions of SI field investigations.
- Summary of existing information pertaining to the Incinerator Disposal Site.
- Summary of sample locations and sampling methodology.
- Assessment of the nature and extent of any contamination discovered and related impacts to physical site conditions.
- Results of data collected and analysis of same, completed in the form of tables and maps.
- Additional characterization of site geology and hydrogeologic conditions.
- Comparison of analytical results to TRRP Tier 1 Residential PCLs.
- Update of CSM.
- Recommendations on future site activities.

8.0 PROJECT SCHEDULE

The Project Schedule (Table 8-1) outlines milestones which include the major project and data deliverable milestones for each of the tasks described in this Work Plan.

TABLE 8-1

PROJECT SCHEDULE
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS

TASK	ESTIMATED START DATE	ESTIMATED END DATE	DURATION (DAYS)
Final Work Plan and HASP to Navy		28 Oct 07	
Field Event	02 Jan 08	02 Mar 08	60
Prepare Draft After Action Report	04 Apr 08	04 Jul 08	90
Prepare Draft Preliminary Assessment/Site Investigation Report	02 May 08	02 Jan 09	240

9.0 REFERENCES

Final Preliminary Assessment, Naval Auxiliary Landing Field Cabaniss, Texas, Malcolm Pirnie, Inc., April 2005.

MEC Time Critical Removal Action and Site Inspection Support Work Plan for the Former Incinerator Disposal Site, Naval Auxiliary Landing Field Cabaniss, Texas, TtNUS 2006

Health and Safety Plan for the Former Incinerator Disposal Site, Naval Auxiliary Landing Field Cabaniss, Texas, TtNUS 2006.

ATTACHMENT A

SAMPLING AND ANALYSIS PLAN

A.1 Field Sampling Plan (FSP)
A.2 Quality Assurance Project Plan (QAPP)

ATTACHMENT A.1

FIELD SAMPLING PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 1
March 2008

Field Sampling Plan
for the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

NAVFAC
Naval Facilities Engineering Command
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

TETRA TECH NUS, Inc.

FIELD SAMPLING PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

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NALF Cabaniss, Corpus Christi, Texas

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FIELD SAMPLING PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

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FIELD SAMPLING PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

ABBREVIATIONS AND ACRONYMS

AICUZ	Air Installation Compatible Use Zone
ASTM	American Society of Testing and Materials
bgs	below ground surface
°C	Degrees Celsius
CLEAN	Comprehensive Long-term Environmental Action Navy
COC	Constituent of Concern
CRREL	Cold Regions Research Engineering Laboratory
CTO	Contract Task Order
DoD	Department of Defense
DOT	Department of Transportation
DPT	Direct-push Technology
e.g.	For example
°F	Degrees Fahrenheit
FOL	Field Operations Leader
FSP	Field Sampling Plan
GPS	Global Positioning System
GSA	General Services Administration
HASP	Health and Safety Plan
HSM	Health and Safety Manager
ID	Inner diameter
IDW	Investigation derived waste
NAAS	Naval Auxiliary Air Station
NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NASCC	Naval Air Station Corpus Christi
NAVFAC SE	Naval Facilities Engineering Command Southeast
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
mL	milliliter
MRP	Munitions Response Program
MS/MSD	Matrix Spike/Matrix Spike Duplicate
MSL	Mean Sea Level
OLF	Outlying Field
ORP	Oxidation-Reduction Potential
PA	Preliminary Assessment
PAH	Polyaromatic Hydrocarbons
PID	Photoionization detector
POE	Point of Exposure
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCI	Reactivity, corrosivity and ignitability
RI	Remedial Investigation
RPM	Remedial Project Manager
SI	Site Inspection
SOP	Standard Operating Procedure
SSO	Site Safety Officer

FIELD SAMPLING PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

ABBREVIATIONS AND ACRONYMS (Continued)

SUXOS	Senior Unexploded Ordnance Supervisor
TAL	Target Analyte List
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total dissolved solids
TOM	Task Order Manager
TRRP	Texas Risk Reduction Program
TtNUS	Tetra Tech NUS, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WP	Work Plan
WWII	World War II
XRF	X-ray Fluorescence

1.0 INTRODUCTION AND PURPOSE

Tetra Tech NUS, Inc. (TtNUS) has been contracted by the Department of the Navy, Naval Facilities Engineering Command SOUTHEAST (NAVFAC SE) to perform a time critical removal action of Munitions and Explosives of Concern (MEC), a site inspection (SI), and associated reporting for the former Incinerator Disposal Site located at Naval Auxiliary Landing Field (NALF) Cabaniss, Corpus Christi, Texas. Figure 1-1 shows the general location of NALF Cabaniss and the location of the former Incinerator Disposal Site at NALF Cabaniss. This work will be performed under Contract Task Order (CTO) No. 0023 under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract No. N62467-04-D-0055.

This Field Sampling Plan (FSP) details the tasks that will be performed for the SI at the former Incinerator Disposal Site. The MEC removal activities are discussed under separate cover and are considered a separate action from the SI.

1.1 PROJECT OVERVIEW

A SI will be conducted to determine the presence, nature and extent of soil, surface water and sediment contamination present at the former Incinerator Disposal Site. In addition, groundwater samples will be collected for water quality purposes. The SI will consist of the drilling of soil borings, collection of surface and subsurface soil samples and laboratory analysis of soil samples, installation of temporary groundwater monitoring wells, collection and laboratory analysis of groundwater samples, collection and laboratory analysis of surface water/sediment samples, land surveying of sample locations and reporting of results.

1.2 FIELD SAMPLING PLAN OVERVIEW

This FSP describes in detail the project organization, field investigation activities and procedures, field quality assurance/quality control (QA/QC) requirements pertaining to acquisition of chemical and physical data in support of the SI at the former Incinerator Disposal Site.

This FSP contains the following sections:

1.0 – Introduction
2.0 – Project Background and Physical Setting
3.0 – Project Organization and Responsibilities
4.0 – Field Operations

5.0 – Sample Management

6.0 – Laboratory Analytical Procedures

7.0 – Waste Management

8.0 – Corrective Action

9.0 – References

The SI to be performed at the NALF Cabaniss will be conducted in accordance with the procedures outlined in this FSP. Additional documents related to the FSP that will be used to perform the SI and MEC removal action at NALF Cabaniss are as follows:

- SI Work Plan (WP), this document contains a description of the overall technical approach to completing the SI. The SI WP contains a summary of available environmental information, conceptual site model, description of investigation objectives and activities, and evaluation and reporting requirements.

- Health and Safety Plan (HASP) (under separate cover), this document details activities and procedures to be followed to ensure that SI-related field activities are conducted in a manner that is protective of on-site workers and the surrounding community.

- MEC WP (under separate cover), this document contains a description of munitions clearance and avoidance activities, procedures and MEC field quality control procedures. This document details the activities and procedures to be followed to ensure that MEC and geophysical survey-related field activities are conducted in a manner that is protective of on-site workers and the surrounding community. This document also outlines the field data collection methods, field QA/QC procedures (e.g., geophysical prove-out activities) that will be used to collect, interpret, and manage the MEC and geophysical data.

- Quality Assurance Project Plan (QAPP), this document details the field data collection methods, and field and analytical laboratory QA/QC procedures that will be used to collect, interpret, manage and analyze the data.

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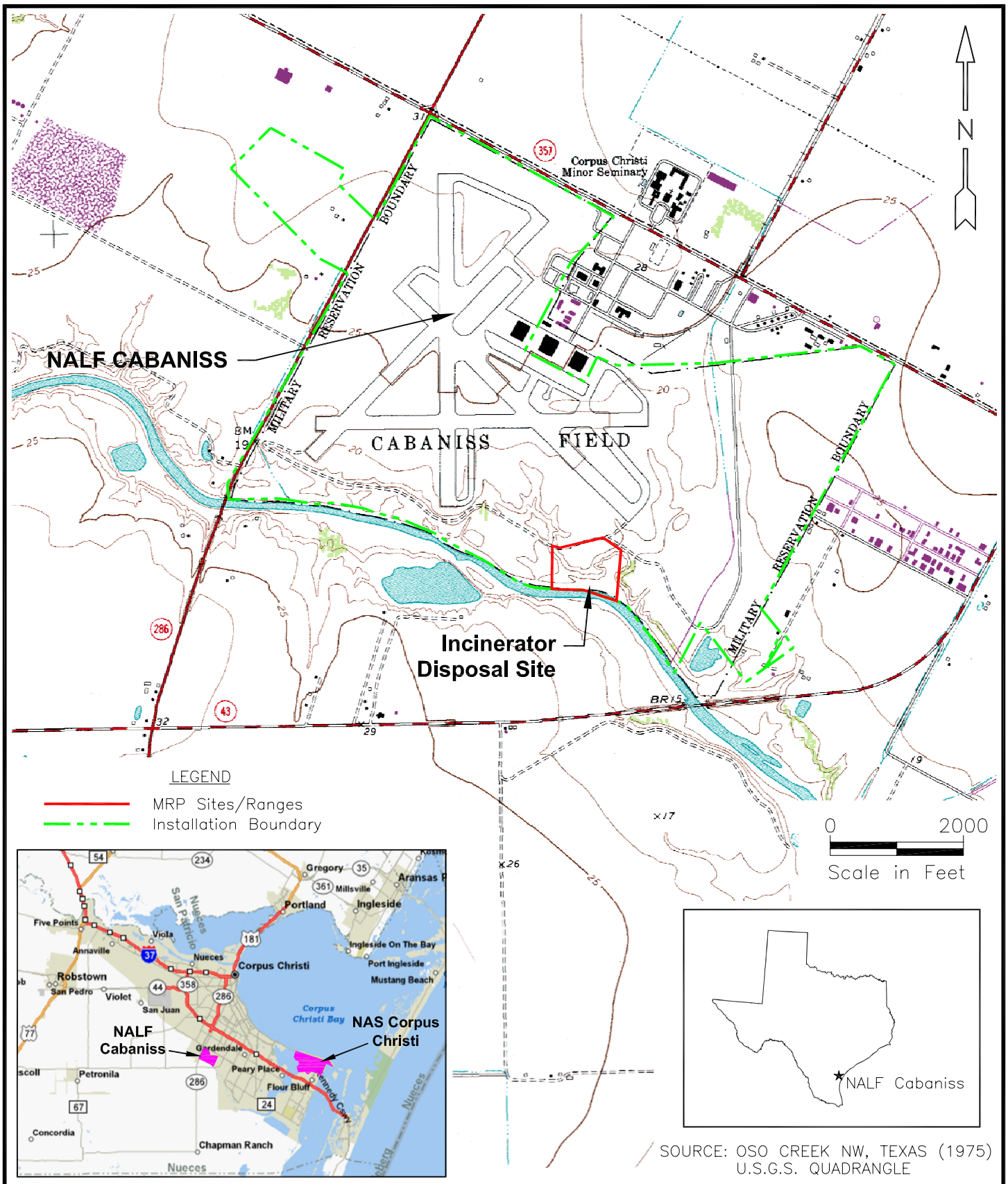

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2.0 PROJECT BACKGROUND AND PHYSICAL SETTING

The following sections provide a brief description of the project background and physical setting along with a summary of previous relevant investigations completed at the former Incinerator Disposal Site at NALF Cabaniss. Figure 1-1 shows the general location of NALF Cabaniss and Figure 2-1 shows the former Incinerator Disposal Site at NALF Cabaniss. Additional detailed information on the site background is contained in Sections 2.0 and 3.0 of the SI WP.

2.1 FACILITY LOCATION

NALF Cabaniss is located on the eastern side of Nueces County, Texas, and lies approximately eight miles west of Naval Air Station Corpus Christi (NASCC). The installation is immediately bounded on the east by Brezina Road, on the north by Ayers Street and FM 286, to the west by Saratoga Road, and to the south by Oso Creek. The installation encompasses a total of 923 acres and lies just outside the corporate bounds of the City of Corpus Christi.

2.2 FACILITY DESCRIPTION AND HISTORY

NALF Cabaniss is an outlying field (OLF) that supports Naval air training operations out of NASCC. Home to the Chief of Naval Air Training, NASCC maintains and operates facilities and provides services and material to support the operations of the aviation facilities of the Naval Air Training Command and other tenant activities.

NALF Cabaniss is located eight miles west of NASCC. The installation occupies 923 acres and was originally constructed with four 5,000-foot runways. Only two runways, oriented in north/south and northwest/southeast directions, are presently active and maintained.

2.3 INCINERATOR DISPOSAL SITE

The Incinerator Disposal Site was located in the southern portion of the installation, 750 feet southwest of the eastern end of Runway 31 and bounded to the south by Oso Creek (Figure 2-1). Perimeter Road runs along the western and northern boundary of the site. The site is covered in dense vegetation, with open sections of wetlands on the south end near Oso Creek. The site was a former sanitary landfill that also contained a boiler used to incinerate confiscated drug material, small arms, and ordnance items. Though its exact dimensions are unknown, the site may have occupied approximately 17 acres.

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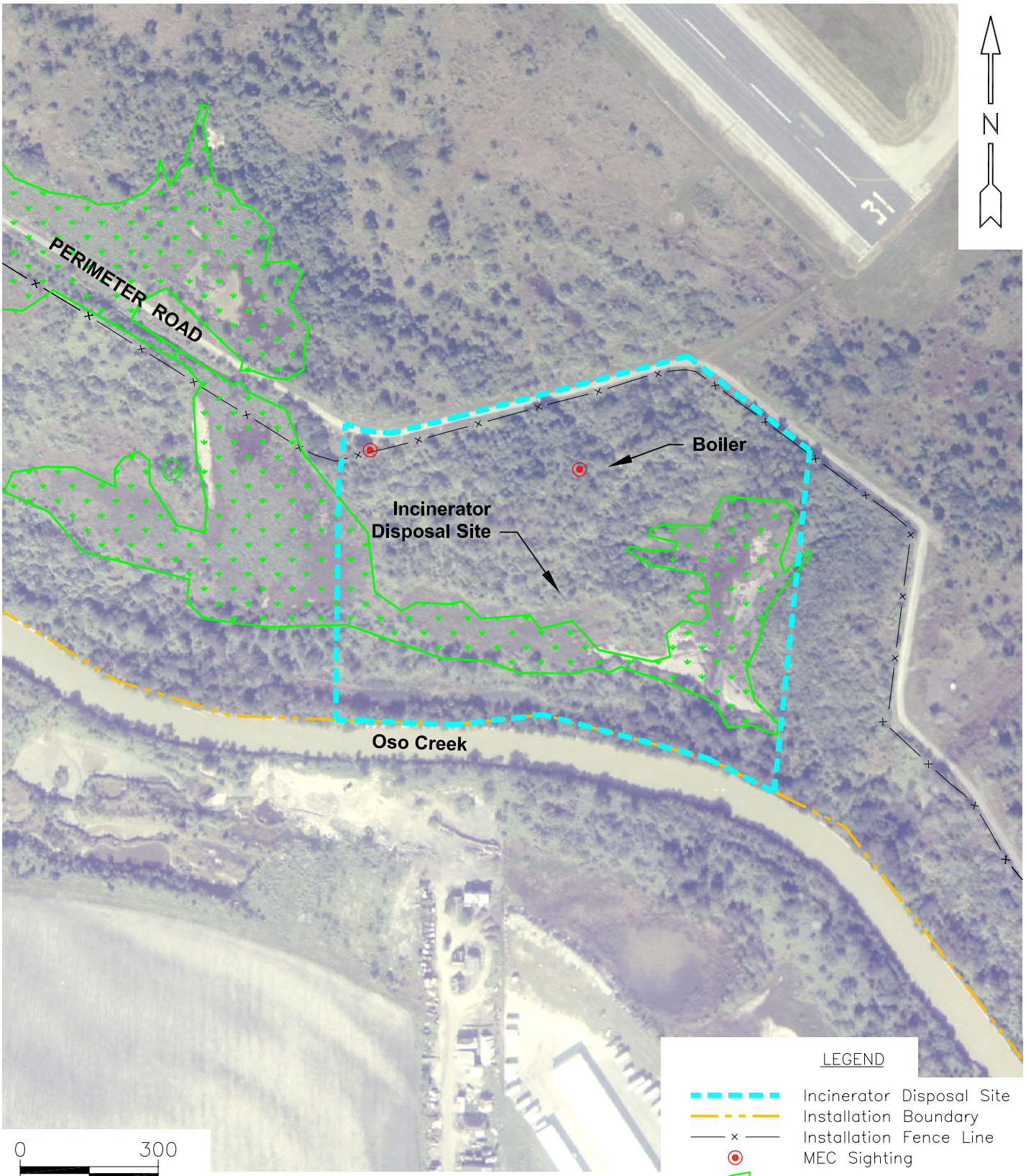

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

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2.4 PHYSICAL SETTING

The topographic profile of NALF Cabaniss is generally flat with a mean elevation of 30 feet above mean sea level (MSL), with some steep downward slopes near Oso Creek.

Freshwater and brackish water jurisdictional wetlands have been delineated at NALF Cabaniss, primarily concentrated at the southern end of the installation along Oso Creek.

Oso Creek is the largest surface water body in the immediate area and lies directly south of the former Incinerator Disposal Site. The creek is approximately 85 feet wide with variable depth.

The average depth to groundwater at NALF Cabaniss is not known but is believed to be six feet below ground surface (bgs).

2.5 PREVIOUS INVESTIGATIONS

In 2005, Malcolm Pirnie, Inc. conducted a Preliminary assessment (PA) of the former Incinerator Disposal Site at NALF Cabaniss.

The PA concluded that based upon historical operations and visual observations made at the site, MEC and MC were confirmed at two discrete locations at the site. Due to the observation of multiple areas of thermally treated munitions scrap at the site, it is possible that similar areas of munitions scrap may be present. Therefore, MEC and MC are suspected to be present at other locations within the site.

2.6 PURPOSE OF THE SITE INSPECTION

The SI described in this FSP focuses on the former Incinerator Disposal Site at NALF Cabaniss. This SI is being performed to determine presence or absence of MC at the former Incinerator Disposal Site.

Data collected will be used to meet the following objectives:

- Determine the presence and nature of MC contamination within soils at the former Incinerator Disposal Site.

- Determine the presence and nature of MC contamination within surface water (Oso Creek) at the former Incinerator Disposal Site.

- Determine the presence and nature of MC contamination within sediments (Oso Creek) at the former Incinerator Disposal Site.

- Determine the site specific geology and depth to shallow groundwater at the former Incinerator Disposal Site.

Laboratory analyses of surface water, soil and sediment samples will confirm the presence or absence of MC at the former Incinerator Disposal Site. Laboratory analyses of groundwater samples will be performed to determine groundwater quality classification at the former Incinerator Disposal Site. If MC is present, a Remedial Investigation (RI) and potentially a removal action may be necessary for MC at the site following the SI.

The information necessary to achieve these objectives will be obtained in accordance with the investigatory program described in this FSP and other related WP documents.

3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The following sections provide a description of the key personnel and organizations responsible for implementation of the project. Figure 3-1 provides an organizational chart for the SI to be conducted at the former Incinerator Disposal Site.

Navy personnel from NAVFAC SE will be responsible for administrative and technical oversight of the program, and project management and coordination between state and federal regulatory agencies, while the Navy personnel from the NASCC and NALF Cabaniss will be responsible for on-site coordination with TtNUS.

TtNUS will be responsible for the overall management of the project, including the performance of field activities presented in this WP.

3.1 KEY PROJECT TEAM MEMBERS

Key Navy personnel supporting this project are as follows:

Ms. Helen Lockard, P.E. (904-542-3991 x4522) is the Navy Remedial Project Manager (RPM) for the project.

Mr. Mike Hilger, (361-961-5354) and Gary LeFlore (361-961-3704) are the onsite NASCC points of contact.

Mr. Hal Resides, (361-820-7357) is the NASCC Explosive Safety Officer.

Ms. Caroline Scheible, (361-820-7357) is the NASCC Safety Officer.

Mr. Mike Singletary, P.E. (843-820-7465) and Ms. Helen Lockard, P.E. (904-542-3991 x4522) are the Navy Munitions Response Program (MRP) Technical Managers for the project.

Key TtNUS personnel supporting this project are as follows:

Mr. G. Kenneth Grim, P.G. (832-251-6023) is the Task Order Manager (TOM) for the project.

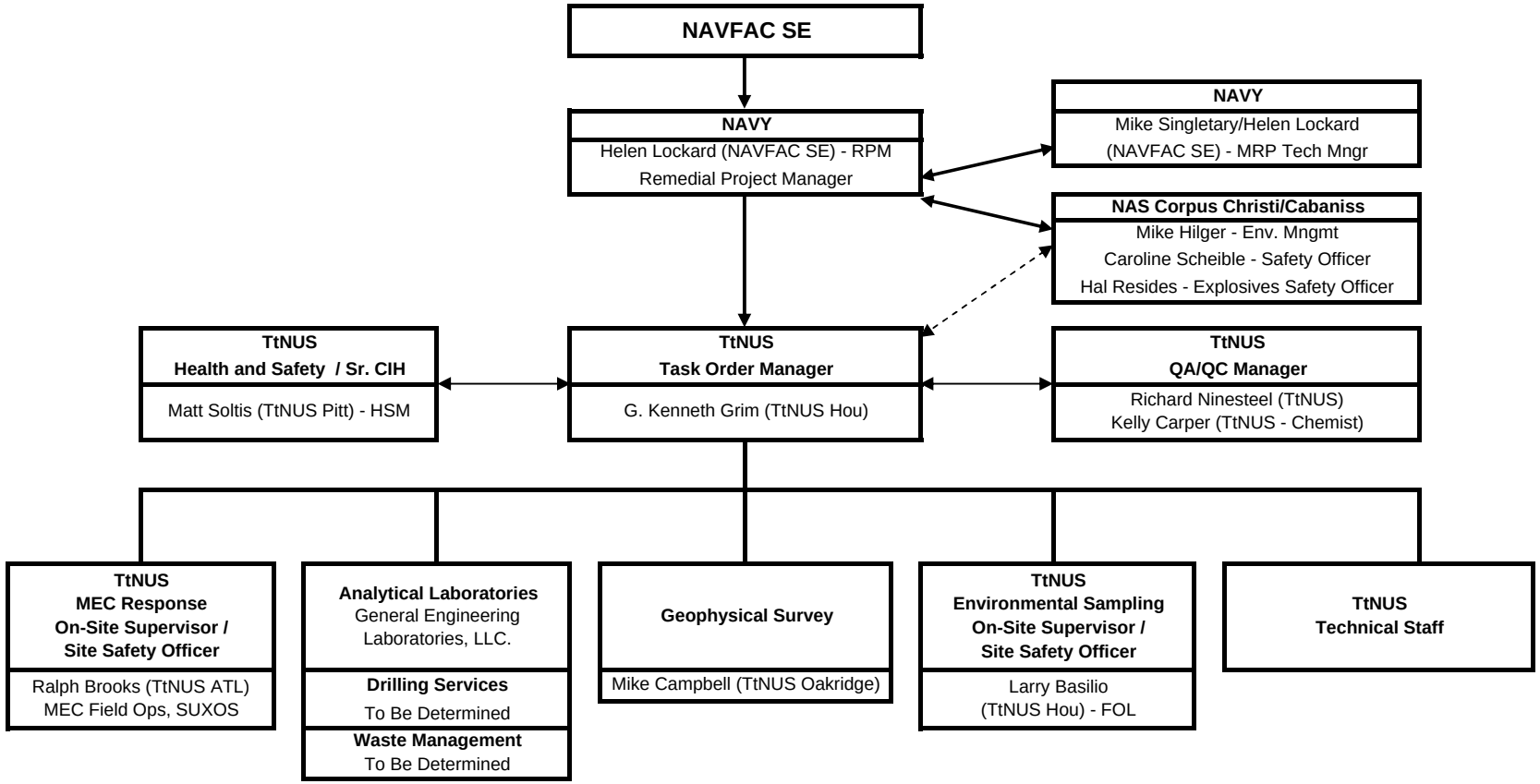
Mr. Larry Basilio, P.G. (832-251-6018) is the Field Operations Leader (FOL) for the project.

Ms. Kelly Carper, (412-921-7273) is the Lead Chemist for this project.

Mr. Ralph Brooks, (770-413-6733 x231) is the Unexploded Ordnance (UXO) Manager for this project.

FIGURE 3-1

Project Organization Chart
Site Inspection
Former Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas



Mr. Mike Campbell, P.G., (865-220-4714) is the Geophysical Manager for this project.

Mr. Richard Ninesteel, (412-921-8746) is the QA/QC Manager for this project.

Mr. Matt Soltis, CIH, CSP, (412 921-8912) is the Health and Safety Manager (HSM) for this project.

The TtNUS TOM will have the primary responsibility for implementing and managing the SI, and notifying regulatory agencies of field activities or schedule modifications. Additionally, the TOM will have overall responsibility for the management and completion of the project, which includes at a minimum: resource allocation; financial reporting; schedule control; review and approval of deliverables; invoice review and approval; and overall management of the project.

The FOL will be responsible for directing on-site field activities and will report directly to the TOM. The FOL will coordinate efforts of the field sampling staff, the subcontractors, and the lead technical staff and will be responsible for identifying problem areas and bringing them to the attention of the TOM for resolution. The FOL also has immediate stop work authority.

The UXO Manager is responsible for ensuring all UXO issues are addressed and resolved to include equipment, staffing and administrative requirements. The UXO Manager will provide support off-site throughout the project duration unless requested on-site by the TOM, or may also act on-site as the Senior Unexploded Ordnance Supervisor (SUXOS).

The Lead Chemist will advise the TOM on technical requirements of the chemical data, prepare laboratory specifications for analysis of samples collected, oversee the subcontracted analytical laboratories, and review or oversee the validation of the analytical reports prepared.

The Geophysical Manager has overall responsibility for design, implementation, and management of all geophysical investigations required for the work effort, but may not be on-site full time. This responsibility may be assigned to a subcontractor, if necessary.

The QA/QC Manager is responsible for QA/QC requirements for the TtNUS CLEAN program. This individual reviews data and deliverable documents, and performs system audits to ensure contract QA/QC goals are met.

The CLEAN HSM is responsible for reviewing health and safety plans for all CLEAN operations, and performs site audits to ensure compliance with program and site health and safety requirements.

A Site Safety Officer (SSO) will be designated by the FOL prior to field activities and will be responsible for ensuring adherence to the site-specific HASP. The SSO reports directly to the CLEAN HSM and the TOM.

In addition to the above personnel, TtNUS program personnel will provide overall support to the TOM through subcontracting, cost tracking, progress reporting, and technical guidance.

3.2 SUBCONTRACTORS

TtNUS will utilize subcontractors to provide drilling, waste management, land surveying and analytical services during the SI at the former Incinerator Disposal Site.

Drilling services will be performed by:

TBD
XXX
XXX
Attention:
Phone:
Fax:

Waste management services will be performed by:

TBD
XXX
XXX
Attention:
Phone:
Fax:

Land surveying services will be performed by:

TBD
XXX
XXX
Attention:
Phone:
Fax:

Laboratory analytical services will be performed by:

General Engineering Laboratories, LLC.
2040 Savage Road
Charleston, SC 29407
Attention: Jack Crook
Phone: (843) 556-8171
Fax: (843) 766-1178

4.0 FIELD OPERATIONS

The following subsections provide a detailed discussion of field operations that will be conducted during the course of the SI at the former Incinerator Disposal Site at NALF Cabaniss. Figures 1-1 and 2-1 show the general location of NALF Cabaniss and the location of the former Incinerator Disposal Site at NALF Cabaniss.

4.1 GENERAL DESCRIPTION AND INFORMATION

This SI is being performed to determine the presence or absence of MC at the former Incinerator Disposal Site.

Data collected will be used to meet the following objectives:

- Determine the presence and nature of MC contamination within soils at the former Incinerator Disposal Site.
- Determine the presence and nature of MC contamination within surface water (Oso Creek) at the former Incinerator Disposal Site.
- Determine the presence and nature of MC contamination within sediments (Oso Creek) soils at the former Incinerator Disposal Site.
- Determine the site specific geology and depth to shallow groundwater at the former Incinerator Disposal Site.

Laboratory analyses of surface water, soil and sediment samples will confirm the presence or absence of MC at the former Incinerator Disposal Site. Laboratory analyses of groundwater to determine groundwater quality classification at the former Incinerator Disposal Site. If MC is present, a RI and potentially a removal action may be necessary for MC at the site following the SI.

The information necessary to achieve these objectives will be obtained in accordance with the investigatory program described in this FSP and other related WP documents.

The SI will consist of the drilling of soil borings, collection and laboratory analysis of surface and subsurface soil samples, installation of temporary groundwater monitoring wells, collection and laboratory

analysis of groundwater samples, collection and laboratory analysis of surface water and sediment samples, Global Positioning System (GPS) survey of sample locations and reporting of results.

4.2 SURFACE WATER SAMPLING

Surface water samples will be collected from Oso Creek, adjacent to the former Incinerator Disposal Site, to characterize present levels and the extent of site-related contaminants in the surface water.

Eight surface water samples will be collected adjacent to the site and two surface water background samples will be collected upstream of the site. Figure 4-1 depicts the proposed locations of the surface water samples. Surface water samples will be collected in a staggered “w” pattern with a bias towards the site. The base of the “w” will be the approximate centerline of Oso Creek.

Access to Oso Creek will be by a boat supplied and manned by NASCC personnel. The person piloting the boat will have no other responsibility than piloting the boat. A two or three person sampling crew will be responsible for collecting the surface water samples.

Collection of surface water samples for chemical analysis will be performed using clean laboratory supplied sample containers. Grab samples will be collected by dipping the sample containers directly into the surface water. Samples will be collected from 1-foot below the surface.

The sample container should be inverted, lowered below the water surface depth, and held at about a 45-degree angle with the mouth of the bottle facing upstream. The bottle will be allowed to fill slowly and continuously using the cap to regulate the speed of water entering the bottle. When sample containers are provided "pre-preserved," a dedicated, clean, un-preserved bottle will be used for sampling and transferring the surface water to an appropriately-preserved container.

To prevent potential cross contamination of samples, the samples will be collected by progressing up the channel from downstream locations to upstream locations.

At each sample location the pH, conductivity, specific conductance, temperature, oxidation reduction potential (ORP), and turbidity of the water sample will be measured using a multi-parameter instrument such as a Horiba U-22. The multi-parameter probe will be lowered into the water body to a depth of 1-foot below the water surface. The physical characteristics of the sample (e.g., color, general appearance, odor, etc.) will be recorded on a sample log sheet.

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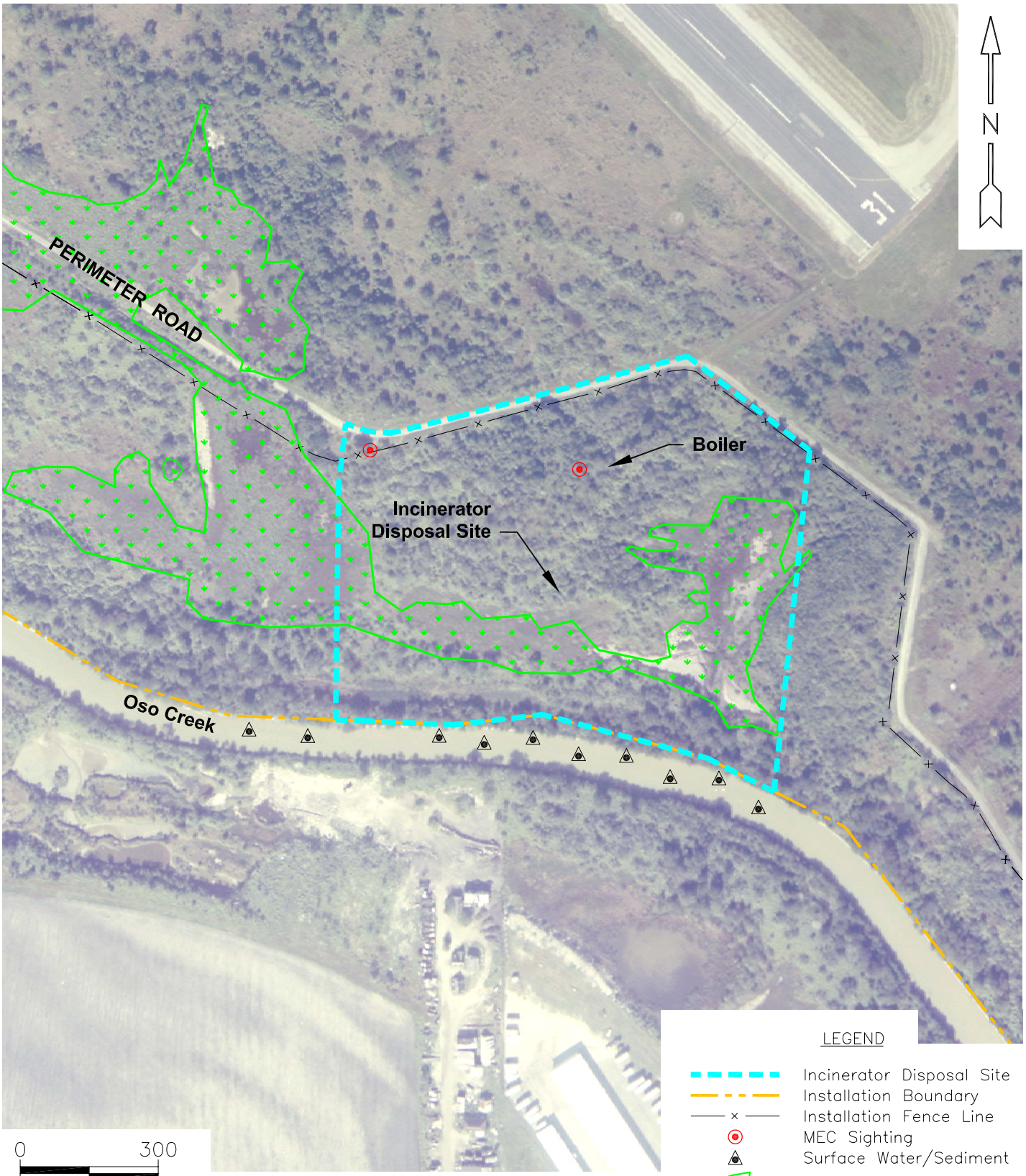

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

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Surface water samples will be analyzed for explosives, metals and perchlorate. Sample aliquots designated for perchlorate analysis will be collected first, followed by aliquots for explosives, then the aliquots for metals. Preservatives, if required, will have been placed into the sample containers at the analytical laboratory prior to transport of the sample containers to the site. The surface water samples to be submitted for laboratory analysis will be immediately labeled and placed on ice in an insulated cooler awaiting packaging and shipping. The samples will be packaged for shipment at the conclusion of each day's sample collection activities. All surface water samples will be analyzed for the parameters listed in the site analytical program table (Table 6-1) included in Section 6.0 using the methods, sample containers, holding times, and preservation listed in the tables.

The surface water sample locations will be recorded using a hand-held GPS unit.

Surface water samples will be collected in conjunction with the collection of sediment samples as described in Section 4.3. At each location, the surface water sample will be collected prior to the sediment sample.

4.3 SEDIMENT SAMPLING

Sediment samples will be collected from Oso Creek adjacent to the former Incinerator Disposal Site to characterize present levels and the extent of site-related contaminants in the sediment.

Eight sediment samples will be collected adjacent to the site and two background sediment samples will be collected upstream of the site. Figure 4-1 depicts the proposed locations of the sediment samples. Sediment samples will be collected in a staggered "w" pattern with a bias towards the site. The base of the "w" will be the approximate centerline of Oso Creek. The sediment samples will be collected at the same locations as the surface water samples. Surface water samples will be collected prior to collection of the sediment samples.

Access to Oso Creek will be by a boat supplied and manned by NASCC personnel. The person piloting the boat will have no other responsibility than piloting the boat. A two or three person sampling crew will be responsible for collecting the sediment samples.

The upper one-foot of sediment will be collected for laboratory analysis. According to Texas Risk Reduction Program (TRRP-24), the prescribed Point of Exposure (POE) for sediment for human exposure is within the upper one-foot of sediment. This depth of sample will also target the aerobic layer since it represents more recent deposition, and is where most benthic fauna will occur. The biological active layer is frequently considered to be the upper 4 inches of sediment.

Because the depth of Oso Creek, the nature of the sediments (sandy, clayey, dense or excessively rocky) are not known, multiple sediment sampling devices will be available on-site to meet the anticipated conditions. These devices are described below.

A telescopic dipper with a ladle will be used to scoop along the bottom of the creek in an upstream direction. The pole will be made of plastic or metal tubing with the capability of telescoping from 7 to 24 feet in length. A disposable pre-cleaned polypropylene ladle, 600-milliliters (ml) in capacity, will be used to collect the sediment samples. A new ladle will be used for each sample collected. The dipper will be the preferred method of sediment sample collection.

Alternatively, stainless steel coring tubes will be utilized to collect the sediment samples. This sampling system consists of an auger, a series of extension rods and a ‘T” handle. The auger is driven into the sediment and used to extract a core.

A stainless steel grab sampling device (Eckman dredge or ponar sampler) may also be used. This technique consists of lowering a sampling device to the sediment by use of a rope, cable or extended handle. The mechanism is triggered and the device entraps sediment in its spring loaded jaws, or within lever operated jaws.

To prevent potential cross contamination of samples, the samples will be collected by progressing up the channel from downstream locations to upstream locations.

The physical characteristics of the sample (e.g., color, general appearance, odor, etc.) will be recorded on a sample log sheet.

Sediment samples will be analyzed for explosives, metals and perchlorate. Sample aliquots designated for perchlorate analysis will be collected first followed by aliquots for explosives, then aliquots for metals. Preservatives, if required, will have been placed into the sample containers at the analytical laboratory prior to transport of the sample containers to the site. The sediment samples to be submitted for laboratory analysis will be immediately labeled and placed on ice in an insulated cooler awaiting packaging and shipping. The samples will be packaged for shipment at the conclusion of each day’s sample collection activities. All sediment samples will be analyzed for the parameters listed in the site analytical program Table 6-1 included in Section 6.0 using the methods, sample containers, holding times, and preservation listed in the tables.

The sediment sample locations will be recorded using a hand-held GPS unit.

Sediment samples will be collected in conjunction with the collection of surface water samples as described in Section 4.2. At each location, the surface water sample will be collected prior to the sediment sample.

4.4 SURFACE SOIL SAMPLING

Surface soil samples will be collected for laboratory analysis from approximately 40 locations at the former Incinerator Disposal Site. The exact locations and the number of samples will be determined in the field by screening the soils in the field using the TRIAD approach and x-ray fluorescence (XRF). The goal is to focus on known areas of MEC and newly found areas of MEC discovered during the MEC Clearance. UXO avoidance techniques will be utilized during the MC sampling. Members of the SI sampling team will be escorted by TtNUS UXO personnel.

4.4.1 Surface Soil Sampling Strategy

The two known locations of MEC at the former Incinerator Disposal Site are in and around the former boiler and on the ground surface near Perimeter Road approximately 450 feet west of the boiler. Additional area delineation for MEC is planned as part of the overall project. The former Incinerator Disposal Site will be divided into transects and a detector aided surface sweep performed to locate MEC on the surface and to identify areas for follow-on geophysical mapping of subsurface anomalies. This MEC delineation and geophysical investigation will be conducted prior to the SI. Details of the MEC delineation and geophysical investigation are found in the MEC Time Critical Removal Action and SI Support WP.

If six MEC locations or less are identified, one surface soil sample will be collected at the source (i.e., near the MEC location) at each location and four surrounding surface soil samples will be collected for laboratory analysis.

If seven to 30 MEC locations are identified, one soil sample will be collected at the source at each location for laboratory analysis.

If greater than 30 MEC locations are identified, soil samples will be collected from 30 random MEC locations. Sample locations will be selected to obtain an equal geographic distribution.

A MEC location is one that is visually identified on the ground surface by a qualified UXO personnel. The MEC may consist of unexploded ordnance or discarded military munitions.

In addition to samples collected at known MEC locations, 10 soil samples will be collected from random non-MEC locations for laboratory analysis.

4.4.2 Surface Soil Sample Collection

One surface soil sample will be collected at the source as close to the MEC as possible. The UXO escort will determine the safe sampling distance.

Soil samples will be collected using the 7-Sample Wheel Approach as described in the United States Army Corps of Engineers (USACE) Cold Regions Research Engineering Laboratory (CRREL) Special Report 96-15. In this sampling approach, a seven part composite sample is collected. One sample is collected from the center and six samples are collected from a circle, four feet in diameter from the center samples. Figure 4-2 depicts the 7 Sample Wheel approach.

Soil samples will be collected at each sub sample location from a depth of 0 to 6 inches and placed in a labeled individual plastic Ziplock^{tm} (or equivalent) bag. Soil samples will be collected using a decontaminated stainless steel trowel or disposable plastic sampler. Care will be taken to not include any foreign matter (i.e., vegetation, rocks, debris). Each of the seven sub samples will be analyzed in the field using XRF. Details of the XRF screening and sampling methodology are discussed in Section 4.4.3. The samples in general will be analyzed “as-is”. The samples may be manipulated within the baggies to break up any larger soil fragments to produce a relatively homogenous sample.

The XRF reading for each sub sample will recorded on a field log. Following XRF analysis of the sub samples, portions of each sub sample will be composited into one sample. A XRF reading of the composited sample will be recorded in the field log. The composite sample will be submitted to the laboratory for analytical testing. The soil sample will be placed into clean laboratory supplied sample containers. Figure 4-3 is a schematic of the soil sample preparation for analysis and compositing procedures.

As stated earlier, if there are six or less MEC locations, four surrounding soil samples at each location will be collected for laboratory analysis. Surface soil samples will be collected 10 feet from the initial sample location. The locations will be situated at the 12, 3, 6 and 9 o’clock positions from the initial sample location. Surface soil samples at each location will be collected using the 7-Sample Wheel approach described earlier.

If six MEC locations or less are identified, one surface soil sample will be collected at the source (i.e., near the MEC location) at each location and four surrounding surface soil samples will be collected for laboratory analysis. If the number of MEC locations is greater than six, a maximum of six locations will be selected for step out sampling. The step out locations selected will be based on the highest XRF readings recorded. At each selected location, four surrounding soil samples will be collected as described above.

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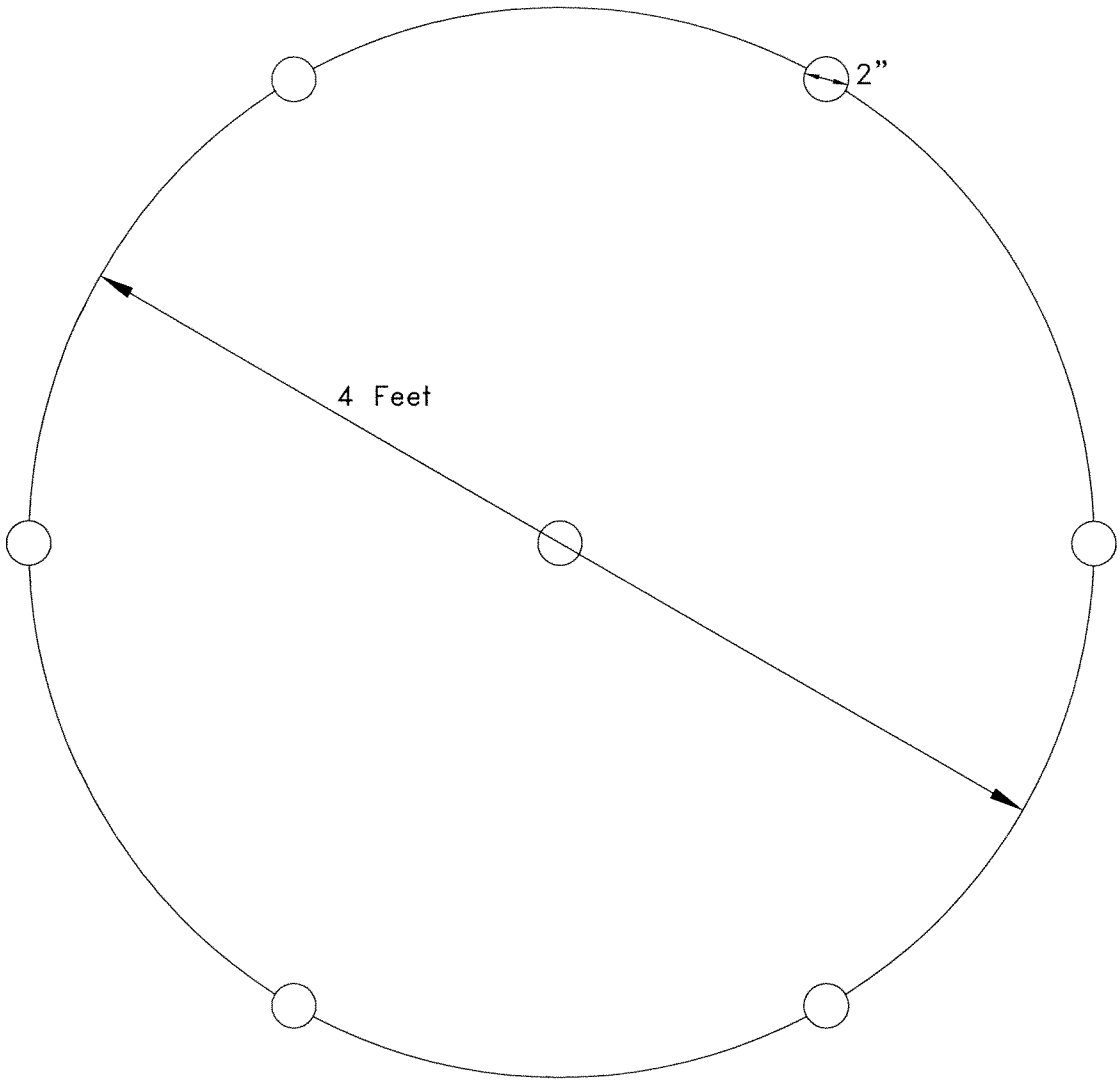

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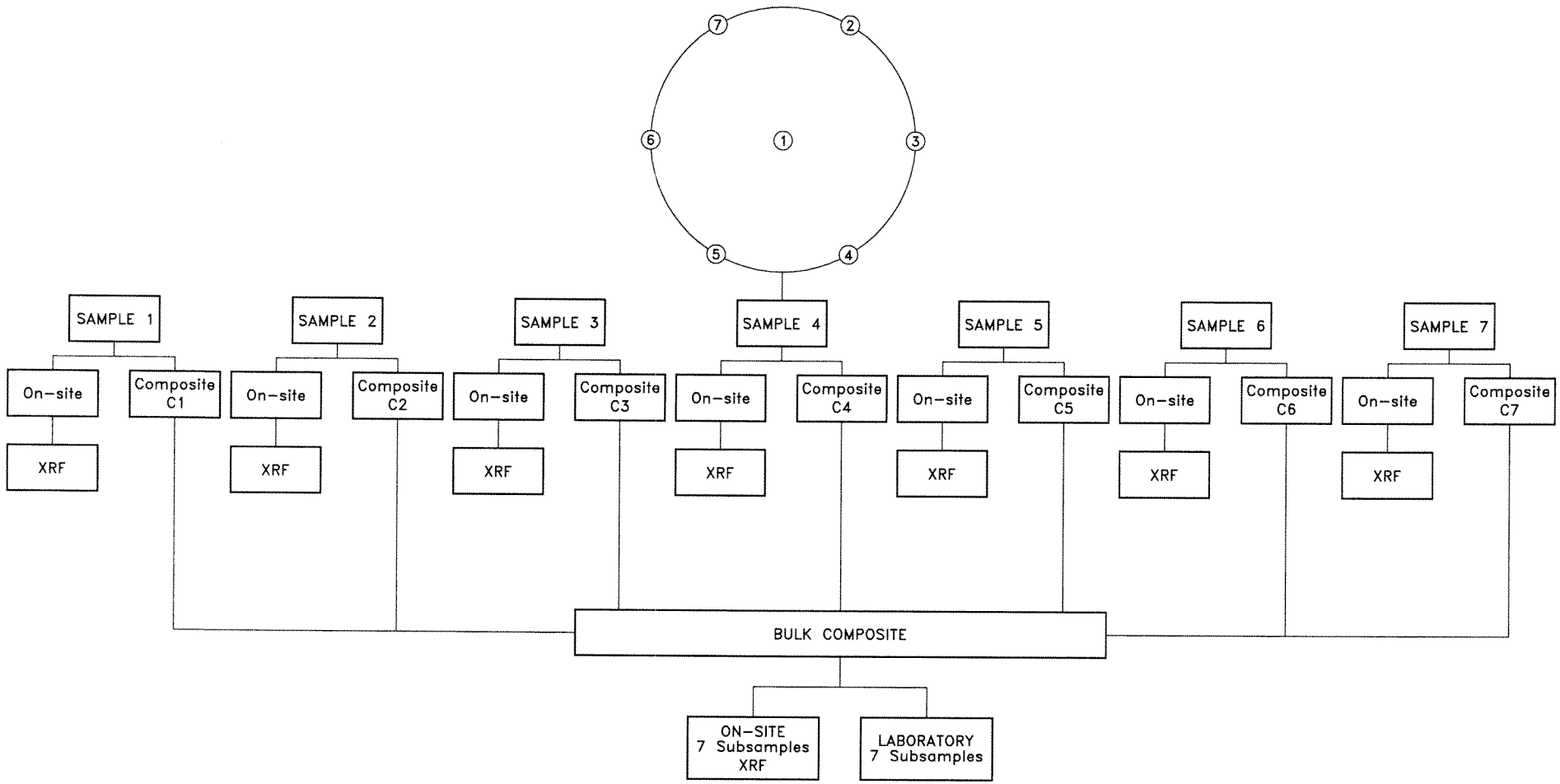

NOTE: XRF=Xray Fluorescence

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REVISED BY --	DATE ------		APPROVED BY / DATE
SCALE NOT APPLICABLE			DRAWING NO. FIGURE 4-3 / REV. 0

Surface soil samples will be analyzed for explosives, metals, perchlorate (at the source only), and polyaromatic hydrocarbons (PAHs) (at the boiler location only). Sample aliquots designated for perchlorate analysis will be collected first followed by aliquots for PAHs, explosives then aliquots for metals. The surface soil samples to be submitted for laboratory analysis will be immediately labeled and placed on ice in an insulated cooler awaiting packaging and shipping. The samples will be packaged for shipment at the conclusion of each day's sample collection activities. All surface soil samples will be analyzed for the parameters listed in the site analytical program table included in Section 6.0 using the methods, sample containers, holding times, and preservation listed in the tables.

Boring logs will not be prepared for surface soil samples. However, the physical characteristics of the samples (e.g., color, lithology, general appearance, odor, etc.) will be recorded in the field notebook or sample log sheet.

4.4.3 XRF Screening

XRF will be used to screen soil samples. This technique measures the fluorescence spectrum of x-rays emitted when metal atoms are excited by an x-ray source. The energy of emitted x-rays reveals the identity of the metals in the sample and the intensity of emitted x-rays is related to their concentrations. Rapid, multi-element analysis can be performed by XRF. The target constituent of concern (COC) will be lead. Semi-quantitative analysis of lead in soil will be performed. A Niton XLt 700 Series, Innov-X XT400, or equivalent will be used to field analyze the soil samples.

Soil samples will be collected as described in Section 4.4.2 and analyzed in the plastic Ziplock^{tm} (or equivalent) bags. The samples will be analyzed "as-is". The samples will not be dried but will be manipulated within the plastic bag by kneading to breakup any larger soil fragments.

The XRF instrument will be operated in accordance with the manufacturer's instructions.

4.5 SUBSURFACE SOIL SAMPLING

Direct Push Technology (DPT) drilling will be conducted via a hydraulically-powered direct-push machine for lithologic characterization of soils, collection of geotechnical and groundwater samples and to determine depth to the water table in and around the former Incinerator Disposal Site. The direct-push machine uses both static force and percussion to advance sampling tools to obtain continuous soil cores. Surface and subsurface soil samples will be collected with a solid barrel sampler, such as a MacroCore® sampler. The MacroCore® soil sampling system consists of a 1.5-inch diameter piston-operated sampler.

Before any intrusive drilling or subsurface sampling activities commence at the site, utility maps of the area will be obtained (if available) and reviewed by the FOL. Once drilling locations are selected, it is the responsibility of TtNUS to call the National Dig Safe Center, providing them with the information they require as to the whereabouts of intrusive activities. It shall be communicated to the National Dig Safe Center that the site is located in a secured area and access is restricted. TtNUS must also complete a Digging Permit from NASCC identifying the area where the intrusive activities will occur. The Request will be forwarded to Mr. Michael Hilger (NASCC Point of Contact). All proposed areas intended for intrusive work must be completely cleared in accordance with TtNUS SOP HS-1.0, Utility Locating and Excavation Clearance.

4.5.1 DPT Drilling

DPT soil borings will be installed at two locations as shown on Figure 4-4. For ease of access, the DPT soil borings will be located along the Perimeter Road.

Each boring will be logged by an on-site geologist as the boring is being drilled. Boring logs will meet the following requirements, as appropriate:

- All log entries will be printed.
- Borehole depth information will be from direct measurements, accurate to one tenth of a foot.
- All relevant information blanks in the log heading and log body will be completed. If surveyed horizontal control is not available during field operations, location sketches referenced by measured distances from prominent surface features will be shown or attached to the log.
- Logs will clearly show depth at which fill material, if any, is first encountered; depth of bottom of fill material, and a detailed description of fill material.
- Each material type encountered will be described, and soil sample material will also be characterized to the "Group Name" designation specified in American Society of Testing and Materials (ASTM) Method D 2488.
- Logs will clearly show the depth intervals from which all geotechnical and chemical samples submitted for laboratory analysis were collected.

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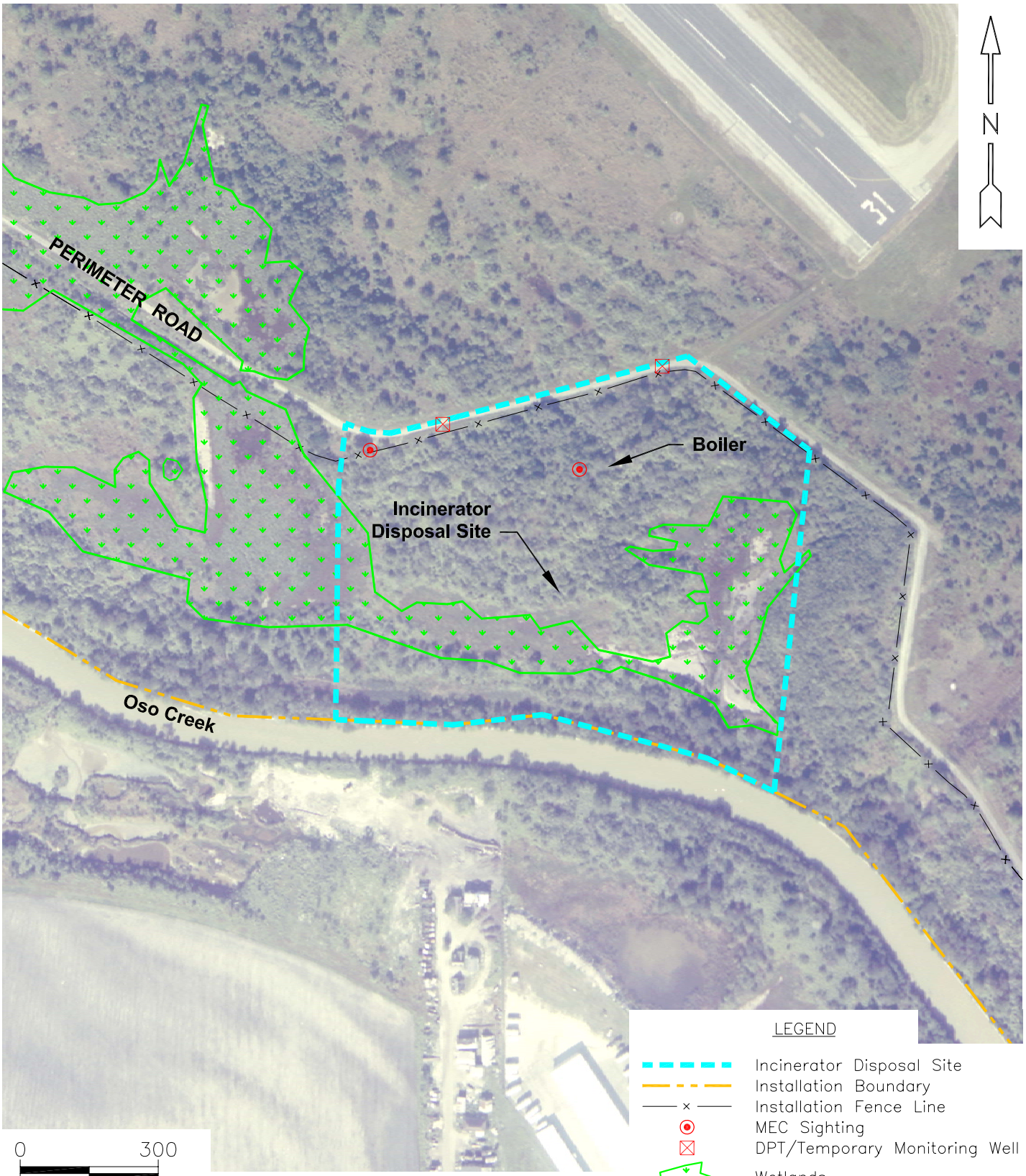

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF DATE 1/2/07	NAVFAC	PROPOSED DPT SOIL BORING AND TEMPORARY MONITORING WELL LOCATIONS INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY BT DATE 1/2/07			OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-4 REV. 0

- Logs will identify the depth at which water was first encountered, the depth to water at the completion of drilling, and the stabilized depth to water, if possible. Given the nature of the temporary wells, sufficient time for groundwater to stabilize before the well is removed may not be practical. Therefore, water level data will include the time (24 hours), if possible, allowed for stabilization. The absence of water also will be indicated.

- Logs will show the borehole and sample diameters and depths at which drilling or sampling methods or equipment change (e.g., change from hollow stem auger to a core barrel).

- Logs will show the total depth of penetration of sampling. The bottom of the hole will be clearly identified on the log along with the notation "Bottom of Hole."

- Logs will identify any intervals of borehole instability.

- Any special drilling or sampling problems will be recorded on logs, along with descriptions of problem resolutions.

- Logs will show all other pertinent information relevant to the investigation, including, but not limited to, the following:

  - Odors
  - Field screening or test results
  - Any observed evidence of contamination in samples or cuttings

- Copies of computer-generated boring logs will be included in the draft and final RI report.

No electronic logging of boreholes will be conducted by TtNUS as such activities are outside of the scope defined for this project.

Air quality will be monitored in and near each borehole during drilling operations using a photoionization detector (PID).

4.5.2 Subsurface Soil Sample Collection

Collection of soil samples for geotechnical analysis will be performed in conjunction with the soil boring program using downhole sampling devices.

One soil sample for geotechnical analyses will be collected from each DPT soil boring. Soil samples for geotechnical analysis will be collected using a Shelby tube, bag samples or quart jars. Shelby tube samples will be sealed with tape, wax, sealed plugs, or other appropriate material, to prevent material from escaping or the samples from drying out.

Recovered soil cores will be field scanned with a PID at approximate one-foot intervals and at changes in stratigraphy or lithology. All field-screening readings (i.e., PID) will be recorded in the Field Log of Boring. Soil samples collected for geotechnical analysis will be analyzed for pH, fraction organic content, and effective porosity.

The samples will be packaged for shipment at the conclusion of each day's sample collection activities. Further details regarding sample management are provided in Section 5.0.

4.6 MONITORING WELL INSTALLATION AND SAMPLING

Temporary monitoring wells will be installed in each of the DPT soil borings drilled at the former Incinerator Disposal Site. Temporary monitoring wells will allow for the collection of groundwater samples for laboratory analysis to aid in the determination of the classification of groundwater at the site and to determine the depth to groundwater. The temporary monitoring wells will be allowed to equilibrate overnight. If no measurable groundwater is present, the temporary monitoring wells will be plugged and abandoned. The riser pipe and screen assembly will be pulled and the borehole will be plugged, as described in Section 4.5.3. If groundwater is present in the monitoring well(s), the well(s) will be sampled and then plugged and abandoned.

The following subsections present discussions pertaining to the drilling, installation, construction, and sample collection pertaining to the temporary groundwater monitoring wells.

4.6.1 Temporary Well Drilling and Installation

Temporary groundwater monitoring wells will be installed at the sites as shown on Figure 4-4. Borings in which the temporary wells are to be installed will be advanced and documented using the procedures described in Section 4.5. Temporary wells will consist of flush-threaded 1-inch inner diameter (ID), Schedule 40 polyvinyl chloride (PVC) riser pipe and factory slotted screen. The inner and outer diameter of well screens will be measured. The riser pipe will be composed of Schedule 40 PVC, and will be set round, plumb and true to line as much as possible, given the nature of the subsurface conditions. The screen slot size will be 0.01 inches. The screen length will be 5 to 10 feet depending on the total depth of the borings. Due to the narrow size of the annulus a pre-pack screen will be used.

The natural formation will be allowed to collapse around the well screen as the drill rods are removed. This will provide an effective barrier between the screen and the surface. A bentonite seal will not be emplaced for the temporary well, and the temporary wells will not be developed. The temporary monitoring wells will be allowed to equilibrate overnight.

A record of the type of temporary well construction will be completed in the field for all wells. Information provided in the logs will include the following:

- Total depth of the completed well
- Depth and type of well casing
- Static water level upon completion of the well
- Pertinent construction details of the temporary wells, such as length, location, diameter, slot size, material (e.g., PVC) and manufacturer of the well screens; location of any blank pipe installed in the well.
- Description of any difficulties encountered during well construction and PID readings.

All well construction materials will be cleaned prior to insertion into the ground, unless the well construction materials have been previously decontaminated and/or remained factory-sealed until immediately prior to commencement of well construction activities. No attempt will be made to disinfect temporary wells. Precautions will be used to prevent tampering with wells and the entrance of foreign materials, including runoff, at all times during well construction/sampling.

4.6.2 Groundwater Sampling and Preservation Methodology

Groundwater samples will be collected from the temporary monitoring wells using a disposable bailer. Prior to sampling the groundwater, the water level within the well will be measured from an estimate of ground surface using a decontaminated electronic water level indicator.

Groundwater samples collected will be analyzed for total dissolved solids (TDS). Preservatives, if required, will have been placed into sample containers at the analytical laboratory prior to transport of the sample containers to the site. The groundwater samples to be submitted for laboratory analyses will be immediately labeled and placed on ice in an insulated cooler awaiting packing and shipment. The samples will be packaged for shipment at the conclusion of each day's sample collection activities.

All water samples will be analyzed for the parameters listed in the individual site analytical program tables included in Section 6.0 using the analytical methods, sample containers, holding times, and preservation methods listed in the tables.

After collection of the liquid samples, the remaining liquid obtained will be field measured for temperature, conductivity, dissolved oxygen, turbidity and pH using a water quality meter.

4.6.3 Backfilling and Abandonment of Borings

The temporary monitoring wells will be plugged and abandoned following collection of groundwater samples. The riser pipe and screen assembly will be pulled. Borings will be backfilled using cement/bentonite or bentonite slurry. After allowing the grout to cure for a period of 24 hours, the borehole will be topped off with clean soil.

Borehole locations will be identified with an appropriately marked wooden stake (approximately one foot in length, with flagging tape attached) driven into the ground for future GPS surveying.

4.7 FIELD QA/QC SAMPLE DESCRIPTION

The QA/QC samples will be collected during the investigation sampling activities to assess the variability introduced in sampling, handling, shipping and laboratory analysis. Field QA/QC samples include equipment blanks, QC samples (field duplicates), and Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples. The types and frequency of field QA/QC samples are described in the following subsections.

4.7.1 Equipment Blanks

Equipment (rinsate) blanks are samples that are prepared in the field to assess the effectiveness of decontamination procedures applicable to soil and groundwater sampling equipment. Equipment blanks will be prepared by pouring analyte-free deionized or distilled water through the decontaminated sampling equipment and collecting the rinsate in appropriate clean laboratory supplied sample containers.

Equipment blanks will be collected at a rate of 5 percent, being defined as one equipment blank for every 20 or less samples per matrix. Equipment blanks will be analyzed for the parameters listed in the site analytical program tables included in Section 6.0.

4.7.2 Field Duplicates

Field duplicates are samples that are divided into two portions at the time of sampling. Field duplication provides precision information regarding homogeneity, handling, shipping, storing, preparation, and analysis. Field duplicates will be collected at a frequency of one per every 10 or less samples per matrix (solid or liquid).

4.7.3 Matrix Spike and Matrix Spike Duplicate Samples

Matrix spike and matrix spike duplicate (MS/MSD) samples will be analyzed at a rate of one set per every 20 or less investigation surface water, soil and sediment surface samples. For water samples, collection of separate MS and MSD samples will entail filling two additional sets of sample containers for each MS and MSD set. The sample aliquots will be collected in sequence with the corresponding soil investigation samples as previously discussed in this section. MS and MSD samples will be clearly identified as such to the analytical laboratory.

4.7.4 Temperature Blanks

Temperature blanks, to be supplied by the analytical laboratory, will be included in each cooler containing samples that are shipped to the laboratory.

4.8 FIELD MEASUREMENTS

The following subsections present discussions pertaining to field measurements that will be performed in conjunction with the SI.

4.8.1 Field Parameters

Field parameters to be measured during the course of the investigation are as follows:

- Volatile organics scanning of worker's breathing space and recovered soil samples.
- Water quality (pH, temperature, specific conductance, turbidity, dissolved oxygen, ORP) of water samples.
- XRF analysis of soil samples.

Volatile organics scanning will be conducted using a Thermo Environmental Instruments Model 580S Organic Vapor meter photoionization device or similar PID apparatus. Water quality parameters will be measured using a Horiba U-10 or equivalent device. XRF analysis will be conducted using a Niton XLt 700 Series, Innov-X XT400, or equivalent instrument.

Calibration and maintenance of the equipment discussed above are discussed in Sections 4.8.2 and 4.8.3, respectively.

4.8.2 Equipment Calibration

Instruments used to collect field data will be identified with a unique identification number so that the instrument calibration and maintenance history can be traced. Each instrument will be calibrated prior to its delivery to the field and supplied with fresh calibration standards. Field instruments used to collect data for temperature, pH, and conductivity will be calibrated against known standards using the manufacturer's recommended procedures. SOPs for calibrating the equipment will be provided for field personnel. Calibration standards for field instruments will be obtained from a commercial source and used as received unless otherwise specified by the manufacturer. Traceability of those standards will be maintained through routine procurement documents. Standards for field instruments will be stored in a manner consistent with the manufacturer's recommendations.

The project field notebook or the calibration log sheet will be used to document the calibration of field testing equipment. Documentation of calibration will include the following:

- Date of calibration
- Identification number of instrument being calibrated
- Initials of the person performing the calibration
- Instrument readings versus standard value

Additional information will be recorded at the discretion of the individual performing the calibration.

4.8.3 Equipment Maintenance

Equipment used by TtNUS will be maintained in accordance with the manufacturer's instructions. Routine maintenance and equipment repairs performed in the field will be documented in the project field notebook or on equipment maintenance forms and maintained in an equipment maintenance file.

Whenever an instrument fails to operate properly, the instrument may either be repaired in the field or in-house. If these attempts are unsuccessful, the instrument will be sent out for repairs. In most cases, an identical instrument (manufacturer and model) can be obtained as an alternate to the inoperable equipment. In the event that an identical instrument can not be obtained, however, contingency plans will include the following:

- Substitute an instrument of equivalent accuracy and precision as the original.
- Postpone the field event until such time that a suitable replacement instrument can be located or the original equipment can be repaired.

4.9 DECONTAMINATION PROCEDURES

Proper decontamination of field equipment is an integral part of the overall QC process. A decontamination pad will be constructed for heavy equipment, if needed. The decontamination pad will be set up at a sufficient distance from the sample locations to prevent cross-contamination. The pad will consist of a 30-mil high-density polyethylene membrane liner supported and secured on all sides by a 1-foot high berm constructed of soil or landscape timbers. Wash racks will be used at the decontamination pad to hold the equipment above ground to facilitate cleaning during decontamination activities. All decontamination liquids will be pumped either to a tank or to 55-gallon drums and stored in a secure designated area until final disposition. All containers used to containerize waste shall be Department of Transportation (DOT) approved. All containers shall be clearly identified and labeled. In addition, all containers shall be labeled "PENDING ANALYSIS".

The following subsections detail decontamination procedures that will be used throughout the field activities conducted at the site.

4.9.1 Drilling Equipment

Heavy equipment (e.g., bits, rods, tools, etc.) will be pressure washed with site supplied water at the designated decontamination area prior to commencement of intrusive operations, after completion of each boring, and upon the conclusion of intrusive operations. The entire drilling rig will be pressure cleaned prior to the initiation and upon completion of field activities.

Heavy equipment will be free of leaks that could contaminate borings (e.g., hydraulic fluid, oil, gasoline, etc.). Non-hydrocarbon type greases (“environmental grease”, non-petroleum based) may be used sparingly on rod shoulders to ease rod breaking upon completion of borings.

4.9.2 Sampling Equipment

Prior to and after the completion of all sampling events, sampling equipment (e.g., split spoons, hand augers, etc.) will be decontaminated by pressure washing, or through the following steps:

- Wash in solution of tap water and Liquinox® soap or equivalent
- Spray equipment with isopropyl alcohol
- Tap water rinse
- Double rinse with deionized or distilled water
- Air dry, if feasible

Tap water for decontamination will be obtained from a city public water supply. It is assumed that the public water supply is adequate for use as decontamination rinse water and that no analytical testing of the water is required.

4.9.3 Field Measurement Equipment

Field measurement equipment that does not directly contact environmental media (i.e., PID) will be maintained in a clean manner. In the event that the PID probe contacts soil, the exterior probe will be wiped clean with an unused paper towel prior to reuse. Additionally, the probe will be disconnected and dirt and/or debris will be removed from the interior of the probe before additional measurements are conducted.

Field measurement equipment that directly contacts environmental media (i.e., interface probe, flow-through cell, etc.) will be sprayed with isopropyl alcohol and rinsed with distilled/deionized water after each usage. During measurement operations involving groundwater, the probes of these instruments will be rinsed twice with aliquots of the groundwater sample to be measured prior to actual collection of groundwater-related data.

4.9.4 Well Sampling Equipment

Well development and sampling equipment (e.g., interface probe, etc.) will be sprayed with isopropyl alcohol and be rinsed with distilled/deionized water prior to insertion into monitoring wells. New cotton or polypropylene rope will be used to introduce new disposable bailers into monitoring wells.

4.10 FIELD DOCUMENTATION

Field documentation and tracking of sample custody are integral portions of the overall QA/QC process for the SI. The field documentation system serves as a record of activities conducted in the field during sample collection and data generation and provides the means to identify track and monitor each sample from the time of collection through final reporting of data. All field documentation will be completed in the field notebook or data sheets (e.g., boring log forms, sampling sheets, etc.) using indelible ink. Procedures pertaining to sample custody and documentation to be employed during the SI are discussed in Section 5.0.

4.10.1 Sample Identification

The sample identification scheme presented below will be used to identify and label all field samples collected and all field QC blanks created during the SI. The sample identification procedure will be used

for all sample labels and chain-of-custody documents in order to maintain consistency in the labeling process and to allow efficient handling of a large number of samples from different sources.

The sampling numbers will be assigned as follows:

ss-xxxaa-bbcc-dd

- **ss** – refers to the site being investigated, where
  - ID = Incinerator Disposal Site
  - BG = Background Area
- **xxx -** describes the type of sample, where:
  - SB = soil boring sample
  - GW = groundwater sample
  - SS = surface soil sample
  - SW = surface water sample
  - SD = sediment sample
  - IDW = investigation derived waste sample
- **aa** - refers to the sample location number
- **bb** - indicates the top depth of the sample, where applicable
- **cc** - indicates the bottom depth of the sample, where applicable

In the case where a QA/QC modifier is used (e.g., EB [see below]), the depth indicator will be separately and sequentially incremented for each type of blank. The first equipment blank will be labeled 001, the second 002, etc.

- **dd** - is a QA/QC modifier, when needed, where:

  - QC Quality Control sample duplicate
  - EB Equipment Blank
  - MS Matrix Spike
  - MSD Matrix Spike Duplicate

The MS/MSD identifier is added as a suffix to a given sample that has been designated as having an associated MS/MSD. For soil samples, since MS/MSDs will be extracted by the laboratory from the same aliquots as the normal environmental samples, the sample label and chain-of custody form will indicate this to the laboratory.

For water MS/MSD samples, separate aliquots will be created for samples. Therefore, each aliquot would contain its own label one for the MS and one for MSD suffixes.

4.10.2 Field Log Books

The sampling coordinator for each field team will maintain a field notebook and field data sheets containing pertinent information regarding the samples. The field logs are intended to provide sufficient data and observations to enable the field team and other interested parties to reconstruct events that occur during field activities. The field notebook will be a bound book with consecutively numbered pages. Entries in the field notebook and the associated field data sheets will be made in indelible ink and may include the following information, as appropriate:

- Identification of the project Work Plan (by reference)
- Names of all field personnel present
- Date and times of arrival and departure for all field personnel
- Names, arrival, and departure times of site visitors
- Instrument calibration records
- Chronology of site events
- Arrival and departure of equipment
- Details about drilling and sampling activities
- Location (area) of sampling
- Sample medium (e.g., soil, groundwater, etc.)
- Location of sampling points
- Nomenclature of samples collected
- Identity of the sampler(s)

- Date and (military) time of sample collection
- Preservatives used, if any
- Analytical parameters to be measured
- References such as maps or photographs of the sampling site (if necessary)
- Field observations, such as stained soil, stressed vegetation, or if location is in a drainage area, etc.
- Weather conditions, including estimated temperature
- Any field measurements made (e.g., pH, PID reading, etc.)
- Signature of person who made entries in the sample log book
- Copy of chain-of-custody
- Details about sample handling and transfer of samples
- Details about sample packaging and shipping
- Drum log record, including drum number, date drilled, drum contents (soil or water) and any remarks describing the origin of the waste
- Details about health and safety issues
- Unusual occurrence or activities
- Any procedural steps taken that deviate from those outlined in this FSP.

4.10.3 Boring Logs and Well Construction Diagrams

Boring logs and well construction diagrams will be maintained for all soil borings. Information to be recorded on geologic boring logs is presented in Section 4.5. Boring logs will not be prepared for surface soil or sediment samples. The physical characteristics of these samples (e.g., color, lithology, general appearance, odor, etc.) will be recorded on a sample log sheet or field notebook. Similarly, sample log sheets will be prepared for surface water and groundwater samples.

4.11 LAND SURVEYING

Land surveying will be conducted to determine the horizontal location of all soil borings, temporary monitoring wells, surface soil, surface water, and sediment samples.

Land surveying will be conducted by TtNUS using a Trimble GPS Pathfinder Pro XRS or similar system to determine the horizontal (XY) location of all sample locations. Accuracy of locations will be to approximately one-half meter in the horizontal axis. All points will be referenced to the Texas State Plane Coordinate System North American Datum 1983 (NAD 83).

Due to the heavy vegetation and tree canopy at the site, use of GPS may be restricted. In that case an alternate means of identifying the sample locations will be employed. This may involve measurement of the location using a tape measure and/or compass from a known point.

5.0 SAMPLE MANAGEMENT

The procedures for proper management of samples to be collected throughout the course of the investigation are discussed in the following subsections.

The following record keeping items will be used to document sample collection and handling:

- Chain-of-custody records (see Section 5.2).
- Sample Data Sheets.
- Freight bills for samples shipped via an overnight carrier.
- Analytical reports (electronic file and hard copy).

All samples collected during the course of the investigation will be placed in appropriate laboratory-supplied, decontaminated sample containers, with the exception of water sample aliquots designated for pH/temperature/turbidity/conductivity testing. These samples will either be placed directly into the sample analysis reservoir of the pH/conductivity meter or into a previously unused laboratory-supplied, decontaminated glass sample container for testing.

The following guidelines and procedures pertaining to sample containers shall be adhered to throughout the course of the investigation:

- The appropriate type and amount of chemical preservative, if required, will be placed in the sample containers prior to sample collection. Addition of preservatives is usually performed at the analytical laboratory. Specific sample container and preservative requirements are listed in Table 6-1.

- After samples are collected, caps will be screwed tightly onto the containers to provide a seal and to prevent loosening of the cap during transport to the analytical laboratory.

Each member of the sampling crew will put on a new pair of gloves at each sampling location. The person collecting the samples will wear disposable gloves and will exchange them for a fresh pair between collection of each sample.

The sample numbering scheme discussed in Section 4.10 will be used for the investigation.

5.1 SAMPLE SECURITY

Sample security involves procedures that ensure sample integrity. Security is required until final disposal of the sample after laboratory analysis is complete. Aspects of sample security are discussed below.

Security of the Sample in the Field. Samples, once collected, will be in the possession of the sampling crew at all times. The QC samples will be collected, which, when analyzed, also will document the integrity of the sample.

Security of the Sample in the Lab. Samples will be sorted in a secure, limited access, area of the laboratory. Upon receipt of the ice chests, laboratory personnel will check the temperature of the ice bath, the condition of the samples, and the accuracy of the accompanying paperwork.

5.2 SAMPLE CUSTODY

The following chain-of-custody procedures are intended to document sample possession from the time of sample collection until ultimate disposal of the sample. For the purposes of these procedures, a sample is considered to be in custody if it is:

- In one's actual possession.
- In view after being in one's possession.
- Secured (i.e., locked up) so that no one can tamper with it.
- In a secured area, available to authorized personnel only.

Strict chain-of-custody procedures will be maintained throughout the duration of the SI. These procedures include the following:

- A custody seal, which is an integral part of the custody process, is used to detect unauthorized tampering with sample containers. The seal will be signed, dated, and affixed to the shipping container. After the custody seal has been attached to the shipping container, the only access to the shipping container is by breaking the custody seal.

- Two custody seals will be attached to each shipping container used to ship samples.

- A chain-of-custody record will be completed in the field. The original will accompany the samples, and copies will be maintained at intermediate steps.

- At every point where the responsibility for custody of the samples changes, the new custodian will sign the chain-of-custody record and note the date and time. A copy of the signed record will be made by the previous custodian, and a copy will be sent to the TtNUS TOM or his/her designate to allow tracking of possession of the samples.

5.3 SAMPLE PACKAGING AND SHIPPING PROCEDURES

The following guidelines and procedures pertaining to sample packaging and shipping shall be adhered to throughout the duration of the SI:

- Sample containers will be placed in previously unused polyethylene Ziplock® (or equipment) bags to keep them dry during shipment to the analytical laboratory. Several sample containers may be placed in each bag. As much air as possible will be removed from the bag to conserve space within the shipping container.

- Sample containers will then be placed in shipping coolers containing packing materials and ice.

- Prior to shipping, confirm that the sample is properly labeled and sealed. To the maximum extent possible, samples from a given boring or other sample collection locale should be contained within a single shipping container.

- Place a large, empty, previously unused plastic trash bag in a dry, clean ice chest and place samples into the trash bag without packing them too tightly against one another.

- Place an adequate amount of ice over the samples, taking care to place ice around and in between each sample bag where possible.

- Place plastic bubble-wrap in the plastic trash bag, surrounding the samples for cushioning and absorption of water.

- Twist the trash bag to create a "goose-neck" and seal the trash bag by wrapping tape around the "goose-neck".

- Place the completed and signed chain-of-custody form within a plastic bag and tape the bag to the inside cover of the ice chest.

- Close the lid of the ice chest and wrap clear packing/strapping tape around the ice chest on both ends of the ice chest. Be sure that the drain plug of the ice chest is taped shut securely.

- Affix a minimum of two custody seals to the ice chest, extending across the junction between the lid and the body of the ice chest, and secure them by placing clear packing/strapping tape over the custody seals and onto the exterior of the shipping container.

- Secure appropriate shipping labels to the shipping container and record the freight bill number within the field notebook.

- Deliver the shipping container(s) to an overnight carrier for shipment.

6.0 LABORATORY ANALYTICAL PROCEDURES

The following subsections present a detailed discussion of the analytical program that will be followed for the investigation conducted at the former Incinerator Disposal Site. Table 6-1 summarizes the analytical parameters, sample matrices, number of samples, analytical methods, sample volumes, container types, and preservation procedures that will be utilized for the SI.

6.1 ANALYTICAL PARAMETERS AND METHODS

The following subsections discuss analysis of soil, groundwater, surface water/sediment and QA/QC samples that will be collected for the project.

6.1.1 Surface Water Samples

All surface water samples will be collected as described in Section 4.2. Surface water samples collected for chemical analysis will be analyzed for explosives, Target Analyte List (TAL) metals and perchlorate as listed in the site analytical program table, Table 6-1.

6.1.2 Sediment Samples

All sediment samples will be collected as described in Section 4.3. Sediment samples collected for chemical analysis will be analyzed for explosives, TAL metals and perchlorate as listed in the site analytical program table, Table 6-1.

6.1.3 Soil Samples

All soil samples will be collected as described in Section 4.4 and 4.5. Soil samples collected for chemical analysis will be analyzed for explosives and TAL metals. In addition, soil samples collected from each source will also be analyzed for perchlorate. Soil samples collected in the vicinity of the boiler will also be analyzed for PAHs. Soil samples will be analyzed for the parameters listed in the site analytical program table, Table 6-1.

TABLE 6-1

ANALYTICAL PROGRAM
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS

Analysis	Method [1]	Number of Samples						Holding Time	Container Volume and Material	Preservation
		Investigation Samples	Trip Blanks	MS/ MSD	Rinsate Blanks	Duplicate Samples	Total			
SURFACE WATER										
Explosives[4]	8330	9	1	1	1	1	13	7 days	2 x 1000 mL Amber	4 oC
TAL Metals	6010B, 7000A [2]	18	0	1	1	2	22	6 months/ 28 days	1 x 500 ml plastic	HNO3
Perchlorate	8321	18	0	1	1	2	22	28 days	1 X 125 ml vials	NONE
SEDIMENT										
Explosives[4]	8330	2	0	0	0	0	2	14 days	1 X 4-oz Wide-mouth glass jar	4 oC
TAL Metals	6010B, 7000A [2]	2	0	0	0	0	2	6 months/ 28 days	1 X 4-oz Wide-mouth glass jar	NONE
Perchlorate	8321	2	0	0	0	0	2	28 days	1 X 4-oz Wide-mouth glass jar	4 ^{o}C
SURFACE SOIL										
Explosives[4]	8330	3	0	0	0	0	3	14 days	1 X 4-oz Wide-mouth glass jar	4 oC
TAL Metals	6010B, 7000A [2]	3	0	0	0	0	3	6 months/ 28 days	1 X 4-oz Wide-mouth glass jar	NONE
Polyaromatic Hydrocarbons	8270C							14 days	1 X 4-oz Wide-mouth glass jar	4 oC
Perchlorate	8321	3	0	0	0	0	3	28 days	1 X 4-oz. Wide-mouth glass jar	NONE
GROUNDWATER										
Total Dissolved Solids	160.1	2	0	0	0	0	2	7 days	1 X 125 ml vials	4 ^{o}C
GEOTECHNICAL - SOIL										
pH	9045C	10	0	0	0	0	10	Immediate	1 X 4-oz Wide-mouth glass jar	4 oC
Fraction Organic Content		2	0	0	0	0	2			
Effective Porosity		2	0	0	0	0	2			

TABLE 6-1 (Continued)

ANALYTICAL PROGRAM
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXASN

Analysis	Method [1]	Number of Samples						Holding Time	Container Volume and Material	Preservation
		Investigation Samples	Trip Blanks	MS/ MSD	Rinsate Blanks	Duplicate Samples	Total			
IDW - SOIL										
TCLP Volatile Organics	1311/8260B	2	0	0	0	0	2	14 days	1 X 4-oz. Wide-mouth glass jar	4 ^{o}C
TCLP Semivolatile Organics	1311/8270C	2	0	0	0	0	2	14 days	2 X 8 oz. Wide-mouth glass jar	4 ^{o}C
TCLP Pesticides	1311/8081A	2	0	0	0	0	2	14 days	2 X 8 oz. Wide-mouth glass jar	4 ^{o}C
TCLP Herbicides	1311/8151A	2	0	0	0	0	2	14 days	2 X 8 oz. Wide-mouth glass jar	4 ^{o}C
TCLP Metals	1311/6010B, 7000	2	0	0	0	0	2	6 months/ 28 days	2 x 16-oz. Wide-mouth glass jar	NONE
Reactivity	SW-846 Chapter 7	2	0	0	0	0	2	7 days	1 X 4-oz. Wide-mouth glass jar	NA
Corrosivity	1110	2	0	0	0	0	2	NONE	1 X 4-oz. Wide-mouth glass jar	NONE
Ignitability	1020A	2	0	0	0	0	2	NA	1 X 4-oz. Wide-mouth glass jar	4 oC
IDW - WATER										
TCLP Volatile Organics	1311/8260B	1	0	0	0	0	1	7 days	3 x 40-ml vials	4 ^{o}C
TCLP Semivolatile Organics	1311/8270C	1	0	0	0	0	1	7 days	2 X 1000 ml Amber Jar	4 ^{o}C
TCLP Pesticides	1311/8081A	1	0	0	0	0	1	7 days	2 X 1000 ml Amber Jar	4 ^{o}C
TCLP Herbicides	1311/8151A	1	0	0	0	0	1	7 days	2 X 1000 ml Amber Jar	4 ^{o}C
TCLP Metals	1311/6010B, 7000	1	0	0	0	0	1	6 months/ 28 days	2 x 16-oz. Wide-mouth glass jar	HNO3
Reactivity	SW-846 Chapter 7	1	0	0	0	0	1	7 days	2 X 1000 ml Amber Jar	NA
Corrosivity	1110	1	0	0	0	0	1	NONE	1 X 125 ml vials	NONE
Ignitability	1020A	1	0	0	0	0	1	NA	1 X 125 ml vials	4 oC

Notes:

(1) All methods from EPA SW-846 except Texas Total Petroleum Hydrocarbons (TX TPH) Method 1005

(2) For mercury, the totals analysis will be completed using Method 7471. For all other metals the totals analysis will be completed using Methods 3050/6010 Trace Inductivety Coupled Plasma (ICP).

(3) Perchlorate analyzed using Department of Defense (DoD) SOP HPLC/ESI/MS

Definitions:

TAL=Target Analyte List
IDW=Investigative Derived Waste
oz.= Ounce
^{o}C=Degrees celsius
ASAP=As soon as possible
ml=milliliter
TCLP=Target Compound List Product
ASTM=American Society of Testing and Materials

(4) 1,3,5-Trinitrobenzene; 1,3-Dinitrobenzene; 2,4,6-Trinitrotoluene; 2,4-DA-6-NT; 2,4-Dinitrotoluene; 2,6-DA-4-NT; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3,5-DNA; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene; 4-Nitrotoluene; HMX; Nitrobenzene; RDX; Tetryl.

(5) 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene

6.1.4 Groundwater Samples

All groundwater samples will be collected as described in Section 4.6. Groundwater samples collected for chemical analysis will be analyzed TDS, as listed in the site analytical program table, Table 6-1.

6.1.5 QA/QC Samples

The QA/QC samples to be collected during the course of the investigation are as follows:

- Equipment blanks (see Section 4.7.1).
- Duplicate samples (see Section 4.7.2).
- MS/MSD samples (see Section 4.7.3).

Equipment blanks, duplicates, and MS/MSDs will be analyzed for the soil, sediment and surface water constituents listed in Table 6-1.

6.1.6 Geotechnical Soil Samples

Soil samples will be collected as described in Section 4.6. Soil samples collected for geotechnical analysis will be analyzed for pH, fraction organic content and effective porosity. Soil samples will be analyzed for the parameters listed in the site analytical program table, Table 6-1.

6.1.7 IDW Samples

Soil and liquid Investigation Derived Waste (IDW) samples will be collected as described in Section 7.3. The soil and liquid IDW samples will be analyzed for the waste profile parameters listed in Table 6-1.

6.1.8 Holding Times and Preservatives

Holding times and preservatives for all sample types described within Section 6.1 and subsections thereof are listed in Table 6-1.

7.0 WASTE MANAGEMENT

This section of the FSP describes the procedures that will be used to handle and store IDW requiring off-site disposal that will be generated from investigation activities conducted at the former Incinerator Disposal Site.

7.1 WASTES TO BE GENERATED

7.1.1 Waste Minimization

Waste minimization techniques will be employed, where possible, to reduce the volume of IDW generated as part of the investigation activities.

7.1.2 Drill Cuttings

Drill cuttings, which are excess soil removed by the direct push, hollow stem augers and/or hand auger drilling techniques, will be generated while advancing the soil borings. Minimal IDW is expected to be generated as a result of surface soil sampling.

7.1.3 Produced Groundwater

Minimal groundwater is expected to be generated as a result of sampling the temporary monitoring wells.

7.1.4 Used Personal Protective Equipment (PPE)

Used PPE will include the disposable work clothing, such as gloves and coveralls, worn by field personnel.

7.1.5 Decontamination Fluids

Procedures for equipment decontamination, as described in Section 4.9, will be implemented to minimize the spread of contamination to clean zones, to reduce exposure to personnel, and to reduce cross-contamination of samples when equipment must be used more than once during a sampling event. Decontamination fluids will include soapy water, isopropyl alcohol and rinse water.

7.1.6 Miscellaneous Debris

Miscellaneous debris such as waste paper, boxes, paper cups and miscellaneous containers also will be generated at the site during investigation activities.

7.2 HANDLING OF WASTES GENERATED DURING INVESTIGATION ACTIVITIES

7.2.1 Waste Segregation

Waste segregation activities will be utilized to minimize the mixing of potential hazardous and non-hazardous wastes. All wastes will be segregated according to waste type (i.e., solids, liquids, etc.).

7.2.2 Drill Cuttings

All drill cuttings generated during the investigation activities will be placed in DOT approved (Specification 17-C/H) 55-gallon drums that will be stored on-site until completion of the investigation activities.

7.2.3 Produced Groundwater

All groundwater generated during the investigation activities will be placed in DOT approved (Specification 17-C/H) 55-gallon drums that will be stored on-site until completion of the investigation activities.

7.2.4 Used Personal Protective Equipment (PPE)

Potentially contaminated disposable items (i.e., used PPE, bailer cord, etc.) will be containerized in DOT approved (Specification 17-C/H) 55-gallon drums that will be stored on-site until completion of the investigation activities.

7.2.5 Decontamination Fluids

As mentioned previously, procedures for equipment decontamination will be implemented to minimize the spread of contamination to clean zones, to reduce exposure to personnel, and to reduce cross-contamination of samples when equipment must be used more than once during a sampling event.

The decontamination pad will be located and constructed as described in Section 4.9. In addition, all decontamination procedures will be conducted as described in Section 4.9.

All decontamination fluids generated during the investigation activities will be placed in DOT approved (Specification 17-C/H) 55-gallon drums that will be stored on-site until completion of the investigation activities.

7.2.6 Miscellaneous Debris

Non-contaminated trash generated during the SI activities will be bagged and sealed. All non-contaminated trash will be transported and disposed off-site as municipal waste.

7.2.7 Drum Labeling

The 55-gallon drums for storage of drill cuttings, development/purge water, decontamination fluids, and used PPE will be provided by TtNUS. All drums used to containerize waste will be DOT-approved. The drums will be labeled with the following information:

- Project name
- Site name
- Date
- The type of material contained (e.g., soil or water).
- The source of the waste material (e.g., boring number).
- The date of commencement of filling of the container or drum.
- NASCC Point of Contact and number.

In addition, drums used for storage of waste will be labeled "PENDING ANALYSIS."

A drum log record will be used for drums used to containerize the derived wastes. This record will include the drum number, date generated, contents (soil, water, PPE) and any remarks, if applicable, describing the origin of the waste. An example of the drum log record is included as Figure 7-1.

7.3 WASTE PROFILING AND DISPOSAL

All IDW will be stored on-site and will remain there until waste characterization results are available and disposal is implemented. Drums of IDW will be stored at NALF Cabaniss at a location designated by the Navy. Waste profiling will be completed as follows:

- Liquids – One IDW aliquot will be collected from each drum of liquids and composited into one liquid sample for the Incinerator Disposal Site. The liquid sample will be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) volatiles, TCLP semivolatiles, TCLP herbicides, TCLP pesticides, TCLP metals and reactivity, corrosivity and ignitability (RCI).

- Soil – One soil aliquot will be collected from each drum and composited into one soil sample. The soil sample will be analyzed for TCLP volatiles, TCLP semivolatiles, TCLP herbicides, TCLP pesticides, TCLP metals and RCI.

Upon completion of waste profiling activities, the results will be transmitted to NASCC personnel who will be responsible for the manifesting and disposal of the IDW.

FIGURE 7-1

DRUM LOG SHEET

Drum Number	Date Generated	Contents	Origin of Waste

8.0 CORRECTIVE ACTION

The need for corrective actions may become apparent during surveillance of field activities, procurement of services and supplies, "out of control" situations in laboratories, or other operations that may affect the quality of work. Any and all nonconformance's with the established quality control procedures will be expeditiously identified and controlled. No additional work that is dependent on the nonconforming activity will be performed until the identified nonconformance is corrected.

Depending upon the nature of a problem, the corrective action implemented may be formal or informal. In either case, occurrence of the problem, the corrective action employed, the outcome of these actions, and verification that the problem has been eliminated must be documented.

8.1 FIELD AUDITS

Field audits may be performed to help assure that the field data are being collected accurately and correctly, and that the collection of field data and samples are consistent with the procedures developed for these activities. If a problem arises that can be isolated, corrective actions will be considered and implemented as appropriate.

The audits will include checks on adherence to all applicable procedures outlined in this FSP, as well as the accompanying WP, QAPP, and HASP. The auditor will prepare audit checklists or audit guides. The depth and scopes of the audit will be determined and incorporated into the checklist or guidelines. The audit will cover, but not be limited to, the following items:

- Adherence to sample collection procedures
- Completeness and accuracy of sample chain-of-custody forms
- Documentation of field activities
- Equipment maintenance and calibration
- Training requirements for site workers
- Documentation of variances from field activities and corrective actions

Where an audit team is involved, the audit team leader will establish the ground rules for the audit and assign to various team members the specific areas each is to cover in the audit.

Representatives of the Navy may, at their discretion, perform an external audit during regular business hours to conduct an examination of records, equipment, procedures and other items as necessary.

The above checklist/guide will be used to guide the audit and to ensure adequate depth, scope, and continuity. However, an auditor will not restrict the audit when evidence raises questions not specifically addressed in the checklist. The audit activities will include the review of objective evidence to verify adequate implementation of the QA program.

The auditor will record each finding of nonconformance on a form. When a finding is identified, sufficient investigation will be conducted to determine the basic cause of the finding.

Any finding that requires immediate corrective action will be reported to the TtNUS TOM and recorded on a Quality Notice form.

8.2 FIELD CORRECTIVE ACTION

The site manager or task team leader is responsible for assuring that all field equipment is functioning properly, that proper materials are utilized, and that samples are handled properly. Any situation adverse to quality will be properly investigated, documented in a nonconformance report, and reported to the TtNUS TOM for appropriate corrective action.

Whenever a piece of field equipment fails to operate properly, the instrument will either be repaired or replaced with an equivalent instrument. Field data measurements that are suspect (i.e., grossly extreme or significantly different from all the other readings) will be evaluated by project management and repeated if necessary.

Data deemed unacceptable following the implementation of the required corrective action measures will not be accepted by the TtNUS TOM, and follow-up corrective actions will be explored.

8.3 CORRECTIVE ACTIONS FOLLOWING DATA ASSESSMENT

The project QA officer will review the field and laboratory data for this project to ensure that all QA/QC objectives are met. If any nonconformance's were found in the field procedures, sample collection procedures, field documentation procedures, laboratory analytical and documentation procedures, and data assessment and validation procedures, the impact of those nonconformance's on the overall project QA objectives will be assessed. Appropriate actions may be recommended to the TtNUS TOM so that the project objectives can be accomplished.

9.0 REFERENCES

Malcolm Pirnie, 2005. Final Preliminary Assessment, Naval Auxiliary Landing Field Cabaniss, Texas, Malcolm Pirnie, Inc., April 2005.

TtNUS 2006A. MEC Work Plan, Naval Auxiliary Landing Field Cabaniss, Texas.

TtNUS 2006B. Health and Safety Plan for Incinerator Site, NALF Cabaniss, Texas.

CFR, 1999. Office of the Federal Register National Archives and Records Administration. *Code of Federal Regulations, Part 1926*, Revised as of 1 July 1999.

EPA, 1987. Office of Toxic Substances Guidance Document for the Preparation of Quality Assurance Project Plans *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, 9 September 1987.

Guidance Documents from U.S. Army Engineering and Support Center, Huntsville, AL. (USACE):

Safety and Health Requirements Manual, EM 385-1-1, 3 September 1996.

Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations, EP 385-1-95a, 27 August 2004.

Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities, EP 75-1-2, 01 August 2004.

Type ll Work Plan OE-005-01.01, Revised 1 October 2002.

Technical Management Plan OE-005-02.01, Revised 1 October 2002.

Explosives Management Plan, OE-005-03.01, Revised 1 October 2002.

Site Safety and Health Plan, OE-005-06.01, Revised 1 October 2002.

Monthly Status Report New Number OE-080, Revised 3 March 2000.

Quality Control Plan USACE DID OE-005-11.01, Revised 1 October 2002.

Geographic Information System Plan OE-005-14.01, Revised 1 October 2002.

DoD, 2004. Department of Defense Explosives Safety Board. *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel,* TP 18, 20 December 2004

NSSC, 2005. Director of Commander, Naval Sea Systems Command, *Ammunition and Explosives Safety Ashore,* NAVSEA OP 5 VOLUME 1, 15 January 2001, W/Change 4 - 1 June 2005.

U.S. Army Environmental Center (AEC), 1996. U.S. Army Cold Regions Research and Engineering Laboratory, 1996. Assessment of Sampling Error Associated with Collection and Analysis of Soil Samples at Explosives-Contaminated Sites, U.S. Army Cold Regions Research and Engineering Laboratory, U.S. AEC, Aberdeen Proving Ground, MD, Special Report No. 96-15, Agency Report No. SFIM-AEC-ET-CR-96157. August 1996.

ATTACHMENT A.2

QUALITY ASSURANCE PROJECT PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 1
March 2008

Quality Assurance Project Plan
for the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

NAVFAC
Naval Facilities Engineering Command
NAVFAC SE
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TETRA TECH NUS, Inc.

QUALITY ASSURANCE PROJECT PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

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QUALITY ASSURANCE PROJECT PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

ABBREVIATIONS AND ACRONYMS

AA	Atomic absorption
CCC	Continuing Calibration Curve
CCVC	Continuing Calibration Verification Check
CDQM	Chemical Data Quality Management
CLEAN	Comprehensive Long-term Environmental Action Navy
CLP	Contract Laboratory Program
CTO	Contract Task Order
CV	Coefficient of Variation
DQI	Data Quality Indicators
DQO	Data Quality Objectives
DR	Duplicate sample result
E	Experimental result
EPA	Environmental Protection Agency
FSP	Field Sampling Plan
GC/MS	Gas Chromatography/Mass Spectrophotometry
GEL	General Engineering Laboratories
HASP	Health and Safety Plan
ICB/CCB	Initial Calibration Blank/Continuing Calibration Verification
ICP	Inductively Coupled Plasma
ICV/CCV	Initial Calibration Blank/Continuing Calibration Verification
IDL	Instrument Detection Limit
IDS	Incinerator Disposal Site
IDW	Investigation Derived Waste
IR	Installation Restoration
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LQMP	Laboratory Quality Management Plan
MB	Method Blank
MDL	Method Detection Limit
MEC	Munitions and Explosives Constituents
µg/l	Micrograms per liter
µg/kg	Micrograms per kilogram
mg/kg	Milligrams Per Kilogram
mg/L	Milligrams Per Liter
mL	Milliliter
MQL	Method Quantitation Limit
MRL	Method Reporting Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NALF	Naval Auxiliary Landing Field
NAVFAC SE	Naval Facilities Engineering Field Division Southeast
NELAP	National Environmental Laboratory Accreditation Program
OR	Original sample result
PAH	Polyaromatic Hydrocarbons
PCL	Protective Concentration Level
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QA	Quality Assurance
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund
RAS	Routine Analytical Services

QUALITY ASSURANCE PROJECT PLAN

Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

ABBREVIATIONS AND ACRONYMS (Continued)

RPD	Relative Percent Difference
RRF	Relative Response Factor
RSD	Relative Standard Deviation
SAP	Sampling and Analysis Plan
SDG	Sampling delivery group
SI	Site Inspection
SOP	Standard Operating Procedure
SPCC	System Performance Check Compounds
SQL	Sample Quantitation Limit
SSHP	Site Safety and Health Plan
T	True value or theoretical result
TCEQ	Texas Commission on Environmental Quality
TRRP	Texas Risk Reduction Program
TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
WP	Work Plan
WS	Water Supply
XRF	X-ray Fluorescence
%D	Percent Difference
%R	Percent Recovery
%RSD	Percent Relative Standard Deviation

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) details the analytical methods and quality assurance/quality control (QA/QC) procedures that will be used to analyze the samples and manage the data collected as part of the Site Investigation (SI) activities that will be performed at the former Incinerator Disposal Site, located at Naval Auxiliary Landing Field (NALF) Cabaniss, Corpus Christi, Texas.

This QAPP has been prepared by Tetra Tech NUS, Inc. (TtNUS) for the Department of the Navy, Naval Facilities Engineering Command SOUTHEAST (NAVFAC SE) under Contract Task Order (CTO) No. 0023 under the Comprehensive Long-term Environmental Action Navy (CLEAN) Contract No. N62467-04-D-0055.

1.1 PROJECT OVERVIEW

A SI will be conducted at the Cabaniss Incinerator Disposal Site to determine the presence, nature, and extent of soil and surface water contamination. The SI will consist of the collection of surface soil samples, drilling of soil borings, collection and laboratory analysis of soil samples, collection and laboratory analysis of groundwater samples (for water quality classification purposes only), collection and laboratory analysis of surface water/sediment samples, land surveying of sample locations and reporting of results.

1.2 QAPP OVERVIEW

This QAPP describes in detail the project organization, analytical methods and QA/QC procedures used to analyze and manage the acquisition of chemical and physical data in support of the SI at the Cabaniss Incinerator Disposal Site.

This QAPP consists of the following sections:

- 1.0 -- Introduction
- 2.0 -- Project Laboratory Organization and Responsibilities
- 3.0 -- Data Assessment Organization and Responsibilities
- 4.0 -- Data Quality Objectives
- 5.0 -- Sample Handling
- 6.0 -- Analytical Procedures
- 7.0 -- Data Reduction/Calculation of Data Quality Indicators
- 8.0 -- Laboratory Operations Documentation

- 9.0 -- Data Assessment Procedures
- 10.0 -- References

This QAPP has been prepared as an integral component of the overall Work Plan (WP) for the SI to be performed at the Cabaniss Incinerator Disposal Site. The relationship of the documents used to conduct the activities at the Incinerator Disposal Site is as follows:

- Work Plan (WP), this document contains a description of the overall technical approach to completing the emergency response and SI. The WP contains a summary of available environmental information, conceptual site model, description of investigation objectives and activities, and evaluation and reporting requirements. The WP contains a Sampling and Analysis Plan (SAP), a Munition and Explosives of Concern (MEC) Clearance Plan, and a Geophysical Survey Plan.

- Sampling and Analysis Plan (SAP), as a part of the WP, this document contains the Field Sampling Plan (FSP) and the QAPP. The FSP contains a description of field data collection activities, drilling and sampling procedures and field quality control procedures. The QAPP contains information on the analytical methods and QA/QC procedures used to analyze and manage the data.

- Munitions and Explosives of Concern (MEC) Time Critical Removal Action and SI Support WP, as part of the WP, this document contains a description of munitions clearance and avoidance activities, procedures and MEC field quality control procedures. This document also details activities and procedures to be followed to ensure that MEC- and geophysical survey-related field activities are conducted in a manner that is protective of on-site workers and the surrounding community.

- Geophysical Survey Plan (under separate cover), as part of the WP, this document outlines the field data collection methods, field QA/QC procedures (e.g., geophysical prove-out activities) that will be used to collect, interpret, and manage the data.

- Health and Safety Plan (HASP), this document is a separate document and details activities and procedures to be followed to ensure that investigation-related field activities are conducted in a manner that is protective of on-site workers and the surrounding community.

2.0 PROJECT LABORATORY ORGANIZATION AND RESPONSIBILITIES

Chemical analysis of environmental samples and Quality Assurance (QA) samples collected during the SI will be performed by the following National Environmental Laboratory Accreditation Program (NELAP) certified laboratory:

General Engineering Laboratories, LLC.
2040 Savage Road
Charleston, SC 29407
Ph: 843-556-8171
Lab Director: Jake Crook
QA Manager: Lonnie Morris

This laboratory is Navy-approved and has met the requirements of the Navy Installation Restoration (IR) QA Program. Figure 2-1 provides a laboratory organizational chart for the investigation activities.

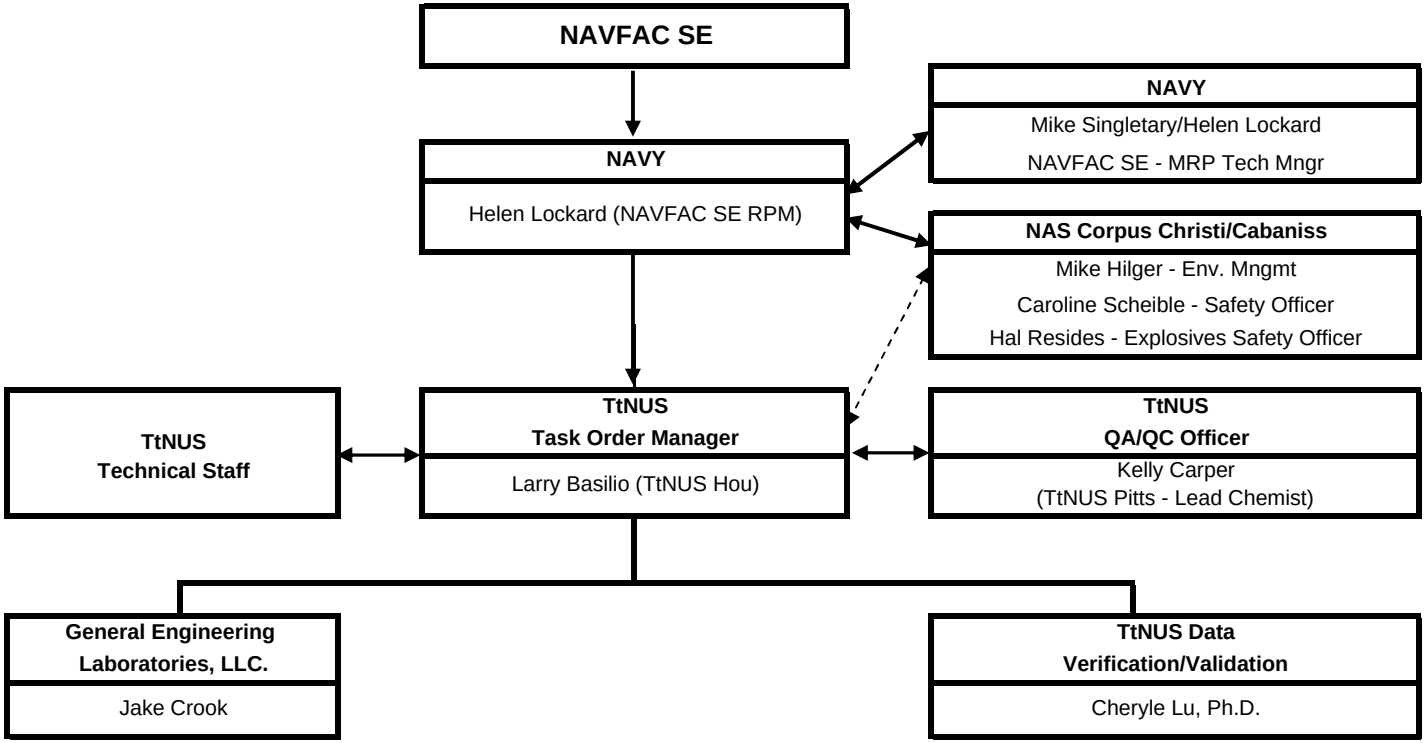
The Laboratory Director will serve as the Laboratory Project Contact. He will serve as a technical resource and is responsible for overall laboratory operations. He and/or his assistants will direct the project setup, fill bottle orders, implement detection limits, and supervise electronic data deliverables and hard copy reporting. In addition, he is responsible for implementing the policy and practices defined within the Laboratory Quality Management Plan (LQMP), maintaining accurate standard operating procedures (SOPs) and enforcing their use in the laboratory, participating in interlaboratory comparisons and proficiency testing, certifying that personnel performing all tests have proper education and training, providing appropriate management and supervisory support to ensure adequate supervision of technical staff, providing a contingency plan that identifies backup personnel for key laboratory positions in the event of personnel absence, having policy and procedures in place that ensure protection of clients' confidential information and proprietary rights, and maintaining a work environment that emphasizes data quality. Appendix A presents the Quality Management Plan for the main laboratory conducting the analysis for this investigation.

The QA Manager will be responsible for maintaining the quality system and overseeing the QA aspects of the data. The QA officer works independently of the laboratory production management and has direct access to the highest level of management for decisions on laboratory policy and resources. The QA officer serves as a focal point for QA issues, performs oversight and QA review for all nonconformance reports, performs QA review for a percentage of laboratory analytical batches or project data packages, evaluates data objectively, independent of laboratory management influence, possesses a general knowledge of the method for which data review is performed, conducts internal audits on the entire

technical operation annually, and monitors laboratory method performance by control charts/ranges evaluation, promoting method improvements as necessary.

FIGURE 2-1

LABORATORY ORGANIZATION
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS



3.0 DATA ASSESSMENT ORGANIZATION AND RESPONSIBILITIES

Data assessment duties may include technical design and/or review, data review, and data verification/validation procedures. Figure 3-1 provides a project organizational chart for the SI to be conducted at the Cabaniss Incinerator Disposal Site. The following personnel will be performing data assessment activities:

Ms. Helen Lockard (904-542-3991 x4522) is the NAVFAC SE Remediation Project Manager for the investigation activities. Ms. Lockard will also be the Technical Point-of-Contact (POC) for specific issues regarding contracting, field investigation strategies, and reporting for this project.

Mr. Larry Basilio, P.G. (832-251-6018) is the TtNUS Task Order Manager for the NAVFAC SE Contract for the investigation activities. Mr. G. Kenneth Grim is ultimately responsible for meeting contract requirements and overview of the implementation of field activities.

Mr. Matt Soltis (412-921-8912) is the TtNUS Health and Safety Officer for the investigation activities. Mr. Soltis is responsible for project adherence to health and safety requirements and overview of the implementation of health and safety in the field.

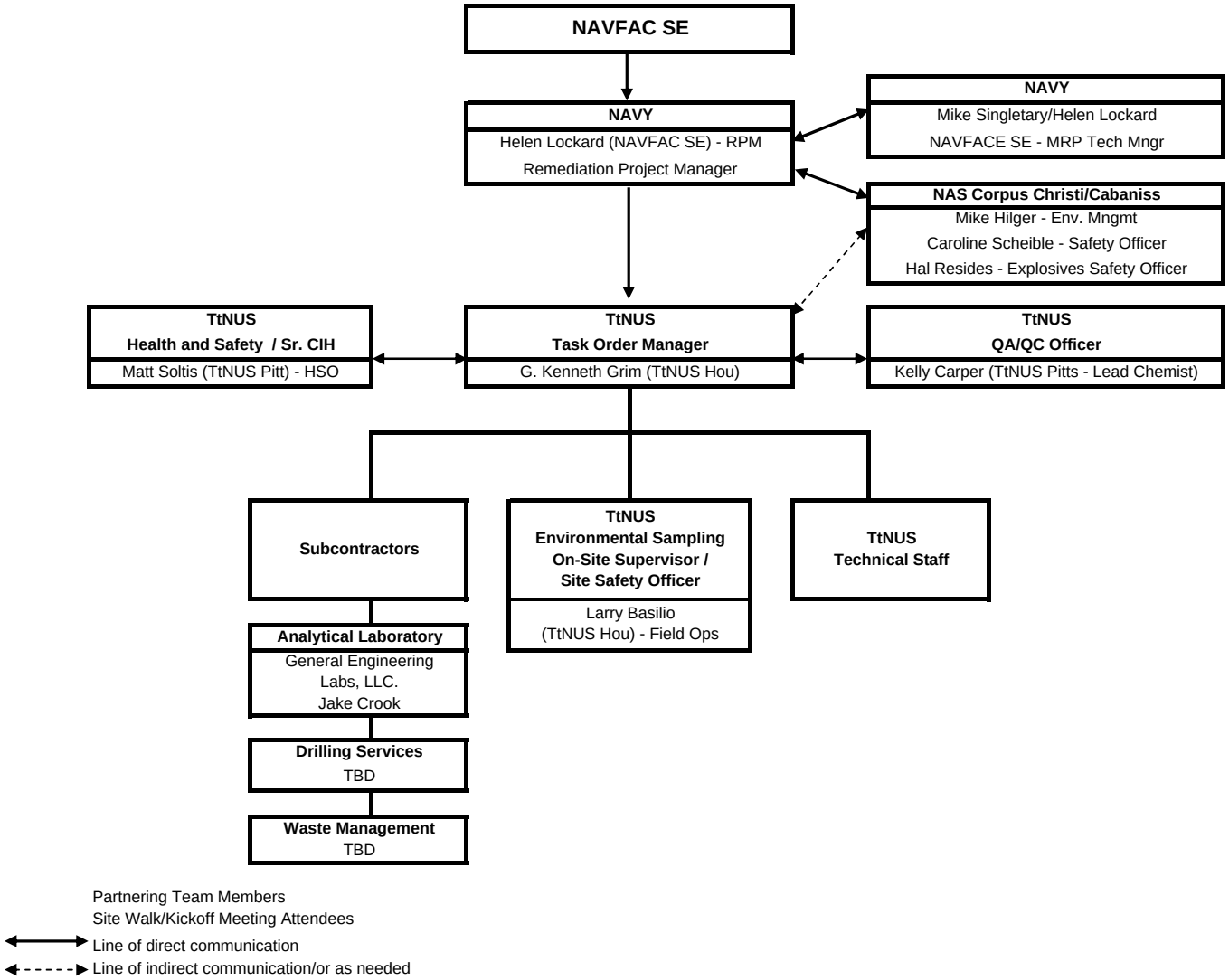
Mr. Ralph Brooks (770-413-0965) is the TtNUS On-Site Supervisor/Safety Officer for the MEC removal activities. Mr. Brooks will be responsible for implementing the MEC Work Plan and ensuring that all HASP requirements are met during the MEC removal activities. In addition, Mr. Brooks will prepare the MEC Report.

Mr. Larry Basilio, P.G. (832-251-6018) is the TtNUS On-Site Supervisor/Site Safety Officer for the SI activities. Mr. Basilio will be responsible for implementing the FSP and ensuring that all QAPP requirements are met. In addition, Mr. Basilio will prepare the Site Investigation (SI).

Mr. Mike Campbell (865-220-4714) is the TtNUS On-Site Supervisor for the Geophysical Survey activities. Mr. Campbell will be responsible for implementing the Geophysical Prove Out Plan and ensuring that all Health and Safety Plan (HASP) requirements are met during the geophysical survey activities. In addition, Mr. Campbell will prepare the Geophysical Survey Report.

FIGURE 3-1

**PROJECT ORGANIZATION
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS**



Ms. Kelly Carper, (412-921-7273) will serve as the TtNUS Project QA/QC Officer. Ms. Carper will ensure that all field and laboratory project QA/QC procedures are followed. In addition, Ms. Carper will be responsible for the laboratory data verification and validation procedures described in Section 9.2 of this QAPP.

Key Navy support personnel are as follows:

Mr. Mike Singletary, P.E. (843-820-7465) and **Ms. Helen Lockard** (904-542-3991 x4522) will server as the Navy MRP Technical Managers for the project.

Mr. Mike Hilger, (361-961-5354) and **Gary LeFlore** (361-961-3704) the onsite NASCC point of contact.

Mr. Hal Resides, (361-820-7357) is the NASCC Explosive Safety Officer.

Ms. Caroline Scheible, (361-961-4470) is the NASCC Safety Officer.

Key Analytical lab personnel are as follows:

Mr. Jake Crook (843-556-8171) is the Project Manager for the lab.

Mr. Lonnie Morris (843-556-8171) will be the QA Officer for the lab.

4.0 DATA QUALITY OBJECTIVES

The overall data quality objective (DQO) for the investigation is to produce data of known and acceptable quality at a level that will meet the goal of identifying the presence and concentration of potential soil, sediment, and surface water contaminants. Achievement of this objective will be accomplished through proper adherence to general and project-specific QA/QC procedures. The QA involves those planned and systematic actions necessary to provide adequate confidence that project activities will be performed satisfactorily and safely. The goal of QA is to assure that activities are planned and performed according to accepted standards and practices to ensure that resulting data are valid and retrievable, while continuing to meet project-specific safety requirements. The Quality Control (QC) is an integral part of the overall QA functions and is comprised of those actions necessary to control and verify that activities as well as resulting data meet established requirements. The objective of QA/QC is to assure that the uncertainty of the generated data is within an acceptable range that will allow proper evaluation of the study area through the collected data.

Project-specific DQOs are established to encompass both field and laboratory operations. The DQO process leads to the specification of the following at a minimum: sample handling procedures; sample preparation (extraction/digestion), cleanup, and determinative methods; target analytes; method quantitation or reporting limits; field and laboratory quality control samples; measurement quality objectives (QC acceptance limits) for data quality indicators (DQIs) (precision, accuracy, representativeness, comparability, and completeness parameters); required corrective actions; and data assessment procedures necessary to meet the intended use of the data.

4.1 DATA USE BACKGROUND

Data needs are determined for the project based on the decisions that need to be made. The data needs quality requirements are assessed by analytical parameter (per matrix, per area). Since it is possible to have more than one data user requesting the same data need(s), the most stringent data user requirements are applied to ensure the suitability of these data by all requesting parties. Data collected from the investigation activities will be used primarily to determine if a release to soils, sediment or surface water at the site has occurred and for the disposition of investigation derived waste (IDW).

The five categories of data quality that may be employed to control the data generated for a project are as follows:

- Level I - Field screening - This level is characterized by the use of portable instruments that can provide real-time data to assist in the optimization of sampling point locations and to facilitate

health and safety support. Data can be generated regarding the presence or absence of certain contaminants (especially volatiles) at sampling locations.

- Level II - Field analysis - This level is characterized by the use of portable analytical instruments that can be used on-site or in mobile laboratories stationed near a site (close-support laboratories). Depending on the types of contaminants, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.

- Level III - Laboratory analysis using methods other than the CLP RAS (Contract Laboratory Program Routine Analytical Services) - All analyses are performed in an off-site analytical laboratory using standard methods other than the Environmental Protection Agency (CLP RAS) procedures (e.g., SW-846 Test Methods for Evaluating Solid Waste, Third Edition).

- Level IV – CLP RAS (Contract Laboratory Program Routine Analytical Services) - This level is characterized by rigorous quality assurance/quality control protocols and documentation. It also provides qualitative and quantitative analytical data. Level IV analysis is performed in a CLP laboratory.

- Level V - Nonstandard methods - Analysis by non-standard methods. Such analyses are performed in an off-site analytical laboratory that may or may not be a CLP laboratory. Method development or method modification may be required for specific constituents or detection limits.

To meet the goals of the SI at the Cabaniss Incinerator Disposal Site, a variety of field parameters will be measured for soil, sediment, surface water, and groundwater samples to be collected. Level I field screening will be used to determine water quality parameters (e.g., pH, temperature, turbidity and specific conductance of groundwater). Field screening for metals using portable x-ray fluorescence (XRF) analysis will be performed at Level II protocol.

Data quality Level III has been selected for samples that will be analyzed at an off-site laboratory. Level III data quality is sufficient to identify the presence and concentration of potential contaminants. This type of data will be generated under laboratory conditions using Environmental Protection Agency (EPA)-approved methods.

4.2 MEASUREMENT QUALITY OBJECTIVES

This section describes the QA elements that will be applied to the project to ensure proper chemical data quality measurement (CDQM). To ensure that quality data are continuously produced during analysis and to allow the eventual compliance review, systematic QC checks are incorporated into the sampling and analyses to show that procedures and test results remain reproducible and that the chosen analytical methods are actually measuring the quantity of target analytes without unacceptable bias. Systematic QC checks include the scheduled analyses of field and laboratory replicates, standards, surrogates, spiked samples, and blanks.

Measurement quality objectives (acceptance criteria or ranges) for these systematic QC checks are established to verify that the DQIs support data usability. DQIs can generally be defined as the parameters of precision, bias, accuracy, representativeness, and comparability. All measurement quality objectives will be in accordance with laboratory- or EPA-specific criteria.

Precision

Precision refers to the distribution of a set of reported values about the mean, or the closeness of agreement between individual test results obtained under prescribed conditions. Precision also characterizes the natural variation of the matrix and how the contamination exists or varies within that matrix. To assess the effect these variables have on the total precision of data, both field and laboratory replicates are collected.

Bias/Accuracy

Bias refers to the systematic or persistent distortion of a measurement process that causes errors in one direction (above or below the true value or mean). Bias may be affected by errors made in field or laboratory handling procedures. Bias assessments are typically based upon the analysis of spiked reference materials or spiked samples. Sources of error may include the loss (or addition) of contaminants from the sampling and analysis process (i.e., sample handling, field cross contamination, improper sample preservation, sample manipulation during preparation and analysis), interferences present within the sample matrix, and measurement error (i.e., calibration error or drift).

Representativeness

Representativeness refers to the degree to which sample data accurately and precisely describe the characteristics of a population of samples, parameter variations at a sampling point, or environmental condition. Samples that are not properly collected or preserved (e.g., contaminant loss or addition) or are

analyzed beyond acceptable holding times should not be considered to provide representative data. The representativeness criterion is best satisfied in the laboratory by making certain that all subsamples taken from a given sample are representative of the sample as a whole. This would include sample premixing/homogenizing prior to and during aliquotting procedures. Representativeness can be assessed by a review of the precision obtained from the field and laboratory duplicate samples. In this way, they provide both precision and representativeness information.

Comparability

Comparability is a qualitative objective of the data, expressing the confidence with which one data set can be compared with another. Sample data should be comparable for similar samples and sample conditions. This goal is achieved through the use of standard techniques to collect representative samples, consistent application of analytical method protocols, and reporting analytical results with appropriate units. Comparability is unknown unless precision and bias are provided. When this information is available, the data sets can be compared with confidence.

5.0 SAMPLE HANDLING

5.1 SAMPLE MANAGEMENT

Procedures for the proper management of samples collected during the SI are discussed in this section.

Custody

To ensure the integrity of a sample from collection through analysis and disposal, it is necessary to have an accurate written record that traces the possession and handling of each sample. The traceability of sample possession is accomplished by the use of a chain-of-custody record. For the purposes of these procedures, a sample is considered to be in custody if it is:

- In one's actual possession.
- In view after being in one's possession.
- Secured (i.e., locked up) so that no one can tamper with it.
- In a secured area, available to authorized personnel only.

Strict chain-of-custody procedures will be maintained throughout the duration of the investigation activities. These procedures include the following:

- A custody seal, which is an integral part of the custody process, is used to detect unauthorized tampering with sample containers. The seal will be signed, dated, and affixed to the shipping container. After the custody seal has been attached to the shipping container, the only access to the shipping container is by breaking the custody seal.

- A minimum of two custody seals will be attached to each shipping container used to ship samples.

- A chain-of-custody record will be completed in the field. The original will accompany the samples, and copies will be maintained at intermediate steps.

- At every point where the responsibility for custody of the samples changes, the new custodian will sign the chain-of-custody record and note the date and time. A copy of the signed record will be made by the previous custodian, and a copy will be sent to the TtNUS Task Order Manager or his/her designee to allow tracking of possession of the samples.

Handling and Receipt

The laboratory will provide an adequate, contamination-free, and well-ventilated work space for the receipt of samples. All samples and their associated extracts are stored under conditions that will ensure their integrity and preservation and are demonstrated to be free from all potential contaminants.

Holding Times

Extraction/digestion holding times shall be defined from the date/time of sample collection in the field to the date/time when the sample is first exposed to the extraction/digestion solvent. Analysis holding times shall be defined from the date/time of sample extraction to the date/time of sample analysis. Samples should be analyzed as soon as possible after sample collection.

5.2 VERIFICATION/DOCUMENTATION OF COOLER RECEIPT CONDITION

A cooler receipt form shall be used by the laboratory for each cooler to verify sample condition, including proper sample containers, volumes, preservation, etc., and document any problems noted. A temperature blank will be used to document the temperature of samples upon receipt by the laboratory. The temperature blank will be a 40-mL (milliliter) volatile organic analysis vial filled with water and placed in a representative position inside the cooler. The laboratory should document if the temperature blank was positioned inappropriately or was not representative of the cooler temperature measurement.

5.3 CORRECTIVE ACTION FOR INCOMING SAMPLES

Problems noted during sample receipt shall be documented on an appropriate form. The Task Order Manager or appropriate technical personnel shall be contacted immediately for problem resolution.

6.0 ANALYTICAL PROCEDURES

This section identifies the analytical test methods to be used for each environmental sample collected as part of the investigation. The applicability of an individual method is dependent on the level of data quality required to support the data needs and decisions of the project. As noted in Section 4.1, data quality Level III has been selected for samples that will be analyzed at an off-site laboratory. Therefore, SW-846 test methods will be utilized for each analysis. Table 6-1 of the FSP present the test methods to be performed on each matrix as well as the appropriate holding times, the sample containers, and preservation, if applicable. The following analyses, as listed in table 6-1 of the FSP, will be performed on soil, sediment and surface water samples collected as part of this investigation:

- Metals — Methods 6010B/6020/7471*
- Polyaromatic Hydrocarbons (PAHs) — Method 8270C
- Explosives — Method 8330
- Perchlorate — Method 6850

*Analysis of arsenic, barium, beryllium, cadmium, chromium, lead, nickel, selenium, silver, thallium, and vanadium will be completed using Methods 3050/6010 Trace Inductively Coupled Plasma (ICP); analysis of antimony, copper, and zinc, will be completed using Methods 3050/6020 Trace ICP; and analysis of mercury will be completed using Method 7471 AA.

The following analyses, as listed in table 6-1 of the FSP, will be performed on groundwater samples collected as part of this investigation:

- Total Dissolved Solids — Methods 160.1

6.1 PREVENTIVE MAINTENANCE

Routine equipment maintenance and instruments servicing ensure a timely and effective completion of a measurement effort. Maintenance responsibilities for permanently-assigned laboratory equipment are assigned to the respective laboratory group leaders who establish maintenance procedures and schedules. Responsibilities for specific items may be delegated to laboratory personnel, but the laboratory group leaders retain responsibility to ensure adherence to prescribed maintenance protocols.

Maintenance will be performed whenever necessary for the equipment to be calibrated correctly. When performing analyses, quality control check standards will be run routinely on each instrument as described in Section 6.3. These procedures will be followed strictly and will be documented. Any

deviations from these procedures will also be documented.

Likewise, field equipment maintenance is the responsibility of field team leaders. Preventive maintenance of field equipment will follow the manufacturer's specifications. Prior to mobilization to the field, all instruments (such as pH meter, specific conductivity meter, etc.) will be cleaned and calibrated. Instruments that cannot meet the calibration criteria will be removed from use. Spares for critical equipment will be made available when necessary.

6.2 CALIBRATION PROCEDURES AND FREQUENCY

The calibration of instruments and support equipment is required to ensure that the analytical system is operating correctly and functioning at the proper precision, bias (accuracy), and sensitivity. Calibration procedures differ by analytical method, but fall into broad categories. Calibration procedures are presented in Table 6-1 in this section.

Standardizations

Precision and bias are an integral part of quality control, but they are effective only when instruments, solutions, and procedures have been standardized.

Solutions are standardized by preparing standards of known purity and concentrations and using the standards to evaluate other solutions. Standards are either traceable to the National Bureau of Standards, or they are certified by the manufacturer to contain a known concentration of analyte.

Standardization of instruments and methods is accomplished by preparing a series of standard solutions and analyzing the standards according to a written procedure. From the results of the standard analyses, standard curves are constructed and used to determine the concentration of the species in each sample.

For metals analyses by Inductively Coupled Plasma (ICP), initial calibration is performed daily and is checked by a continuing calibration verification check (CCVC) sample at a frequency of 10 percent. The apparent concentration of the CCVC sample must lie within 10 percent of its true concentration. Failure to meet specified limits requires recalibration and reanalysis of the preceding samples. For methods employing atomic absorption (AA), the limit will be 15 percent.

Verification Standards

In general, methods that do not require a complete daily standard curve require the analysis of at least one standard each day to verify instrument and method performance. The result of the daily standard

analyses must be within the control limits. Appropriate corrective measures must be taken if the acceptance criteria are not met.

TABLE 6-1

SUMMARY OF LABORATORY INSTRUMENT CALIBRATION PROCEDURES
INCINERATOR DISPOSAL SITE
NALF CABANISS CORPUS CHRISTI, TEXAS
PAGE 1 OF 2

Method	Analytes	Calibration Method	Frequency	Acceptance
6010/6020	Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	Initial Calibration – Each time the instrument is set up	Continuing calibrations must bracket each set of 10 sample analysis	Must be within 90%-110% of the true value
7471	Mercury	Initial Calibration – Each time the instrument is set up	Continuing calibrations must bracket each set of 10 sample analysis	Must be within 90%-110% of the true value
8270	Semi-Volatiles (specifically PAHs)	Initial Calibration Curve – 5 points (pt) Daily Continuing Calibration	Initial Calibration – Each time the instrument is set up when the continuing calibration is not met. Continuing Calibration – Every 12 hours	Initial Calibration – Ave RRF for SPCC must meet method criteria; %RSD for CCC <30%; TCL and Surrogates must be <15% RSD or linear regression (correlation coefficient >0.99%) Continuing Calibration – SPCC must meet method criteria; %D for RRFs of each SPCC </= 20%

TABLE 6-1

SUMMARY OF LABORATORY INSTRUMENT CALIBRATION PROCEDURES
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
PAGE 2 OF 2

Method	Analytes	Calibration Method	Frequency	Acceptance
8330	Explosives	Initial Calibration Curve – 5 points (pt)	Initial Calibration – Each time the instrument is set up when the continuing calibration is not met.	Initial Calibration – Ave RRF for SPCC must meet method criteria; %RSD for CCC <30%; TCL and Surrogates must be <15% RSD or linear regression (correlation coefficient >0.99%)
		Daily Continuing Calibration	Continuing Calibration – Every 12 hours	Continuing Calibration – SPCC must meet method criteria; %D for RRFs of each SPCC </= 20%
6850	Perchlorate	Initial Calibration Curve – 5 points (pt)	Initial Calibration – Each time the instrument is set up when the continuing calibration is not met.	Initial Calibration – Ave RRF for SPCC must meet method criteria; %RSD for CCC <30%; TCL and Surrogates must be <15% RSD or linear regression (correlation coefficient >0.99%)
		Daily Continuing Calibration	Continuing Calibration – Every 12 hours	Continuing Calibration – SPCC must meet method criteria; %D for RRFs of each SPCC </= 20%

Source: Laboratory control criteria were provided by General Engineering Laboratories.

RRF = Relative Response Factor
SPCC = System Performance Check Compounds
% RSD = Percent Relative Standard Deviation
CCC = Continuing Calibration Curve
TCL = Target Compound List
% D = Percent Difference
RPD = Relative Percent Difference

Preparation Blanks

As a check of glassware and reagent contamination in the laboratory, an aliquot of deionized water is taken through the sample preparation procedure. A preparation blank is required each day that samples are prepared.

Detection Limits

Sensitivity is a general term that refers to the calibration sensitivity and the analytical sensitivity of laboratory equipment. The calibration sensitivity is the slope of the calibration curve evaluated in the concentration range of interest. The analytical sensitivity is the ratio of the calibration sensitivity to the standard deviation of the analytical signal at a given analyte concentration. The detection limit, which is based on the sensitivity of the analysis, is the smallest reported concentration in a sample within a specified level of confidence. Quantitation limits represent the sum of all of the uncertainties in the analytical procedure plus a safety factor. The detection limit is a part of the quantitation limit. Three detection limits that are commonly used in the analytical laboratory include:

- Instrument Detection Limit (IDL) - The minimum concentration of a constituent that can be measured and reported with a 99 percent confidence that the value is above zero using a particular instrument.

- Method Detection Limit (MDL) – The minimum concentration of a compound that can be measured and reported with 99 percent confidence that the value is above zero using a particular method.

- Method Quantitation Limit (MQL) – The lowest standard used for the initial calibration curve (or low-level calibration verification standard) that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions for each target analyte by the method.

IDLs are compiled quarterly. The quarterly IDLs applicable at the date of analysis will be supplied in each data package. IDLs and MDLs are instrument dependent. Therefore, detection limits could change as new or different instrumentation is used or new detection limit studies are completed. Appendix B lists the MDLs for each target analyte by the main contract laboratory for this investigation.

6.3 LABORATORY QC PROCEDURES

Laboratory overall method performance will be monitored by the inclusion of various internal quality control checks that allow an evaluation of method control (batch QC), and the effect of the sample matrix

on the data being generated (matrix-specific QC). Batch QC is based on the analysis of a laboratory control sample to generate accuracy (precision and bias) data and method blank data to assess the potential for cross-contamination. Matrix-specific QC shall be based on the use of actual environmental samples for precision and bias determinations from the analysis of method blanks, laboratory control samples, matrix spikes, and surrogate spikes. The laboratory QC procedures for each of the project analyses are summarized in Table 6-2 in this section.

Method Blanks (MB)

Method blanks consist of analyte-free or deionized water that is carried through the analytical scheme like a sample. They serve to measure contamination associated with laboratory preparation or instrumentation. A method blank is used to evaluate the analytical system to establish the background levels (if any) of common laboratory contaminants. An action level is established from the blank background. For most analyses, a method blank is analyzed on a daily basis, and at a frequency of 1 per 20 samples if more than 20 samples are run in a given batch. If the analyte of interest is above the detection limit, corrective action is taken and the samples will be prepared and reanalyzed using a new lot of reagents.

Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD)

A laboratory control sample (LCS) is an interference-free, homogeneous matrix that can be used to gather historical control limit data to monitor the performance of the laboratory in performing an analytical method. The LCS is spiked with specific compounds at a specified concentration and is analyzed at a frequency of one per analytical lot. An analytical lot is defined as a set of 20 or fewer samples analyzed at one time. For each parameter spiked in the LCS, control limits for both accuracy (percent recovery) and precision are used to determine data acceptability.

The stock solutions used for LCSs are purchased or prepared independently of calibration standards. The LCS recovery tests the function of analytical methods and equipment. Control standards or materials are either prepared “in-house” from high-purity starting materials or are purchased as standard concentrates. The laboratory may also use QC samples made from EPA Water Pollution (WP) and Water Supply (WS) series standards.

LCS/LSCDs are prepared and analyzed on a daily basis or at a frequency of 1 per 20 samples. Laboratory control limits are calculated when 20 data points become available. Table 6-1 presents the range of accepted Relative Percent Difference (RPD) and recovery ranges for LCSs.

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
PAGE 1 OF 7**

Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
6010/6020 (ICP)	Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Nickel, Selenium, Silver, Thallium, Vanadium, Zinc	ICV/CCV	Must be within 10% of the true value for Initial Calibration; 80-120% for Continuing Calibration	Each element is evaluated to meet the calibration criteria of the method	Recalibrate and reanalyze affected samples for each element that fails the 10% control limits
		ICB/CCB	Each element must be less than the MDL	Each element is evaluated to meet the calibration criteria of the method	Reanalyze any affected samples bracketed by a bad ICB/CCB
		Prep Blank	Each element must be less than the reporting limit	Each element is evaluated to meet the calibration criteria of the method	Reprep and reanalyze any affected sample
		MS/MSD	%R must be between 75% to 125%	Evaluate the data to determine if matrix interference is causing any compounds to fail the control limits	No Corrective action indicates matrix effect
		LCS/LCSD	%R must be between 80% to 120%	Same	If element is not within the control limits, check calculations, reprep and reanalyze affected samples

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
PAGE 2 OF 7**

Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
6010/6020 (ICP) (continued)		Interference Check	Non-interfering elements must be less than the reporting limit	Inference elements must be within the 80-120% recovery	Reanalyze all affected samples if the interference check sample fails to meet method criteria
7471 (AA)	Mercury	ICV/CCV	Must be within 10% of the true value for Initial Calibration; 80-120% for Continuing Calibration	Each element is evaluated to meet the calibration criteria of the method	Recalibrate and reanalyze affected samples for each element that fails the 10% control limits
		ICB/CCB	Each element must be less than the MDL	Each element is evaluated to meet the calibration criteria of the method	Reanalyze any affected samples bracketed by a bad ICB/CCB
		Prep Blank	Each element must be less than the reporting limit	Each element is evaluated to meet the calibration criteria of the method	Reprep and reanalyze any affected sample
		MS/MSD	%R must be between 75% to 125%	Evaluate the data to determine if matrix interference is causing any compounds to fail the control limits	No Corrective action indicates matrix effect

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
PAGE 3 OF 7**

Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
SW-846 7471 (AA) (continued)		LCS/LCSD	%R must be between 80% to 120%	Same	If element is not within the control limits, check calculations, reprep and reanalyze affected samples
SW-846 8270	Semi-Volatiles (Specifically PAH's)	ICV/CCV	Initial Calibration – Ave RRF for SPCC must meet method criteria; %RSD for CCC <30%; TCL and Surrogates must be <15% RSD or linear regression (correlation coefficient >0.99%) Continuing Calibration – SPCC must be meet method criteria; %D for RRFs of each SPCC </= 20%	Each calibration must be within the method specific criteria. Each standard is evaluated against the criteria to dictate if the calibration is within the method requirements.	If initial calibration fails, correct problem and recalibrate. If CCV fails, recalibrate instrument
		Method Blank	<MDL	Evaluate the data to determine the source of the contamination. Certain compounds that are used within the laboratory must be less than 5x the reporting limit. Common lab solvents are acetone and methylene chloride.	Reprep and reanalyze associated samples

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
PAGE 4 OF 7**

Analytical Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
SW-846 8270 (continued)		MS/MSD	Within the laboratory generated control limits	Evaluate the data to determine if matrix interference is causing any compounds to fail the control limits	No Corrective action indicates matrix effect
		LCS/LCSD	Within the laboratory generated control limits established based on historical limits for TCL compounds only.	None	If compounds are not within the control limits, check calculations, reprep and reanalyze affected samples.
		Surrogates	Within the laboratory generated control limits	None	If compounds are not within the control limits, check calculations, reprep and re analyze affected Samples.
SW-846 8330	Explosives	ICV/CCV	Initial Calibration – Ave RRF for SPCC must meet method criteria; %RSD for CCC <30%; TCL and Surrogates must be <15% RSD or linear regression (correlation coefficient >0.99%) Continuing Calibration – SPCC must be meet method criteria; %D for RRFs of each SPCC </= 20%	Each calibration must be within the method specific criteria. Each standard is evaluated against the criteria to dictate if the calibration is within the method requirements.	If initial calibration fails, correct problem and recalibrate. If CCV fails, recalibrate instrument

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
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Analytical Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
		Method Blank	<MDL	Evaluate the data to determine the source of the contamination. Certain compounds that are used within the laboratory must be less than 5x the reporting limit. Common lab solvents are acetone and methylene chloride.	Reprep and reanalyze associated samples
		MS/MSD	Within the laboratory generated control limits	Evaluate the data to determine if matrix interference is causing any compounds to fail the control limits	No Corrective action indicates matrix effect
		LCS/LCSD	Within the laboratory generated control limits established based on historical limits for TCL compounds only.	None	If compounds are not within the control limits, check calculations, reprep and reanalyze affected samples.
		Surrogates	Within the laboratory generated control limits	None	If compounds are not within the control limits, check calculations, reprep and re analyze affected Samples.

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
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Analytical Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
SW-846 6850	Perchlorate	ICV/CCV	Initial Calibration – Ave RRF for SPCC must meet method criteria; %RSD for CCC <30%; TCL and Surrogates must be <15% RSD or linear regression (correlation coefficient >0.99%) Continuing Calibration – SPCC must be meet method criteria; %D for RRFs of each SPCC </= 20%	Each calibration must be within the method specific criteria. Each standard is evaluated against the criteria to dictate if the calibration is within the method requirements.	If initial calibration fails, correct problem and recalibrate. If CCV fails, recalibrate instrument
		Method Blank	<MDL	Evaluate the data to determine the source of the contamination. Certain compounds that are used within the laboratory must be less than 5x the reporting limit. Common lab solvents are acetone and methylene chloride.	Reprep and reanalyze associated samples
		MS/MSD	Within the laboratory generated control limits	Evaluate the data to determine if matrix interference is causing any compounds to fail the control limits	No Corrective action indicates matrix effect

TABLE 6-2

**SUMMARY OF LABORATORY QUALITY CONTROL CRITERIA
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS
PAGE 7 OF 7**

Analytical Method	Parameters	Quality Control Check	Acceptance Criteria	Corrective Criteria	Corrective Action
		LCS/LCSD	Within the laboratory generated control limits established based on historical limits for TCL compounds only.	None	If compounds are not within the control limits, check calculations, reprep and reanalyze affected samples.
		Surrogates	Within the laboratory generated control limits	None	If compounds are not within the control limits, check calculations, reprep and re analyze affected Samples.

Source: Laboratory control criteria were provided by General Engineering Laboratories

ICV/CCV = Initial calibration verification/continuing calibration verification
ICB/CCB = Initial calibration blank/continuing calibration blank
MS/MSD = Matrix spike/matrix spike duplicate
LCS/LCSD = Laboratory control sample/laboratory control sample duplicate
%RSD = Percent relative standard deviation
%D = Percent difference
MRL = Method Reporting Limit
RRF = Relative Response Factor

Matrix Spikes (MS)

Matrix spikes are aliquots of samples to which known amounts of analyte have been added. They are subjected to the same sample preparation or extraction procedure and analyzed as samples. The amount of spike added will be 20 times the estimated quantitation limit for solid matrices.

The percent spike recovery measures sample matrix interference effects and reflects the accuracy of the determination. Matrix spikes are prepared and analyzed at a frequency of at least one per 20 project samples.

Duplicates and Matrix Spike Duplicates (MSD)

Duplicates are additional aliquots of samples subjected to the same preparation and analytical scheme as the original sample. In cases where a stable, reproducible standard is available, matrix spike duplicates are substituted for duplicates. The RPD between duplicates or matrix spike duplicates measures the precision of a given analysis.

Duplicates (or matrix spike duplicates) are prepared and analyzed on a daily basis and at a frequency of at least one per every 20 samples. Laboratory control limits are calculated when 20 data points become available. Table 6-1 presented the range of accepted RPD and recovery ranges for MS/MSDs.

Surrogate spikes

Surrogates are analyzed to assess the ability of the method to successfully recover the specific nontarget analytes from an actual matrix. Surrogates are organic compounds that are similar to the analytes of interest in chemical behavior but are not normally found in environmental samples. Surrogates to be used are identified within the determinative methods. These compounds should be spiked into all samples and accompanying QC samples requiring GC, liquid chromatography, or Gas Chromatography/Mass Spectrometry (GC/MS) analysis prior to any sample manipulation. As a result, the surrogates are used in much the same way that MSs are used, but cannot replace the function of the MS. The results of the surrogates are evaluated, in conjunction with other QC information, to determine the effect of the matrix on the bias of the individual sample determinations. The use of surrogate spikes will be determined by the laboratory based upon project requirements.

Table 6-1 presented the range of accepted RPD and recovery ranges for spikes.

6.4 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits will be conducted during the SI to ensure that the laboratory programs are producing data of the necessary level of quality. Performance audits will be conducted to evaluate the accuracy of the total measurement system or its component parts. System audits will be performed to evaluate the equipment, equipment set up, and analytical system including inspection of the instruments, analysis of blind standards and comparison of the analytical results of known standards between laboratories.

Annual laboratory audits shall be conducted internally for each analytical area to verify the following, at a minimum:

- Procedures are compliant with SOPs.
- Documentation practices are complete and traceable to a certified source(s).
- Data reviews are complete, well-documented, and effective.
- Data reporting practices, including electronic or manual data transfer and client report generation, are accurate and complete.

All audit findings, any corrective actions, root cause determination, etc. will be fully documented in QA reports to management. The QA officer will document that all corrective actions necessary are verified complete within a reasonable time frame.

6.5 NONCONFORMANCE/CORRECTIVE ACTIONS

The need for laboratory corrective action may result from several sources: equipment malfunction, failure of internal QC checks, method blank contamination, and noncompliance with QA requirements.

The laboratory department supervisor will review the data generated to ensure that all QC samples have been run as specified in the analytical protocols. Recoveries of matrix spike samples for consistency with method accuracy and matrix duplicate samples for method precision will be evaluated. Data from LCSs will be evaluated according to the LQMP. Data generated with LCSs that do not fall within control limits are considered suspect, and the analysis will be repeated. If this is not possible, then the results will be reported with qualifiers.

Laboratory personnel will be alerted that corrective action may be necessary if:

- The QC samples are outside the warning or acceptable windows for precision and accuracy established for laboratory samples.

- Blanks contain contaminants at concentrations above the levels specified in the LQMP for any analyte.

- Undesirable trends are detected in matrix spike recoveries or RPD between matrix spike duplicates.

- There are unusual changes in detection limits.

- Deficiencies are detected by the laboratory QA director during internal or external audits, or from the results of performance evaluation samples.

If any nonconformance in analytical methodologies, quality control sample results, etc., is identified by the bench analyst, corrective actions will be implemented immediately. Corrective action procedures initially will be handled at the bench level by the analyst, who will review the preparation procedures for possible errors and check the instrument calibration, sensitivity, etc. The analyst will immediately notify his/her supervisor as to any problem that is identified and the investigation that is being conducted. If the problem persists or cannot be identified, the matter will be referred to the laboratory supervisor and QA director for further investigation. Once resolved, full documentation of the corrective action procedure will be filed by the laboratory QA director, and the QA/QC Officer will be provided a corrective action memorandum for inclusion into the project file if data are affected.

Data deemed unacceptable following the implementation of the required corrective action measures will not be accepted by the TtNUS Task Order Manager, and follow-up corrective actions will be explored.

7.0 DATA REDUCTION/CALCULATION OF DATA QUALITY INDICATORS

Data reduction procedures, whether performed by the instrument or manually, shall follow methodologies outlined within the laboratory SOP or analytical method. All analytical data generated by the laboratory shall be extensively reviewed prior to report release to assure the validity of the reported data. This internal data evaluation process shall cover the areas of data generation, reduction, and a minimum three levels of documented review. For each level, the review process shall be documented using an appropriate checklist that is signed and dated by the reviewer. The analyst who generates the analytical data has the prime responsibility for the correctness and completeness of the data. Each step of this review process involves evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. All data generated and reduced shall follow well-documented in-house protocols as presented in the laboratory Quality Systems Manual in Appendix A.

The laboratory will report the data as a group of 20 samples or less, along with QC supporting data. The laboratory will provide the following hard copy information in each analytical data package submitted:

- Chain-of-custody.
- Cover sheet listing the samples included in the report and narrative comments for all analytes.
- Tabulated results of analytes identified and quantified and reporting limits for all analytes.
- Analytical results for QC sample spikes, sample duplicates, initial and continuing calibration verifications of standards and blanks, standard procedural blanks, laboratory control samples, and ICP interference check samples.
- Tabulation of reporting limits related to the sample (i.e., sample quantitation limits (SQLs) and MQLs).

7.1 PRECISION

For environmental samples, laboratory precision is commonly determined from laboratory duplicate samples (i.e., MS/MSD or MD samples). However, to establish the precision of a given analytical method without the effect of a matrix, laboratory control samples (LCS/LCSD) are necessary. Statistical measures of precision include relative percent difference (RPD), standard deviation, or relative standard deviation.

RPD is calculated as follows:

$$RPD = \frac{OR - DR}{1/2(OR+DR)} \times 100\%$$

Where:
OR = original sample result
DR = duplicate sample result

If sufficient replicates are taken from a particular matrix for a project, precision may be expressed as the standard deviation, Percent Relative Standard Deviation (RSD), or Coefficient of Variation (CV). This value assesses the precision of the sample within that population matrix. Control limits for precision are presented in the laboratory Quality Systems Manual in Appendix A.

7.2 BIAS

Bias is the comparison between experimental and known or calculated values expressed as a percent recovery (%R). Percent recovery is derived from analysis of standards spiked into deionized water (standard recovery) or into actual samples (matrix spike or surrogate spike recovery). Percent recovery is calculated as follows:

$$\%R = \frac{E}{T} \times 100\%$$

Where:
E = experimental result
T = true value or theoretical result

Control limits for bias are presented in the laboratory Quality Systems Manual in Appendix A. Accuracy is the measure of the closeness of an observed value to the “true” value (e.g., theoretical or reference value, or population mean). Accuracy includes a combination of random error and systematic error (bias) components that result from sampling and analytical operations.

7.3 SAMPLE QUANTITATION LIMITS/METHOD QUANTITATION LIMITS

The sample quantitation limit (SQL) is a term established within the United States Environmental Protection Agency (USEPA) Risk Assessment Guidance for Superfund (RAGS), and is the limits of interest for reporting data for use in this project. The SQL is defined as the MDL adjusted for sample-specific action such as dilution or use of varying sample aliquot sizes. The SQLs and the MQLs established to meet project-specific DQOs are also presented in the tables in Appendix B.

7.4 COMPLETENESS

Completeness goals, if defined for individual sampling and analytical protocols, are normally combined to assess the expectations of the project as a whole. Completeness is the percentage of measurements that are judged to meet the project-specific requirements compared to the total number of measurements planned. It is important that critical samples are identified and appropriate QC maintained to ensure that valid data are obtained in order to secure the requisite type, quantity, and quality of data necessary to complete the project.

Completeness is defined as follows:

$$\%C = (V/T) \times 100\%$$

Where:

V = amount of valid data obtained

T = amount of valid data obtained under normal conditions

Together, the Task Order Manager and the laboratory QA manager determine if analytical results meet project-specific requirements at 90 percent completeness.

7.5 COMPARABILITY

As noted in Section 4.0, comparability is a qualitative objective of the data, expressing the confidence with which one data set can be compared with another. Sample data should be comparable for similar samples and sample conditions. This goal is achieved through the use of standard techniques to collect representative samples, consistent application of analytical method protocols, and reporting analytical results with appropriate units. Comparability is unknown unless precision and bias are provided. When this information is available, the data sets can be compared with confidence.

7.6 SENSITIVITY

Sensitivity is a general term that refers to the calibration sensitivity and the analytical sensitivity of laboratory equipment. The calibration sensitivity is the slope of the calibration curve evaluated in the concentration range of interest. The analytical sensitivity is the ratio of the calibration sensitivity to the standard deviation of the analytical signal at a given analyte concentration. The detection limit, which is based on the sensitivity of the analysis, is the smallest reported concentration in a sample within a specified level of confidence. Quantitation limits represent the sum of all of the uncertainties in the analytical procedure plus a safety factor. The detection limit is a part of the quantitation limit.

8.0 LABORATORY OPERATIONS DOCUMENTATION

8.1 SAMPLE MANAGEMENT RECORDS

The receiving laboratory's chain-of-custody, sample storage, and dispersement for analysis shall be documented per specific laboratory SOPs as presented in the laboratory Quality Systems Manual in Appendix A. Information on project custody, analysis, and data reporting requirements as noted in the FSP and highlighted on the Laboratory Notification Checklist or similar should be received by the laboratory prior to (or accompanying with the Laboratory Notification Checklist) the first shipment of incoming samples.

8.2 DATA REPORTING PROCEDURES

Environmental and field quality control sample results (duplicates, rinsate blanks) will be included in the SI. The result summary will include pertinent sampling information such as sample number, sampling date, general location, depth, and survey coordinates (if applicable). Sample-specific quantitation limit (SQL) will be reported for nondetected analytes.

Data will be handled electronically pursuant to the electronic deliverable requirements specified in TtNUS' Technical Specification for Laboratory Services. This agreement requires the analytical laboratories to provide data in both hard copy and electronic form. The original electronic diskettes and the original hard copy analytical data are maintained in the TtNUS central files as received.

Validation will be completed using the hard copy data. Upon completion of validation of a Sample Delivery Group and review by the Data Validation Coordinator, the validation qualifiers will be entered in the electronic data base and will be subjected to independent review for accuracy. During this review process, the electronic data base printout will also be contrasted with the hard copy data to ensure that the hard copy data and electronic data are consistent.

TtNUS will be responsible for laboratory data reporting subject to data validation. A Data Usability Report of the validation results (actions taken and completeness, precision and accuracy) will be provided in the SI.

8.2.1 <u>Data Package Format and Contents</u>

Project analytical data, including the results of QC samples, will be submitted to the Navy upon receipt and review by TtNUS.

The information to be submitted is as follows:

- Data will be submitted in accordance with the electronic data format requirements as presented in Section 8.2.2.

- A tabular presentation will be prepared that correlates contract laboratory sample identification numbers to associated laboratory QA sample numbers. The table also will identify field QA samples (e.g., duplicates, field and travel blanks, etc.) and match investigation samples to all applicable field QA samples.

- The contract analytical laboratory will complete and submit a "Cooler Receipt Form" for all shipments. This form will document the condition of samples submitted to the laboratory and will identify any problems associated with sample packaging, chain-of-custody, and sample preservation.

- For each analytical method run, all analytes will be reported for each sample as either a detected concentration or as less than the SQL. Generally, all samples with out-of-control spike recoveries attributed to matrix interferences will be identified as such. Soil samples submitted for chemical analysis will be reported on a dry weight basis, with percentage moisture also recorded and reported. Dilution factors for each sample as well as the date of sample collection, date of sample extraction (if applicable), and date of analysis also will be reported for all analytical methods pertaining to each sample.

- All analytes will be reported for each laboratory blank.

- Surrogate spike recoveries, concentrations, and percentages will be reported with all organic methods reports where appropriate (e.g., when the method requires surrogate spikes). The report also will specify the control limits for surrogate spike results as well as the spiking concentration.

- Matrix spike recoveries, concentrations, and percentages will be reported, as appropriate, for all organic and inorganic analyses. All general matrix spike results will be designated as corresponding to a particular matrix spike sample. The report will indicate what field sample was spiked, even if it was not a project sample. The report also will specify the control limits for matrix spike results for each method for each matrix..

- Relative percent difference will be reported for all duplicate pairs as well as analyte/matrix control.

- Chain-of-Custody forms (original).

- Narrative comments, if any.

8.2.2 Electronic Deliverables

All analytical laboratory data must be presented in electronic format. The electronic analytical data format will be presented in the following format:

- Site Name – refers to sampling location, where:

  IDS = Incinerator Disposal Site

- Lab Name – refers to laboratory performing analysis, where:

  GEL = General Engineering Laboratories

- SDG – refers to sampling delivery group as assigned by laboratory.
- Collection Date – refers to the date the sample was taken.
- Lab ID – refers to the internal sample identification number as assigned by the laboratory.
- Sample ID – refers to sample field identification number (see Section 4.8 of the FSP).
- Depth – refers to depth at which sample was retrieved, in the case of groundwater samples, the value reported will be 0.0.
- Chain of Custody Number – refers to number assigned to the chain of custody document accompanying the sample.
- Sample Type – refers to type of sample collected, where:

  FBLK = Field Blank;
  RNSW = Equipment Rinsate Blank
  FDUP = Field Duplicate
  FTRP = Field Triplicate
  BLK = Laboratory Blank
  LCS = Laboratory Control Sample

- Matrix – refers to the sample media (i.e. water or soil).
- Method – refers to the analytical testing methodology to be performed.
- CAS – refers to the Chemical Abstract Number of the analyte.

- Analyte – refers to the target analyte.
- Less Than Flag – refers to a detection value that is lower than the reportable limit (SQL).
- Result – refers to the concentration of the target analyte within the tested sample.
- Units – refers to the unit of measure, where:

  μg/l = micrograms per liter;
  μg/kg = micrograms per kilogram;
  mg/l = milligrams per liter;
  mg/kg = milligrams per kilogram;

- Lab Flag – refers to a notation assigned by the laboratory, where:

  U = "Non-detect"
  J = Estimated value;

- Dilution – refers to sample dilution.

- Total or Dissolved – refers to the total or dissolved concentration of the target analyte (metals only).

- Method Detection Limit – refers to the limit, or value of concentration, where the analytical method can no longer accurately detect the target analyte.

- Contract Required Detection Limit – refers to a limit, or a value of concentration, required by the contract to be reported, should be lower than Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Levels (PCLs).

- Extraction/Prep Date – refers to the date on which the collected sample is extracted and prepared for analysis.

- Analysis Date – refers to the date on which the prepared sample is analyzed.

- Moisture – refers to the percent moisture content of the sample (soil samples only).

8.3 DATA MANAGEMENT PROCEDURES

The objectives of a data management program for the investigation results include:

- Quality data presentation and organization of data collected.
- Timeliness of the reporting of results.
- Ease of data use.
- Accessibility of data to the end users.

These objectives will be accomplished, if possible, using computerized data management techniques and electronic communication with the Laboratory's Information Management Systems to receive, store, and present data. This procedure will minimize transcription errors. Data tables can be input into graphic software to produce graphic presentations, such as maps to show concentration distribution.

A tabulated summary and sampling location map for the laboratory results that have undergone a complete quality assurance review will be included in the SI. Qualified data will be identified on the tabulated data summaries. The raw data can be provided in the SI or can be supplied electronically. Data will be conveyed to the data users through reports, technical memoranda, or public meetings, as appropriate.

8.3.1 Laboratory Turnaround Time

Although expedited sample analysis is available at an increased cost, standard laboratory turnaround times will be expected for analysis of samples as part of this investigation (i.e., 30 days). Expedited sample analysis may be used, but will be determined on a sample-by-sample basis by the Task Order Manager and the laboratory QA manager.

Upon completion of the data analysis, review, and reduction, the laboratory will contact TtNUS for transfer of electronic data. Hard copy reports of the data will be shipped the same day the electronic data is transferred.

8.3.2 Data Archival/Retention Requirements

The laboratory report generation group generates an electronic file of completed reports and the accompanying support data using automated or manual processes, which are transferred to a document server. The server hard drives are backed up on tapes for long term storage and archive. The tapes are transferred to an onsite fireproof safe for secure storage. The laboratory will maintain copies of original

reports and data via electronic media in archive for a period of five (5) years. After five years, the reports may be automatically discarded.

TtNUS will maintain an electronic file of completed reports and associated laboratory data in accordance with the CLEAN contract.

9.0 DATA ASSESSMENT PROCEDURES

The principal functions of a sampling and analysis program are to obtain reliable, representative environmental samples and to provide validated analytical data to support decision-making. This task can be accomplished through the implementation of a quality control program for both field sampling and laboratory activities. The data assessment will be based on the assumption that the samples were properly collected and handled according to the procedures detailed in this QAPP.

Since the SI is being conducted in Texas, the data will be evaluated in accordance with the Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP). The TRRP-13 rule, revised in December 2002, provides procedures for review and reporting of analytical data. Adhering to the TRRP-13 data review and reporting process assures that the data will be considered accurate and complete in accordance with 30 TAC 350.54. The following subsections discuss the data review, verification, or validation process that is required to assure the validity of the data.

9.1 DATA QC REVIEW

The analytical data generated as part of the investigation will be evaluated in terms of precision, bias, and completeness. Acceptance limits for precision and bias are taken from EPA methods or are established by the laboratory from actual QC data. Project completeness will be compared against a goal of 90 percent. If the goal is not met, professional judgment will be used to assess if the data are sufficient for the site objectives and use of data. If it is judged that the data are inadequate and data gaps are determined to exist, additional field samples may be collected to accomplish the project goals. Decisions to repeat sample collection and analysis will be made by the Task Order Manager and the project QA officer based on the extent of the deficiencies and their importance to the overall context of the project.

9.2 DATA VERIFICATION/VALIDATION

All of the samples will be subject to a complete data validation (Level III) in accordance with EPA functional guidelines for data review (EPA, 1994a; EPA, 1994b).

The elements to be checked in the validation and review process include the following:

- Chain-of-custody
- Holding time
- Blanks
- Gas Chromatography/Mass Spectrophotometer (GC/MS) Data

- LCSs
- Matrix spike/matrix spike duplicates
- Surrogate Recoveries
- Field duplicates
- Overall assessment of the data
- Sample Data
- Standard Data

Specific elements of the data package validation procedure will include the following:

- A comparison of the data package to the reporting level requirements to ensure completeness in the analytical data package and compliance with the contract.

- A comparison of sampling dates, sample extraction dates, and analysis dates to ensure that samples were extracted and analyzed within the proper holding times.

- Checks of QA/QC samples (field and laboratory blanks) to evaluate possible contamination sources.

To perform the validation, the laboratory will provide all the pertinent information described above. Analytical results for each sample will include a tabulated list of the specific parameters along with the measured concentration (if present), the concentration units, and the detection limit.

Data qualifiers that will be applied to sample results include:

- U - Not detected at the stated detection limit
- J - The associated value is an estimated quantity
- R - The result is unusable
- UJ - Not detected at the stated detection limit, but the associated value is an estimated quantity.

The reasons for any data qualification and associated biases will be explained in the report. The definition of any data qualifiers used will be provided along with the analytical results. Constituents detected for water samples will be reported in concentration units of milligrams per liter (mg/L). Constituents detected for soil samples will be reported in concentration units of milligrams per kilogram (mg/kg).

9.3 DQO RECONCILIATION

As stated in Section 4.0, the overall DQO for the investigation is to produce data of known and acceptable quality at a level that will meet the goals of evaluating the environmental condition of the property and of developing a limited amount of site information so that users are informed about the presence of a recognized environmental condition at the site.

Chemical data will be deemed acceptable if the field and laboratory QC checks are within acceptable limits (as discussed in Section 6.3). The project QA officer will review the laboratory data for this project to ensure that all QA/QC objectives are met. If any nonconformances were found in the field procedures, sample collection procedures, field documentation procedures, laboratory analytical and documentation procedures, and data assessment and validation procedures, the impact of those nonconformances on the overall project QA objectives will be assessed and reported (as discussed in Section 9.2). Appropriate actions, including resampling, reanalysis, etc., may be recommended by the TtNUS Task Order Manager so that the project objectives can be accomplished.

The quality of data depends not only on the analytical method selected and how carefully the method is carried out, but also on the sample point selection, sampling procedures, and sample integrity. If the physical and chemical data collected at the facility are deemed acceptable, the following information can be determined:

- The presence of potentially hazardous chemicals in the surface water.
- The presence of potentially hazardous chemicals in in-situ soil and sediments.

This information will provide data users with limited site information with which to make decisions regarding the presence of a recognized environmental condition at the facility.

9.4 PROJECT COMPLETENESS ASSESSMENT

Completeness describes the amount of data generated that meets the objectives for precision, accuracy, and representativeness versus the amount of data expected to be obtained. Where analysis is reduced or where data objectives are compromised, effects on the overall investigation must be considered. Whether or not any particular sample is critical to the investigation will be evaluated in terms of the sample location, the parameter in question, the intended use of the data, and the risk associated with the error.

10.0 REFERENCES

US EPA, 1983. Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

TCEQ Regulatory Guidance Document, RG-366/TRRP-13, December 2002. Review and Reporting of COC Concentration data.

EPA, Test Methods for Evaluating Solid Waste SW-846, 3rd Edition, 1986.

EPA, Test Methods for Evaluating Solid Waste SW-846, 3rd Edition, Final Update IVB, 2000.

USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999.

USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review: February, 1994.

Malcolm Pirnie, 2005. Final Preliminary Assessment, Naval Auxiliary Landing Field Cabaniss, Texas, April 2005.

NAVFAC, 1999. Navy Installation Restoration Chemical Data Quality Manual, SP-2056-ENV, September 1999.

APPENDIX A

GENERAL ENGINEERING LABORATORIES, LLC.
LABORATORY QUALITY MANUAL

APPENDIX B

GENERAL ENGINEERING LABORATORIES, LLC.
METHOD DETECTION LIMITS

Current SOLID MDL and PQL studies for Organics

2002 Florida Pro/Conn. Solid MDL
PQL-F Alaska/Florida Pro/Conn. Solid
Instrument: GC/FID
Methods: Connecticut Method, Connecticut Method, Florida Pro
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	ETPH		3405.035	ug/kg	5003	ug/kg
SOLID	TRPH (C8-C40)		3871.935	ug/kg	5670	ug/kg

2005 MDL-F MADEP EPH Solid
2005 PQL-F MADEP EPH Solid
Instrument: GC/FID
Methods: MADEP EPH
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	C11-C22 Aromatic Hydrocarbons		4200	ug/kg	17000	ug/kg
SOLID	C19-C36 Aliphatic Hydrocarbons		1600	ug/kg	8000	ug/kg
SOLID	C9-C18 Aliphatic Hydrocarbons		1600	ug/kg	6000	ug/kg

2006 MDL-F 8015/GEL Method Solid
PQL-F 8015/GEL Solid
Instrument: GC/FID
Methods: GEL FID Method, SW846 8015A/B SVOC, TNRCC Method 1005, TNRCC Method 1006
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	1,1,1-Trichloroethane	71-55-6	3000	ug/kg	20000	ug/kg
SOLID	2-Butanone	78-93-3	3000	ug/kg	20000	ug/kg
SOLID	2-Ethoxyethanol	110-80-5	2230	ug/kg	10000	ug/kg
SOLID	4-Methyl-2-pentanone	108-10-1	3000	ug/kg	20000	ug/kg
SOLID	Acetone	67-64-1	3000	ug/kg	10000	ug/kg
SOLID	Acrylamide	79-06-1	5120	ug/kg	10000	ug/kg
SOLID	Aliphatic Hydrocarbons >C10-C12		8503.2	ug/kg	20000	ug/kg
SOLID	Aliphatic Hydrocarbons >C12-C16		8503.2	ug/kg	20000	ug/kg
SOLID	Aliphatic Hydrocarbons >C16-C21		8503.2	ug/kg	20000	ug/kg
SOLID	Aliphatic Hydrocarbons >C21-C36		8503.2	ug/kg	20000	ug/kg
SOLID	Aliphatic Hydrocarbons >C6-C8		8503.2	ug/kg	20000	ug/kg
SOLID	Aliphatic Hydrocarbons >C8-C10		8503.2	ug/kg	20000	ug/kg
SOLID	Aliphatic Hydrocarbons C6		8503.2	ug/kg	20000	ug/kg
SOLID	Aromatic Hydrocarbons >C10-C12		8503.2	ug/kg	20000	ug/kg
SOLID	Aromatic Hydrocarbons >C12-C16		8503.2	ug/kg	20000	ug/kg
SOLID	Aromatic Hydrocarbons >C16-C21		8503.2	ug/kg	20000	ug/kg
SOLID	Aromatic Hydrocarbons >C21-C36		8503.2	ug/kg	20000	ug/kg
SOLID	Aromatic Hydrocarbons >C7-C8		8503.2	ug/kg	20000	ug/kg
SOLID	Aromatic Hydrocarbons >C8-C10		8503.2	ug/kg	20000	ug/kg
SOLID	Benzene	71-43-2	3000	ug/kg	20000	ug/kg

SOLID	Chloroform	67-66-3	4000	ug/kg	20000	ug/kg
SOLID	Diesel Range Organics		330	ug/kg	1665	ug/kg
SOLID	Diethylene glycol	111-46-6	3300	ug/kg	10000	ug/kg
SOLID	Ethanol	64-17-5	5200	ug/kg	20000	ug/kg
SOLID	Ethyl acetate	141-78-6	6020	ug/kg	10000	ug/kg
SOLID	Ethylbenzene	100-41-4	3000	ug/kg	20000	ug/kg
SOLID	Ethylene glycol	107-21-1	3300	ug/kg	10000	ug/kg
SOLID	Hexane	110-54-3	3000	ug/kg	20000	ug/kg
SOLID	Isobutyl alcohol	78-83-1	1958	ug/kg	10000	ug/kg
SOLID	Isopropyl Alcohol	67-63-0	2805	ug/kg	20000	ug/kg
SOLID	Methanol	67-56-1	200	ug/kg	1000	ug/kg
SOLID	Methylene chloride	75-09-2	3000	ug/kg	20000	ug/kg
SOLID	Propylene glycol	57-55-6	3300	ug/kg	10000	ug/kg
SOLID	TPH (>C12-C28)		8503.2	ug/kg	20000	ug/kg
SOLID	TPH (>C28-C36)		8503.2	ug/kg	20000	ug/kg
SOLID	TPH (C6-C12)		8503.2	ug/kg	20000	ug/kg
SOLID	TPH (C6-C36)		8503.2	ug/kg	20000	ug/kg
SOLID	Toluene	108-88-3	3000	ug/kg	20000	ug/kg
SOLID	Triethylene glycol	112-27-6	3300	ug/kg	10000	ug/kg
SOLID	m,p-Xylenes	179601-23-1	6000	ug/kg	20000	ug/kg
SOLID	n-Butyl alcohol	71-36-3	1239	ug/kg	10000	ug/kg
SOLID	o-Xylene	95-47-6	3000	ug/kg	20000	ug/kg

MDL-P 2005 PCB Soil Soxtherm
2005 PQL-P PCB SOIL SOXTHERM
Instrument: GC/ECD
Methods: SW846 3541/8082
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	Aroclor-1016	12674-11-2	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1221	11104-28-2	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1232	11141-16-5	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1242	53469-21-9	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1248	12672-29-6	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1254	11097-69-1	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1260	11096-82-5	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1262	37324-23-5	310	ug/kg	1000	ug/kg
SOLID	Aroclor-1268	11100-14-4	310	ug/kg	1000	ug/kg

2006 MDL-P PEST/PCB Soil
PQL-P Pesticide 8081A Solid
Instrument: GC/ECD
Methods: SW846 8081, SW846 8081A
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	2,4-DDD	53-19-0	0.167	ug/kg	0.668	ug/kg
SOLID	2,4-DDE	3424-82-6	0.167	ug/kg	0.668	ug/kg
SOLID	2,4-DDT	789-02-6	0.167	ug/kg	0.668	ug/kg
SOLID	4,4'-DDD	72-54-8	0.334	ug/kg	1.336	ug/kg
SOLID	4,4'-DDE	72-55-9	0.334	ug/kg	1.336	ug/kg
SOLID	4,4'-DDT	50-29-3	0.334	ug/kg	1.336	ug/kg
SOLID	Aldrin	309-00-2	0.167	ug/kg	0.668	ug/kg
SOLID	Aroclor-1016	12674-11-2	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1221	11104-28-2	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1232	11141-16-5	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1242	53469-21-9	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1248	12672-29-6	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1254	11097-69-1	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1260	11096-82-5	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1262	37324-23-5	5.5611	ug/kg	16.7	ug/kg
SOLID	Aroclor-1268	11100-14-4	5.5611	ug/kg	16.7	ug/kg
SOLID	Chlordane (tech.)	57-74-9	1.67	ug/kg	8.35	ug/kg
SOLID	Dieldrin	60-57-1	0.334	ug/kg	1.336	ug/kg
SOLID	Endosulfan I	959-98-8	0.167	ug/kg	0.668	ug/kg
SOLID	Endosulfan II	33213-65-9	0.334	ug/kg	1.336	ug/kg
SOLID	Endosulfan sulfate	1031-07-8	0.334	ug/kg	1.336	ug/kg
SOLID	Endrin	72-20-8	0.334	ug/kg	1.336	ug/kg
SOLID	Endrin aldehyde	7421-93-4	0.334	ug/kg	1.336	ug/kg
SOLID	Endrin ketone	53494-70-5	0.334	ug/kg	1.336	ug/kg
SOLID	Heptachlor	76-44-8	0.167	ug/kg	0.668	ug/kg
SOLID	Heptachlor epoxide	1024-57-3	0.167	ug/kg	0.668	ug/kg
SOLID	Hexachlorobenzene	118-74-1	0.334	ug/kg	0.668	ug/kg
SOLID	Methoxychlor	72-43-5	1.67	ug/kg	6.68	ug/kg
SOLID	Mirex	2385-85-5	0.167	ug/kg	0.668	ug/kg
SOLID	O-Chlordane	27304-13-8	0.167	ug/kg	0.668	ug/kg
SOLID	Toxaphene	8001-35-2	5.5611	ug/kg	33.4	ug/kg
SOLID	alpha-BHC	319-84-6	0.167	ug/kg	0.668	ug/kg
SOLID	alpha-Chlordane	5103-71-9	0.167	ug/kg	0.668	ug/kg
SOLID	beta-BHC	319-85-7	0.167	ug/kg	0.668	ug/kg
SOLID	cis-Nonachlor	5703-73-1	0.167	ug/kg	0.668	ug/kg
SOLID	delta-BHC	319-86-8	0.167	ug/kg	0.668	ug/kg
SOLID	gamma-BHC (Lindane)	58-89-9	0.167	ug/kg	0.668	ug/kg
SOLID	gamma-Chlordane	5103-74-2	0.167	ug/kg	0.668	ug/kg
SOLID	trans-Nonachlor	39765-80-5	0.167	ug/kg	0.668	ug/kg

2006 MDL-H Herbicide Soil
PQL-H Herbicide Soil
Instrument: GC/ECD
Methods: SW846 8151A
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	2,4,5-T	93-76-5	1.66	ug/kg	5	ug/kg
SOLID	2,4,5-TP	93-72-1	1.66	ug/kg	5	ug/kg
SOLID	2,4-D	94-75-7	1.66	ug/kg	5	ug/kg
SOLID	2,4-DB	94-82-6	1.66	ug/kg	5	ug/kg
SOLID	Dalapon	75-99-0	16.66	ug/kg	100	ug/kg
SOLID	Dicamba	1918-00-9	1.66	ug/kg	5	ug/kg
SOLID	Dichlorprop	120-36-5	1.66	ug/kg	5	ug/kg
SOLID	Dinoseb	88-85-7	1.66	ug/kg	5	ug/kg
SOLID	MCPA	2436-73-9	340	ug/kg	1000	ug/kg
SOLID	MCPP	93-65-2	340	ug/kg	1000	ug/kg

2006 MDL-P PCB Soil
PQL-B PCB 8082 Solid
Instrument: GC/ECD
Methods: SW846 3580A/8082, SW846 8080, SW846 8082, SW846 8082 Screen
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	2,2',5-Trichlorobiphenyl (18)	37680-65-2	0.27489	ug/kg	0.33	ug/kg
SOLID	2,4'-Dichlorobiphenyl (8)	34883-43-7	0.231	ug/kg	0.33	ug/kg
SOLID	2,4,4'-Trichlorobiphenyl (28)	7012-37-5	0.2046	ug/kg	0.33	ug/kg
SOLID	Aroclor-1016	12674-11-2	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1221	11104-28-2	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1232	11141-16-5	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1242	53469-21-9	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1248	12672-29-6	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1254	11097-69-1	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1260	11096-82-5	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1262	37324-23-5	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-1268	11100-14-4	1.0989	ug/kg	3.333	ug/kg
SOLID	Aroclor-Total	PCBTOT	1.10889	ug/kg	3.33	ug/kg
SOLID	Decachlorobiphenyl	2051-24-3	0.33	ug/kg	0.333	ug/kg
SOLID	Heptachlorobiphenyl (170)	35065-30-6	0.10032	ug/kg	0.33	ug/kg
SOLID	Heptachlorobiphenyl (180)	35065-29-3	0.10725	ug/kg	0.33	ug/kg
SOLID	Heptachlorobiphenyl (183)	52663-69-1	0.12243	ug/kg	0.33	ug/kg
SOLID	Heptachlorobiphenyl (184)	74472-48-3	0.11055	ug/kg	0.33	ug/kg
SOLID	Heptachlorobiphenyl (187)	52663-68-0	0.09504	ug/kg	0.33	ug/kg
SOLID	Heptachlorobiphenyl (189)	39635-31-9	0.1914	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (128)	38380-07-3	0.15906	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (138)	35065-28-2	0.2409	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (153)	35065-27-1	0.11583	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (156)	38380-08-4	0.12276	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (157)	69782-90-7	0.21351	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (167)	52663-72-6	0.11517	ug/kg	0.33	ug/kg
SOLID	Hexachlorobiphenyl (169)	32774-16-6	0.21681	ug/kg	0.33	ug/kg
SOLID	Nonachlorobiphenyl (206)	40186-72-9	0.10494	ug/kg	0.33	ug/kg

SOLID	Octachlorobiphenyl (195)	52663-78-2	0.10395	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (101)	37680-73-2	0.17292	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (105)	32598-14-4	0.15906	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (114)	74472-37-0	0.18876	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (118)	31508-00-6	0.26268	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (123)	65510-44-3	0.12936	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (126)	57465-28-8	0.18315	ug/kg	0.33	ug/kg
SOLID	Pentachlorobiphenyl (87)	38380-02-8	0.21846	ug/kg	0.33	ug/kg
SOLID	Tetrachlorobiphenyl (44)	41464-39-5	1.1748	ug/kg	0.33	ug/kg
SOLID	Tetrachlorobiphenyl (49)	41464-40-8	0.13563	ug/kg	0.33	ug/kg
SOLID	Tetrachlorobiphenyl (52)	35693-99-3	0.18546	ug/kg	0.33	ug/kg
SOLID	Tetrachlorobiphenyl (66)	32598-10-0	0.14586	ug/kg	0.33	ug/kg
SOLID	Tetrachlorobiphenyl (77)	32598-13-3	0.29568	ug/kg	0.33	ug/kg
SOLID	Tetrachlorobiphenyl (81)	70362-50-4	0.33	ug/kg	0.33	ug/kg

2005 MDL-S BNA Solid
PQL-S 8270C/CLP Solid 2004
Instrument: SEMIVOA GC/MS
Methods: OLM 3.1 CLP BNA, OLM 4.2 CLP BNA, SW846 8270C
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	(2,3-Dibromopropyl)phosphate	126-72-7	26.64	ug/kg	1665	ug/kg
SOLID	1,1'-Biphenyl	92-52-4	99.9	ug/kg	333	ug/kg
SOLID	1,2,4,5-Tetrachlorobenzene	95-94-3	66.6	ug/kg	333	ug/kg
SOLID	1,2,4-Trichlorobenzene	120-82-1	66.6	ug/kg	333	ug/kg
SOLID	1,2-Dichlorobenzene	95-50-1	66.6	ug/kg	333	ug/kg
SOLID	1,2-Diphenylhydrazine	122-66-7	66.6	ug/kg	333	ug/kg
SOLID	1,3,5-Trinitrobenzene	99-35-4	66.6	ug/kg	333	ug/kg
SOLID	1,3-Dichlorobenzene	541-73-1	66.6	ug/kg	333	ug/kg
SOLID	1,4-Dichlorobenzene	106-46-7	66.6	ug/kg	333	ug/kg
SOLID	1,4-Dinitrobenzene	100-25-4	432.9	ug/kg	1665	ug/kg
SOLID	1,4-Dioxane	123-91-1	66.6	ug/kg	333	ug/kg
SOLID	1,4-Naphthoquinone	130-15-4	66.6	ug/kg	333	ug/kg
SOLID	1-Methylnaphthalene	90-12-0	9.99	ug/kg	33.3	ug/kg
SOLID	1-Naphthylamine	134-32-7	99.9	ug/kg	333	ug/kg
SOLID	2,3,4,6-Tetrachlorophenol	58-90-2	66.6	ug/kg	333	ug/kg
SOLID	2,3-Dichloroaniline	608-27-5	99.9	ug/kg	333	ug/kg
SOLID	2,4,5-Trichlorophenol	95-95-4	66.6	ug/kg	333	ug/kg
SOLID	2,4,6-Trichlorophenol	88-06-2	66.6	ug/kg	333	ug/kg
SOLID	2,4-Dichlorophenol	120-83-2	66.6	ug/kg	333	ug/kg
SOLID	2,4-Dimethylphenol	105-67-9	66.6	ug/kg	333	ug/kg
SOLID	2,4-Dinitrophenol	51-28-5	126.54	ug/kg	666	ug/kg
SOLID	2,4-Dinitrotoluene	121-14-2	33.3	ug/kg	333	ug/kg
SOLID	2,6-Dichlorophenol	87-65-0	66.6	ug/kg	333	ug/kg
SOLID	2,6-Dinitrotoluene	606-20-2	33.3	ug/kg	333	ug/kg
SOLID	2-Acetylaminofluorene	53-96-3	126.873	ug/kg	333	ug/kg
SOLID	2-Chloronaphthalene	91-58-7	11.655	ug/kg	33.3	ug/kg
SOLID	2-Chlorophenol	95-57-8	66.6	ug/kg	333	ug/kg
SOLID	2-Ethoxyethanol	110-80-5	298.035	ug/kg	1665	ug/kg
SOLID	2-Methyl-4,6-dinitrophenol	534-52-1	66.6	ug/kg	333	ug/kg
SOLID	2-Methylnaphthalene	91-57-6	6.66	ug/kg	33.3	ug/kg
SOLID	2-Naphthylamine	91-59-8	116.55	ug/kg	333	ug/kg
SOLID	2-Nitrophenol	88-75-5	33.3	ug/kg	333	ug/kg
SOLID	2-Picoline	109-06-8	66.6	ug/kg	333	ug/kg

SOLID	3,3'-Dichlorobenzidine	91-94-1	99.9	ug/kg	333	ug/kg
SOLID	3,3'-Dimethylbenzidine	119-93-7	99.9	ug/kg	333	ug/kg
SOLID	3-Methylcholanthrene	56-49-5	121.545	ug/kg	333	ug/kg
SOLID	4,4'-Methylenebis(2-chloroaniline)	101-14-4	333	ug/kg	1665	ug/kg
SOLID	4-Aminobiphenyl	92-67-1	66.6	ug/kg	333	ug/kg
SOLID	4-Bromophenylphenylether	101-55-3	33.3	ug/kg	333	ug/kg
SOLID	4-Chloro-3-methylphenol	59-50-7	33.3	ug/kg	333	ug/kg
SOLID	4-Chloroaniline	106-47-8	66.6	ug/kg	333	ug/kg
SOLID	4-Chlorophenylphenylether	7005-72-3	33.3	ug/kg	333	ug/kg
SOLID	4-Nitrophenol	100-02-7	66.6	ug/kg	333	ug/kg
SOLID	4-Nitroquinoline-1-oxide	56-57-5	66.6	ug/kg	333	ug/kg
SOLID	5-Nitro-o-toluidine	99-55-8	33.3	ug/kg	333	ug/kg
SOLID	7,12Dimethylbenz(a)anthracene	57-97-6	99.9	ug/kg	333	ug/kg
SOLID	Acenaphthene	83-32-9	11.1222	ug/kg	33.3	ug/kg
SOLID	Acenaphthylene	208-96-8	9.99	ug/kg	33.3	ug/kg
SOLID	Acetophenone	98-86-2	33.3	ug/kg	333	ug/kg
SOLID	Aniline	62-53-3	116.55	ug/kg	333	ug/kg
SOLID	Anthracene	120-12-7	6.66	ug/kg	33.3	ug/kg
SOLID	Aramite	140-57-8	109.89	ug/kg	333	ug/kg
SOLID	Atrazine	1912-24-9	99.9	ug/kg	333	ug/kg
SOLID	Benzaldehyde	100-52-7	99.9	ug/kg	333	ug/kg
SOLID	Benzidine	92-87-5	333	ug/kg	1665	ug/kg
SOLID	Benzo(a)anthracene	56-55-3	9.99	ug/kg	33.3	ug/kg
SOLID	Benzo(a)pyrene	50-32-8	9.99	ug/kg	33.3	ug/kg
SOLID	Benzo(b)fluoranthene	205-99-2	9.99	ug/kg	33.3	ug/kg
SOLID	Benzo(ghi)perylene	191-24-2	9.99	ug/kg	33.3	ug/kg
SOLID	Benzo(k)fluoranthene	207-08-9	9.99	ug/kg	33.3	ug/kg
SOLID	Benzoic acid	65-85-0	166.5	ug/kg	666	ug/kg
SOLID	Benzyl alcohol	100-51-6	99.9	ug/kg	333	ug/kg
SOLID	Butylbenzylphthalate	85-68-7	66.6	ug/kg	333	ug/kg
SOLID	Caprolactam	105-60-2	66.6	ug/kg	333	ug/kg
SOLID	Carbazole	86-74-8	9.99	ug/kg	333	ug/kg
SOLID	Chlorobenzilate	510-15-6	66.6	ug/kg	333	ug/kg
SOLID	Chrysene	218-01-9	9.99	ug/kg	33.3	ug/kg
SOLID	Di-n-butylphthalate	84-74-2	33.3	ug/kg	333	ug/kg
SOLID	Di-n-octylphthalate	117-84-0	66.6	ug/kg	333	ug/kg
SOLID	Diallate	2303-16-4	66.6	ug/kg	333	ug/kg
SOLID	Dibenzo(a,e)pyrene	192-65-4	399.6	ug/kg	1665	ug/kg
SOLID	Dibenzo(a,h)anthracene	53-70-3	9.99	ug/kg	33.3	ug/kg
SOLID	Dibenzofuran	132-64-9	66.6	ug/kg	333	ug/kg
SOLID	Diethylphthalate	84-66-2	66.6	ug/kg	333	ug/kg
SOLID	Dimethoate	60-51-5	66.6	ug/kg	333	ug/kg
SOLID	Dimethylphthalate	131-11-3	66.6	ug/kg	333	ug/kg
SOLID	Dinoseb	88-85-7	66.6	ug/kg	333	ug/kg
SOLID	Diphenylamine	122-39-4	66.6	ug/kg	333	ug/kg
SOLID	Disulfoton	298-04-4	66.6	ug/kg	333	ug/kg
SOLID	Ethyl Methanesulfonate	62-50-0	66.6	ug/kg	333	ug/kg
SOLID	Ethyl methacrylate	97-63-2	66.6	ug/kg	333	ug/kg
SOLID	Famphur	52-85-7	66.6	ug/kg	333	ug/kg
SOLID	Fluoranthene	206-44-0	9.99	ug/kg	33.3	ug/kg
SOLID	Fluorene	86-73-7	9.99	ug/kg	33.3	ug/kg
SOLID	Hexachlorobenzene	118-74-1	66.6	ug/kg	333	ug/kg
SOLID	Hexachlorobutadiene	87-68-3	66.6	ug/kg	333	ug/kg
SOLID	Hexachlorocyclopentadiene	77-47-4	66.6	ug/kg	333	ug/kg
SOLID	Hexachloroethane	67-72-1	66.6	ug/kg	333	ug/kg
SOLID	Hexachlorophene	70-30-4	3363.3	ug/kg	16650	ug/kg
SOLID	Hexachloropropene	1888-71-7	66.6	ug/kg	333	ug/kg

SOLID	Indeno(1,2,3-cd)pyrene	193-39-5	9.99	ug/kg	33.3	ug/kg
SOLID	Isodrin	465-73-6	66.6	ug/kg	333	ug/kg
SOLID	Isophorone	78-59-1	66.6	ug/kg	333	ug/kg
SOLID	Isosafrole	120-58-1	66.6	ug/kg	333	ug/kg
SOLID	Kepone	143-50-0	99.9	ug/kg	333	ug/kg
SOLID	Methapyrilene	91-80-5	116.55	ug/kg	333	ug/kg
SOLID	Methoxychlor	72-43-5	66.6	ug/kg	333	ug/kg
SOLID	Methyl methacrylate	80-62-6	66.6	ug/kg	333	ug/kg
SOLID	Methyl methanesulfonate	66-27-3	66.6	ug/kg	333	ug/kg
SOLID	Methyl parathion	298-00-0	66.6	ug/kg	333	ug/kg
SOLID	N-Methyl-N-nitrosomethylamine	62-75-9	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosodi-n-butylamine	924-16-3	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosodiethylamine	55-18-5	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosodipropylamine	621-64-7	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosomethylethylamine	10595-95-6	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosomorpholine	59-89-2	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosopiperidine	100-75-4	66.6	ug/kg	333	ug/kg
SOLID	N-Nitrosopyrrolidine	930-55-2	66.6	ug/kg	333	ug/kg
SOLID	Naphthalene	91-20-3	9.99	ug/kg	33.3	ug/kg
SOLID	Nitrobenzene	98-95-3	66.6	ug/kg	333	ug/kg
SOLID	Parathion	56-38-2	66.6	ug/kg	333	ug/kg
SOLID	Pentachlorobenzene	608-93-5	66.6	ug/kg	333	ug/kg
SOLID	Pentachloroethane	76-01-7	66.6	ug/kg	333	ug/kg
SOLID	Pentachloronitrobenzene	82-68-8	66.6	ug/kg	333	ug/kg
SOLID	Pentachlorophenol	87-86-5	66.6	ug/kg	333	ug/kg
SOLID	Phenacetin	62-44-2	66.6	ug/kg	333	ug/kg
SOLID	Phenanthrene	85-01-8	9.99	ug/kg	33.3	ug/kg
SOLID	Phenol	108-95-2	66.6	ug/kg	333	ug/kg
SOLID	Phorate	298-02-2	66.6	ug/kg	333	ug/kg
SOLID	Pronamide	23950-58-5	66.6	ug/kg	333	ug/kg
SOLID	Pyrene	129-00-0	10.4562	ug/kg	33.3	ug/kg
SOLID	Pyridine	110-86-1	66.6	ug/kg	333	ug/kg
SOLID	Safrole	94-59-7	66.6	ug/kg	333	ug/kg
SOLID	Sulfotepp	3689-24-5	66.6	ug/kg	333	ug/kg
SOLID	Thionazin	297-97-2	66.6	ug/kg	333	ug/kg
SOLID	Tributylphosphate	126-73-8	66.6	ug/kg	333	ug/kg
SOLID	Triethylphosphorothioate	126-68-1	66.6	ug/kg	333	ug/kg
SOLID	a,a-Dimethylphenethylamine	122-09-8	109.89	ug/kg	666	ug/kg
SOLID	alpha-Terpineol	98-55-5	66.6	ug/kg	333	ug/kg
SOLID	bis(2-Chloroethoxy)methane	111-91-1	66.6	ug/kg	333	ug/kg
SOLID	bis(2-Chloroethyl) ether	111-44-4	66.6	ug/kg	333	ug/kg
SOLID	bis(2-Chloroisopropyl)ether	108-60-1	66.6	ug/kg	333	ug/kg
SOLID	bis(2-Ethylhexyl)phthalate	117-81-7	66.6	ug/kg	333	ug/kg
SOLID	m,p-Cresols	65794-96-9	133.2	ug/kg	333	ug/kg
SOLID	m-Dinitrobenzene	99-65-0	66.6	ug/kg	333	ug/kg
SOLID	m-Nitroaniline	99-09-2	66.6	ug/kg	333	ug/kg
SOLID	n-Decane	124-18-5	66.6	ug/kg	333	ug/kg
SOLID	n-Octadecane	593-45-3	99.9	ug/kg	333	ug/kg
SOLID	o-Cresol	95-48-7	66.6	ug/kg	333	ug/kg
SOLID	o-Nitroaniline	88-74-4	66.6	ug/kg	333	ug/kg
SOLID	o-Toluidine	95-53-4	66.6	ug/kg	333	ug/kg
SOLID	p-(Dimethylamino)azobenzene	60-11-7	66.6	ug/kg	333	ug/kg
SOLID	p-Benzoquinone	106-51-4	66.6	ug/kg	333	ug/kg
SOLID	p-Nitroaniline	100-01-6	66.6	ug/kg	333	ug/kg
SOLID	p-Phenylenediamine	106-50-3	166.5	ug/kg	666	ug/kg

2005 MDL-X PAH Solid

PQL-X PAH 8310 Solid
Instrument: HPLC
Methods: SW846 8310
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	1-Methylnaphthalene	90-12-0	5.0283	ug/kg	16.65	ug/kg
SOLID	2-Methylnaphthalene	91-57-6	4.995	ug/kg	16.65	ug/kg
SOLID	Acenaphthene	83-32-9	4.995	ug/kg	16.65	ug/kg
SOLID	Acenaphthylene	208-96-8	1.665	ug/kg	16.65	ug/kg
SOLID	Anthracene	120-12-7	4.995	ug/kg	16.65	ug/kg
SOLID	Benzo(a)anthracene	56-55-3	0.5328	ug/kg	1.665	ug/kg
SOLID	Benzo(a)pyrene	50-32-8	0.5328	ug/kg	1.665	ug/kg
SOLID	Benzo(b)fluoranthene	205-99-2	0.5328	ug/kg	1.665	ug/kg
SOLID	Benzo(ghi)perylene	191-24-2	0.5328	ug/kg	1.665	ug/kg
SOLID	Benzo(k)fluoranthene	207-08-9	0.333	ug/kg	0.833	ug/kg
SOLID	Chrysene	218-01-9	0.56943	ug/kg	1.665	ug/kg
SOLID	Dibenzo(a,h)anthracene	53-70-3	0.5328	ug/kg	1.665	ug/kg
SOLID	Fluoranthene	206-44-0	0.5328	ug/kg	1.665	ug/kg
SOLID	Fluorene	86-73-7	3.33	ug/kg	16.65	ug/kg
SOLID	Indeno(1,2,3-cd)pyrene	193-39-5	0.5328	ug/kg	1.665	ug/kg
SOLID	Naphthalene	91-20-3	4.995	ug/kg	16.65	ug/kg
SOLID	Phenanthrene	85-01-8	1.665	ug/kg	16.65	ug/kg
SOLID	Pyrene	129-00-0	0.5328	ug/kg	1.665	ug/kg

2006 MDL-X 8330 Soil
2006 PQL-X 8330 Soil
Instrument: HPLC
Methods: SW846 8330
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	1,3,5-Trinitrobenzene	99-35-4	50	ug/kg	150	ug/kg
SOLID	2,4,6-Trinitrotoluene	118-96-7	50	ug/kg	150	ug/kg
SOLID	2,4-Dinitrotoluene	121-14-2	50	ug/kg	150	ug/kg
SOLID	2,6-Dinitrotoluene	606-20-2	50	ug/kg	150	ug/kg
SOLID	2-Amino-4,6-dinitrotoluene	35572-78-2	50	ug/kg	150	ug/kg
SOLID	4-Amino-2,6-dinitrotoluene	19406-51-0	50	ug/kg	150	ug/kg
SOLID	HMX	2691-41-0	50	ug/kg	150	ug/kg
SOLID	Nitrobenzene	98-95-3	50	ug/kg	150	ug/kg
SOLID	Nitroglycerin	55-63-0	250	ug/kg	1000	ug/kg
SOLID	PETN	78-11-5	82.5	ug/kg	500	ug/kg
SOLID	RDX	121-82-4	50	ug/kg	150	ug/kg
SOLID	Tetryl	479-45-8	50	ug/kg	150	ug/kg
SOLID	m-Dinitrobenzene	99-65-0	50	ug/kg	150	ug/kg
SOLID	m-Nitrotoluene	99-08-1	50	ug/kg	150	ug/kg
SOLID	o-Nitrotoluene	88-72-2	50	ug/kg	150	ug/kg
SOLID	p-Nitrotoluene	99-99-0	50	ug/kg	150	ug/kg

2005 MDL-V 8260 Solid
PQL-V 2004 8260/OLM CLP Solid
Instrument: VOA GC/MS
Methods: OLM 3.1 CLP Volatile, OLM 4.2 CLP Volatile, SW846 8260A, SW846 8260B

Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	1,1,1,2-Tetrachloroethane	630-20-6	0.2	ug/kg	1	ug/kg
SOLID	1,1,1-Trichloroethane	71-55-6	0.3	ug/kg	1	ug/kg
SOLID	1,1,2,2-Tetrachloroethane	79-34-5	0.25	ug/kg	1	ug/kg
SOLID	1,1,2-Trichloroethane	79-00-5	0.3	ug/kg	1	ug/kg
SOLID	1,1-Dichloroethane	75-34-3	0.3	ug/kg	1	ug/kg
SOLID	1,1-Dichloroethylene	75-35-4	0.3	ug/kg	1	ug/kg
SOLID	1,1-Dichloropropene	563-58-6	0.25	ug/kg	1	ug/kg
SOLID	1,2,3-Trichlorobenzene	87-61-6	0.25	ug/kg	1	ug/kg
SOLID	1,2,3-Trichloropropane	96-18-4	0.5	ug/kg	1	ug/kg
SOLID	1,2,4-Trichlorobenzene	120-82-1	0.3	ug/kg	1	ug/kg
SOLID	1,2,4-Trimethylbenzene	95-63-6	0.2	ug/kg	1	ug/kg
SOLID	1,2-Dibromo-3-chloropropane	96-12-8	0.5	ug/kg	1	ug/kg
SOLID	1,2-Dibromoethane	106-93-4	0.2	ug/kg	1	ug/kg
SOLID	1,2-Dichlorobenzene	95-50-1	0.2	ug/kg	1	ug/kg
SOLID	1,2-Dichloroethane	107-06-2	0.25	ug/kg	1	ug/kg
SOLID	1,2-Dichloroethylene (total)	540-59-0	0.3	ug/kg	1	ug/kg
SOLID	1,2-Dichloropropane	78-87-5	0.3	ug/kg	1	ug/kg
SOLID	1,3,5-Trimethylbenzene	108-67-8	0.2	ug/kg	1	ug/kg
SOLID	1,3-Dichlorobenzene	541-73-1	0.2	ug/kg	1	ug/kg
SOLID	1,3-Dichloropropane	142-28-9	0.3	ug/kg	1	ug/kg
SOLID	1,4-Dichlorobenzene	106-46-7	0.2	ug/kg	1	ug/kg
SOLID	1,4-Dioxane	123-91-1	15	ug/kg	50	ug/kg
SOLID	2,2-Dichloropropane	594-20-7	0.3	ug/kg	1	ug/kg
SOLID	2-Butanone	78-93-3	1.7	ug/kg	5	ug/kg
SOLID	2-Chloro-1,3-butadiene	126-99-8	0.3	ug/kg	1	ug/kg
SOLID	2-Chloroethylvinyl ether	110-75-8	1.25	ug/kg	5	ug/kg
SOLID	2-Chlorotoluene	95-49-8	0.2	ug/kg	1	ug/kg
SOLID	2-Hexanone	591-78-6	1.52	ug/kg	5	ug/kg
SOLID	2-Methylpentane	107-83-5	0.5	ug/kg	UCF	ug/kg
SOLID	2-Nitropropane	79-46-9	0.9	ug/kg	5	ug/kg
SOLID	4-Chlorotoluene	106-43-4	0.24	ug/kg	1	ug/kg
SOLID	4-Isopropyltoluene	99-87-6	0.25	ug/kg	1	ug/kg
SOLID	4-Methyl-2-pentanone	108-10-1	1.09	ug/kg	5	ug/kg
SOLID	Acetone	67-64-1	2.58	ug/kg	5	ug/kg
SOLID	Acetonitrile	75-05-8	9.11	ug/kg	25	ug/kg
SOLID	Acrolein	107-02-8	3	ug/kg	10	ug/kg
SOLID	Acrylonitrile	107-13-1	1	ug/kg	5	ug/kg
SOLID	Allyl chloride	107-05-1	2	ug/kg	5	ug/kg
SOLID	Benzene	71-43-2	0.33	ug/kg	1	ug/kg
SOLID	Benzyl chloride	100-44-7	0.6	ug/kg	5	ug/kg
SOLID	Bromobenzene	108-86-1	0.2	ug/kg	1	ug/kg
SOLID	Bromochloromethane	74-97-5	0.5	ug/kg	1	ug/kg
SOLID	Bromodichloromethane	75-27-4	0.2	ug/kg	1	ug/kg
SOLID	Bromoform	75-25-2	0.3	ug/kg	1	ug/kg
SOLID	Bromomethane	74-83-9	0.5	ug/kg	1	ug/kg
SOLID	Carbon disulfide	75-15-0	1.25	ug/kg	5	ug/kg
SOLID	Carbon tetrachloride	56-23-5	0.2	ug/kg	1	ug/kg
SOLID	Chlorobenzene	108-90-7	0.2	ug/kg	1	ug/kg
SOLID	Chloroethane	75-00-3	0.5	ug/kg	1	ug/kg
SOLID	Chloroform	67-66-3	0.2	ug/kg	1	ug/kg
SOLID	Chloromethane	74-87-3	0.5	ug/kg	1	ug/kg
SOLID	Cyclohexane	110-82-7	0.3	ug/kg	2	ug/kg

SOLID	Cyclohexanone	108-94-1	15	ug/kg	50	ug/kg
SOLID	Dibromochloromethane	124-48-1	0.3	ug/kg	1	ug/kg
SOLID	Dibromomethane	74-95-3	0.3	ug/kg	1	ug/kg
SOLID	Dichlorodifluoromethane	75-71-8	0.5	ug/kg	1	ug/kg
SOLID	Ethyl acetate	141-78-6	1	ug/kg	10	ug/kg
SOLID	Ethyl ether	60-29-7	0.25	ug/kg	1	ug/kg
SOLID	Ethyl methacrylate	97-63-2	0.5	ug/kg	5	ug/kg
SOLID	Ethylbenzene	100-41-4	0.2	ug/kg	1	ug/kg
SOLID	Hexachlorobutadiene	87-68-3	0.5	ug/kg	1	ug/kg
SOLID	Hexane	110-54-3	10	ug/kg	10	ug/kg
SOLID	Iodomethane	74-88-4	1.67	ug/kg	5	ug/kg
SOLID	Isobutyl alcohol	78-83-1	10	ug/kg	50	ug/kg
SOLID	Isopropylbenzene	98-82-8	0.2	ug/kg	1	ug/kg
SOLID	Methacrylonitrile	126-98-7	0.7	ug/kg	5	ug/kg
SOLID	Methyl acetate	79-20-9	1.67	ug/kg	10	ug/kg
SOLID	Methyl methacrylate	80-62-6	1	ug/kg	5	ug/kg
SOLID	Methylcyclohexane	108-87-2	0.3	ug/kg	2	ug/kg
SOLID	Methylene chloride	75-09-2	2	ug/kg	5	ug/kg
SOLID	Naphthalene	91-20-3	0.2	ug/kg	1	ug/kg
SOLID	Pentachloroethane	76-01-7	1.5	ug/kg	5	ug/kg
SOLID	Propionitrile	107-12-0	1	ug/kg	5	ug/kg
SOLID	Styrene	100-42-5	0.2	ug/kg	1	ug/kg
SOLID	Tetrachloroethylene	127-18-4	0.2	ug/kg	1	ug/kg
SOLID	Tetrahydrofuran	109-99-9	3	ug/kg	5	ug/kg
SOLID	Toluene	108-88-3	0.29	ug/kg	1	ug/kg
SOLID	Trichloroethylene	79-01-6	0.25	ug/kg	1	ug/kg
SOLID	Trichlorofluoromethane	75-69-4	0.5	ug/kg	1	ug/kg
SOLID	Trichlorotrifluoroethane	76-13-1	1	ug/kg	5	ug/kg
SOLID	Vinyl acetate	108-05-4	1.25	ug/kg	5	ug/kg
SOLID	Vinyl chloride	75-01-4	0.5	ug/kg	1	ug/kg
SOLID	Xylenes (total)	1330-20-7	0.2	ug/kg	1	ug/kg
SOLID	bis(2-Chloroisopropyl)ether	108-60-1	1.5	ug/kg	5	ug/kg
SOLID	cis-1,2-Dichloroethylene	156-59-2	0.3	ug/kg	1	ug/kg
SOLID	cis-1,3-Dichloropropylene	10061-01-5	0.2	ug/kg	1	ug/kg
SOLID	cis-1,4-Dichloro-2-butene	1476-11-5	0.5	ug/kg	5	ug/kg
SOLID	m,p-Xylenes	179601-23-1	0.25	ug/kg	2	ug/kg

SOLID	n-Butyl alcohol	71-36-3	27	ug/kg	50	ug/kg
SOLID	n-Butylbenzene	104-51-8	0.2	ug/kg	1	ug/kg
SOLID	n-Propylbenzene	103-65-1	0.2	ug/kg	1	ug/kg
SOLID	o-Xylene	95-47-6	0.2	ug/kg	1	ug/kg
SOLID	sec-Butylbenzene	135-98-8	0.2	ug/kg	1	ug/kg
SOLID	tert-Butyl methyl ether	1634-04-4	0.2	ug/kg	1	ug/kg
SOLID	tert-Butylbenzene	98-06-6	0.2	ug/kg	1	ug/kg
SOLID	trans-1,2-Dichloroethylene	156-60-5	0.3	ug/kg	1	ug/kg
SOLID	trans-1,3-Dichloropropylene	10061-02-6	0.3	ug/kg	1	ug/kg
SOLID	trans-1,4-Dichloro-2-butene	110-57-6	0.5	ug/kg	5	ug/kg

2005 MDL-V GRO Soil
PQL-V GRO Solid
Instrument: VOC/FID
Methods: SW846 8015A/B VOC
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	Gasoline Range Organics		25	ug/kg	100	ug/kg
SOLID	Kwik Dry		25	ug/kg	50	ug/kg

2006 MDL-X 8321M Solid
2005 PQL-X 8321 Solids
Instrument: LC-MS/MS
Methods: SW846 6850 Modified, SW846 8321A Modified
Matrices: Solid

Matrix	Parameter	CAS Number	LOD MDL	Unit	LOQ PQL	Unit
SOLID	1,3,5-Trinitrobenzene	99-35-4	100	ug/kg	500	ug/kg
SOLID	2,4,6-Trinitrotoluene	118-96-7	100	ug/kg	500	ug/kg
SOLID	2,4-Diamino-6-nitrotoluene	6629-29-4	500	ug/kg	2000	ug/kg
SOLID	2,4-Dinitrotoluene	121-14-2	100	ug/kg	500	ug/kg
SOLID	2,6-Diamino-4-nitrotoluene	59229-75-3	500	ug/kg	2000	ug/kg
SOLID	2,6-Dinitrotoluene	606-20-2	100	ug/kg	500	ug/kg
SOLID	2-Amino-4,6-dinitrotoluene	35572-78-2	150	ug/kg	500	ug/kg
SOLID	3,5-Dinitroaniline	618-87-1	250	ug/kg	1000	ug/kg
SOLID	4-Amino-2,6-dinitrotoluene	19406-51-0	100	ug/kg	500	ug/kg
SOLID	Ammonium Picrate	131-74-8	0	ug/kg	4296	ug/kg
SOLID	HMX	2691-41-0	150	ug/kg	500	ug/kg
SOLID	Nitrobenzene	98-95-3	150	ug/kg	500	ug/kg
SOLID	Nitroglycerin	55-63-0	250	ug/kg	1000	ug/kg
SOLID	PETN	78-11-5	730	ug/kg	1000	ug/kg
SOLID	Perchlorate	14797-73-0	0.5	ug/kg	2	ug/kg
SOLID	Perchlorate-101	14797-73-0	0.5	ug/kg	2	ug/kg
SOLID	Picric acid	88-89-1	2700	ug/kg	4000	ug/kg
SOLID	RDX	121-82-4	100	ug/kg	500	ug/kg
SOLID	TATB	3058-38-6	300	ug/kg	1000	ug/kg
SOLID	Tetryl	479-45-8	100	ug/kg	500	ug/kg
SOLID	m-Dinitrobenzene	99-65-0	150	ug/kg	500	ug/kg
SOLID	m-Nitrotoluene	99-08-1	100	ug/kg	500	ug/kg
SOLID	o-Nitrotoluene	88-72-2	100	ug/kg	500	ug/kg
SOLID	p-Nitrotoluene	99-99-0	100	ug/kg	500	ug/kg
SOLID	tris(o-cresyl) phosphate	78-30-8	250	ug/kg	1000	ug/kg

ATTACHMENT B

SCOPE OF WORK
April 6, 2006

PLAN OF ACTION

To Support Confirmation of Negotiation

SITE INSPECTION
MUNITIONS RESPONSE PROGRAM
NAVAL AUXILIARY LANDING FIELD (NALF) CABANISS
CORPUS CHRISTI, TEXAS

CTO 0019
SOW #1191

Submitted by:
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February 2006
Revised April 2006

Submitted to:
Southern Division
Naval Facilities Engineering Command
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North Charleston, South Carolina 29406

In support of:

"CLEAN" CONTRACT NUMBER N62467-04-D-0055

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1.0 INTRODUCTION

1.1 PURPOSE

This Plan of Action (POA) was prepared by Tetra Tech NUS (TtNUS) under the Comprehensive Long-term Environmental Action Navy (CLEAN IV) Contract Number N62467-04-D-0055. The Statement of Work (SOW) #1191 dated 24 January 2006 details the following objective:

The objective for this task order is to perform an Emergency Response (ER) with respect to Munitions and Explosives of Concern (MEC) for the Incinerator Disposal Site at Naval Auxiliary Landing Field (NALF) Cabaniss, Corpus Christi, TX. In addition, the objective for this task order is to perform a Site Inspection (SI), upon removal of MEC, for Munitions Constituents (MC) at the Incinerator Disposal Site and a SI at the Skeet and Pistol Range at NALF Cabaniss. As used in this document, the term MEC includes Discarded Military Munitions (DMM) and Unexploded Ordnance (UXO), and MC in high enough concentrations to pose an explosive hazard. All work under this task order shall be completed in accordance with all applicable Department of the Navy policies, regulations and guidance, and Federal, State, and local laws.

Based on discussions with the Navy Remedial Project Manager (RPM), the following changes were made for the Task Order Requirements in Section 4 of the SOW:

In Section 4.1, under Perform Emergency Removal, the existing fence repair in the vicinity of the incinerator disposal Site to restrict access to the site, has been removed from the scope of work.

Additionally under Section 4.1, it was agreed that the following be performed:

Contractor shall perform a limited surface clearance of MEC including a geophysical survey of the site (lead by UXO safety technicians) to locate MEC hidden by vegetation or visible on the surface, followed by surface removal actions (clear and grub site of vegetation, as required, and remove MEC Items.). The surface clearance shall be performed to the extent necessary to mark safe pathways through the area for mowing crews, security patrols, and others to pass and to allow the initial Phase of fieldwork (soil sampling) to take place.

Under Section 4.4.1.4 (laboratory qualifications), it was agreed that the requirement for identification of the laboratory in the POA was revised to the following statement:

The analytical laboratory must be identified in the SAP and hold applicable state certifications to perform the analytical methods required (if available).

This POA describes TtNUS' technical approach and assumptions for executing the SOW, provides the project schedule, and includes the basis of the cost estimate.

1.2 PLAN OF ACTION ORGANIZATION

This POA consists of four sections, plus two appendices. Section 1.0 is this brief introduction. Section 2.0 describes the general management approach and key personnel. Section 3.0 addresses the project-specific SOW and presents assumptions associated with the SOW that represent the basis of the cost estimate. Section 3.0 is organized by the standard Work Breakdown Structure (WBS) tasks that were provided by the Naval Facilities Engineering Field Division South (NAVFAC EFD SOUTH). Section 4.0 details the project deliverables that will be submitted in performing the SOW. These deliverables will be tracked in the Technical and Financial Monthly Report (TFMR) to reflect Contract Task Order (CTO) completion. Appendix A includes the project schedule and Appendix B presents the cost estimate; both the schedule and cost estimates are organized by standard WBS tasks. All proposed Other Direct Costs (ODCs) are included in Appendix B.

For each subtask included within this POA, the summary labor estimate and associated ODCs are provided in Appendix B, Table 5-1. The applicable direct labor estimating rates are presented in Table 5-2. The detail of the ODCs and travel cost is provided in the support tables included as Table 5-3 and 5-4, respectively. Table 5-5 presents the subcontractor, field equipment, and expendable supply summaries (if applicable to this SOW). The subtask reference number in the text (e.g. 3.3.1 – Day-to-Day Project Management) is provided on the Appendix B tables for cross-reference to the assumptions provided for each subtask.

2.0 PROJECT STAFFING

The Houston, Texas office is the lead for this project. Staff from the Houston, TX, Atlanta, GA, and Pittsburgh, PA offices are planned to provide the majority of the staffing for this project.

Ms. Diane Lindsay, from TtNUS' Houston Texas office will be the Task Order Manager (TOM). The TOM can be reached at 832.251.6019 by telephone, 832.251.5190 by facsimile, and diane.lindsay@ttnus.com by e-mail. The TOM will coordinate tasks with other TtNUS offices and subcontractor personnel as necessary.

3.0 BASIS OF ESTIMATE

3.1 SITE BACKGROUND AND HISTORY

NALF Cabaniss is an outlying field that supports naval air training operations out of Naval Air Station Corpus Christi (NASCC). A site visit, conducted by Malcolm Pirnie, Inc., to produce a PA Report, indicated that there is a Skeet and Pistol Range located at NALF Cabaniss and also an Incinerator Disposal Site. The former Skeet and Pistol Range is an approximately 17-acre area located in the southeast corner of NALF Cabaniss. The former Incinerator Disposal Site was located southwest of Runway 31 and west of the former Skeet and Pistol Range, within the boundaries of a former sanitary landfill.

The work required under this SOW falls under the Defense Environmental Restoration Program. MEC and MC may exist on property formerly occupied or leased by the Department of the Navy. MEC is a safety hazard and may constitute an imminent and substantial endangerment to personnel and the local population. This action will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121; Executive Order 12580; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). All activities involving work in areas potentially containing MEC hazards shall be conducted with approval from the Naval Ordnance Safety and Security Activity (NOSSA), and in accordance with the Department of the Navy (DON) and DoD requirements regarding personnel, equipment, and procedures. Federal Regulation 29 CFR 1910.120 (HAZWOPER) also applies to all actions taken at the site.

Skeet Range. The former skeet range was comprised of three skeet firing arcs facing southwest toward Oso Creek, with "high" and "low" skeet houses positioned at the end of each arc. Three trap firing arcs were also present, with trap houses centered in the middle of each arc. The pistol range contained 15 firing positions and an earthen target butt. The Skeet and Pistol Range was used for cadet and security personnel weaponry training and qualification, moving target orientation training of Naval aviators and, likely, for recreation. The range was constructed in 1942 and demolished sometime between 1958 and 1964. Station records from the 1940s indicated the presence of an armory next to the range and a small arms magazine in the northeast quadrant of the installation, east of the barracks. The armory is no longer present at the installation and the date of decommissioning is unknown. The former small arms magazine remains in place in an open field east of a drainage canal on property no longer owned by the installation. The area is currently covered in vegetation and is not used for military purposes. Future use is not expected to change.

Sources. Based on historical use of the Skeet and Pistol Range, the armory likely stored only small arms ammunition (e.g. 12-, 16-, and 20-gage and .410 caliber shot, .22 caliber, .38 caliber, .45 caliber, 9 mm,

and other small arms). Due to the nature of historical operations at the Range, it is possible for MC contamination [lead, antimony, arsenic, copper, zinc, black powder, and polycyclic aromatic hydrocarbons (PAHs)] to exist in surface soil, up to two feet below ground surface, at the site.

Incinerator Disposal Site. The former Incinerator Disposal Site was used by the City of Corpus Christi and the Army to incinerate confiscated drug material, small arms, and ordnance items in a boiler. Incineration operations began at an unknown date and were terminated in approximately 1980. The area is currently covered in dense vegetation and has no military use. A visual survey conducted at the site indicated the presence of munitions scrap at the site in two discrete locations: in and around the former boiler and on the ground surface near Perimeter Road approximately 450 feet west of the boiler. The visual survey confirmed the presence of MEC and MC at the site. No records were found describing maintenance, closure, or remediation activities performed at the site for incinerated munitions.

Sources. The Army used an eight-foot long by five-foot diameter boiler at the Incinerator Disposal Site for the incineration of "small ordnance items," including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and "possibly 80 mm rockets" (likely 2.75-inch rockets) at a former sanitary landfill facility. The City of Corpus Christi also burned confiscated drug material in the boiler. The following thermally-treated munitions scraps were observed during a visual survey performed using a magnetometer to surface sweep of the Incinerator Disposal Area: 7.62 mm small arms, 20 mm, 30 mm, and 40 mm projectiles, 5-pound practice bombs, and flares/pyrotechnics. One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed.

Based on historical operations at the Incinerator Disposal Site, it is possible for MC contamination [explosives, metals, ammonium perchlorate, white phosphorus, pyrotechnics, gun propellants, and primary explosives] to exist in surface soil, up to six feet bgs, at the site.

3.2 PROPOSED ACTIVITIES

The following activities are proposed to fulfill the SOW requirements:

- Task 01 – Project Management
- Task 03 – Preliminary Assessment/Site Investigation Report
- Task 04 – Work Plans
- Task 05 – Field Investigations
- Task 06 – Laboratory Analyses
- Task 07 – Data Management
- Task 37 – Miscellaneous

These activities are detailed in the following sections.

3.3 WBS TASK 01 – PROJECT MANAGEMENT

3.3.1 Day-to-Day Project Management

Scope

The scope includes day-to-day project management.

Assumptions

- Day-to-day project management includes resource planning, monitoring, and control; TFMR preparation and review; routine internal review meetings and weekly reports; general communication with SOUTHDIV Navy, the Installation, and subcontractor personnel; and overall project oversight.
- Because this is considered to be a large installation restoration (IR) project, 8 percent of the total labor hours (minus Task 01) are estimated to be required for TOM day-to-day project management.

- In addition, one hour per week is required for administrative staff for filing, typing, photocopying, and mailing.

3.3.2 Project Controls Support

Scope

The scope includes the effort for project controls personnel to perform all monthly financial and schedule analyses.

Assumptions

- The project controls team will conduct monthly financial and schedule analyses to measure project performance.
- For a large IR type project, two hours per month will be required for a Senior Project Controls Specialist, and one half hour per month will be required for a Project Controls Expert.

3.3.3 Document Archiving

Scope

The scope includes the archiving of all supporting documents generated under this CTO.

Assumptions

- Document archiving efforts include CTO closeout preparation for all documents, scanning, conversion to PDF, and transfer to CD-ROM.
- These efforts will require seven hours per CTO for a Senior Administrative Assistant and eight hours for an Administrative Assistant.
- ***The NAVFAC Living CD format guidelines will be followed when archiving documents.***

3.3.4 Subcontractor Procurement

Scope

The scope includes subcontractor procurement.

Assumptions

- Subcontracts for direct push technology (DPT), fixed-base analytical laboratory, and surveyor support are required. Hours are included for technical staff to prepare technical specifications, perform technical evaluations of bids, and make an award recommendation.
- A pre-bid site walk will be required as part of the DPT procurement. This site walk will be attended by the senior UXO Supervisor and the Senior Geologist. The site walk will take place over a period two days, including travel.
- One analytical subcontract will be procured.
- Deliverables will be submitted via an express mail service.

3.3.5 Procurement Support

Scope

The scope includes the effort for procurement personnel to perform all subcontract procurement activities.

Assumptions

- Each subcontract proposed above requires the initial procurement action to secure a subcontract agreement, routine subcontract administration during the period of performance, and subcontract closeout activities.
- For a large IR type project, ten hours per subcontract will be required for subcontract procurement support, as well as eight hours per field event for the procurement of expendable supplies and rental equipment.

3.3.6 Kickoff Meeting

Scope

The scope of work includes attendance at the kickoff meeting.

Assumptions

- The TRIAD approach (systematic planning, dynamic work plans, and real-time analysis) will be used for the MEC and MC investigation. The kickoff meeting will include a data quality objective (DQO) planning session as part of the TRIAD systematic planning activities.
- The objective of the meeting will be to gather site-specific information and to develop DQOs that are necessary to prepare the following documents: the Explosive Safety Submission (ESS) (SOW Task 1a) for the Incinerator Disposal Site; the Site Inspection Work Plan, including an Emergency Response (ER) with respect to MEC, for the Incinerator Disposal Site (SOW Task 1); the Site Inspection Work Plan for the Skeet and Pistol Range (SOW Task 2); and the Sampling and Analysis Plan for the Incinerator Disposal Site and the Skeet and Pistol Range (SOW Task 4a).
- TtNUS will prepare an agenda seven days prior to the meeting.
- The meeting will take place over a period of four days, including travel, at Corpus Christi.
- NAS Corpus Christi security, safety, and environmental personnel will be available to provide information / identify site requirements as related to the Preliminary Assessment (PA)/Site Investigation (SI).
- Both the Skeet Range and Incinerator Disposal Site will be visited.
- The Kickoff meeting will be attended by the TOM, Senior UXO Supervisor, Senior Geologist, Senior Geophysicist and the Munitions Response Program (MRP) Scientist (Technical Consultant). Representatives of the Navy including the Navy RPM, Environmental coordinators and others from the site, and various EFD South Personnel will attend. Regulators may also attend.
- Site visits will be made to the Skeet Range and the Incinerator Disposal Site.
- After the site visits are conducted, a DQO meeting will be held at Corpus Christi on the second and third days. Representatives of the Navy, including the Navy RPM, Environmental coordinators and others from the site, and various EFD South Personnel will participate. Regulators may also participate.
- Hours are included for each attendee to review the Site Inspection Reports prior to traveling to Corpus Christi.
- Potential sampling locations will be marked (staked) in the field.
- A trip report will be issued, which will include a summary of the DQO meetings. Hours are included for preparation of the trip report.

3.3.7 Partnering Meeting Support

Scope

The scope includes Partnering team meeting support.

Assumptions

- TtNUS will participate in four partnering meetings during the performance period.
- Technical presentations will be made for work conducted by TtNUS.
- TtNUS will not be responsible for any partnering meeting set-up (including meeting notices, arranging for and setting up the meeting rooms), obtaining equipment (slide and overhead projectors, laptop computers, etc.), preparing overheads, or disassembling and returning the meeting equipment at the end of the meeting. ***During negotiations, it was determined that TtNUS will be responsible for these items for one of the four partnering meetings.***
- TtNUS will be responsible for preparation of meeting material (overheads and handouts) for technical material presented by TtNUS personnel.
- TtNUS will be responsible for preparation and distribution of meeting minutes.
- Each meeting will be attended by the TtNUS TOM and one meeting will be attended by the TtNUS Senior UXO Supervisor and the MRP Scientist.

3.4 WBS TASK 03 – PRELIMINARY ASSESSMENT/SITE INVESTIGATION REPORT

3.4.1 Skeet and Pistol Range Preliminary Assessment / Site Investigation Report

Scope

The scope of work includes preparation of the PA/SI report for the Skeet Range. The contents of the report will be based on the information collected during Tasks 05, 06, and 07.

Assumptions

- The Skeet and Pistol Range PA/SI Report will be developed as draft, draft final, and final versions. The draft and draft final versions will be submitted to the Navy for review. The draft final version will be prepared for submittal to regulatory agencies after incorporation of Navy comments on the draft version. The final version will be submitted to the Navy after incorporation of agency comments.
- Formal written responses will be prepared for comments received on the draft version and draft final versions.
- Fieldwork will be conducted in phases. Phase I will consist of soil sampling. This report will address the results of Phase I sampling.
- The Texas Commission on Environmental Quality (TCEQ) format for Affected Property Assessment Report (APAR) will be utilized to the extent practical for reporting data. The Report will contain the following information.
    - Executive Summary
    - Updated Conceptual Site Model
    - Conclusions and Recommendations
    - Review of Existing Information
        - Site description
        - Site Setting
        - Operation history including hazardous waste management activities, if any
        - Data collection activities
        - Archive search report
        - Results of preliminary assessment
    - Exposure Pathways and Groundwater Resource Classification
    - Discussion and Results of Site Inspection Survey
        - Detailed conceptual site model
        - Survey Design and methods
        - Assessment of potential MEC and MC risks/ hazards
        - Migration Pathways
        - Results of initial munitions hazard screening
    - Conclusions and Recommendations

  - Potential or existing MEC risk/hazards
  - Recommendations for future action (phases of investigation)
- A cost-to-complete estimate for each MEC and/or MC site identified for further action.

3.4.2 Incinerator Disposal Site Preliminary Assessment / Site Investigation Report

Scope

The scope of work includes preparation of the PA/SI report for the Incinerator Disposal Site. The contents of the report will be based on the information collected during Tasks 05, 06, and 07.

Assumptions

- The Incinerator Disposal Site PA/SI Report will be developed as draft, draft final, and final versions. The draft and draft final versions will be submitted to the Navy for review. The draft final version will be prepared for submittal to regulatory agencies after incorporation of Navy comments on the draft version. The final version will be submitted to the Navy after incorporation of agency comments.
- ***During negotiations, it was determined that a face-to-face meeting to discuss the comments on the draft report will not be required; a conference call will be scheduled for this purpose.***
- Formal written responses will be prepared for comments received on the draft version and draft final versions.
- Fieldwork will be conducted in phases. Phase I will consist of limited surface MEC clearance, limited subsurface clearance of MEC, and limited soil sampling. This report will address the results of Phase I sampling.
- The Texas Commission on Environmental Quality (TCEQ) format for Affected Property Assessment Report (APAR) will be utilized to extent practical for reporting data. The Report will contain the information detailed in Section 3.4.1.

3.5 WBS TASK 04 – WORK PLANS

3.5.1 Abbreviated Health and Safety Plan

Scope

The scope of work includes preparation of an abbreviated Health and Safety Plan (HASP) to conduct initial site inspection activities during the Kickoff Meeting Site Visit (Task 01, Project Management).

Assumptions

- It is not necessary to develop a HASP or SSHP satisfying all Navy or US COE requirements for the non-intrusive and limited activities that will take place during the site visit.
- The abbreviated HASP will address only those activities that would take place during the site visit.
- No intrusive activities will be conducted during the kickoff meeting site visit.
- All MEC will be avoided.
- Draft and final versions will be prepared.

3.5.2 Health and Safety Plan

Scope

The scope of work includes preparation of the detailed Health and Safety Plan (HASP).

Assumptions

- Two HASPS will be prepared, one each for the Skeet and Pistol Range and the Incinerator Disposal Site.
- The HASPs will be prepared to satisfy the minimum requirements specified in Section 28 of US ACE COE EM 385-1-1 and OSHA 29 CFR 1910.120.
- The HASPs will not address activities specifically related to munitions and explosives of concern (MEC). These activities will be addressed in the Accident Prevention Plan, which will be included in the Work Plan for Site Characterization and Emergency Response.
- The HASPs will address fieldwork activities directly related to the investigation of munitions constituents (MC).
- The HASP for the Incinerator Disposal Site will include information on the identification of asbestos-containing-material (ACM) and procedures to be followed in the event that asbestos-containing material (ACM) is encountered during the field investigations.
- Each HASP will be prepared in draft and final versions.
- The HASPs will include UXO avoidance during intrusive sampling activities.
- Formal written responses will be prepared for comments received from the Navy on the draft version.
- No comments are expected from regulatory agencies.

3.5.3 Explosive Safety Submission

Scope

The scope of work includes preparation of an Explosive Safety Submission (ESS) for the Incinerator Disposal Site.

Assumptions

- No ESS is required for the Skeet and Pistol Range because MEC is not of concern. Anomaly avoidance measures will be taken during intrusive investigations. These anomaly avoidance measures will be addressed in the HASP, which is described in Section 3.5.2 of this POA.
- An ESS is required for the Incinerator Disposal Site because MEC is of concern and emergency removal actions must be addressed.
- The general scope of the MEC-related activities includes geophysics, limited clearing and grubbing, limited surface clearance of MEC, and ER for any MEC that is found.
- The ESS submission will be prepared in accordance with guidelines found in OPNAV 8020.x, Military Munitions Response Program Oversight.
- The content of the ESS will be in accordance with the NOSSAINST 8920.15 Guideline for Preparing an Explosives Safety Submission.
- Interstate Technology & Regulatory Council (ITRC) guidance for conducting geophysical prove-outs will be followed.
- The ESS must be approved by the Naval Ordnance Safety and Security Activity (NOSSA) and Department of Defense Explosive Safety Board (DDESB)
- The ESS will address site characterization and ER activities related to MEC.
- Internal draft, draft, draft final, and final versions will be prepared.
- The internal draft version will be submitted to the Navy for review. The draft version will be submitted to NOSSA for review after Navy comments are addressed. The draft final version will be submitted to DDESB for review after NOSSA comments are addressed.
- ***During negotiations, it was determined that a face-to-face meeting to discuss comments on the draft version of this report was not required. A conference call will be set up for this purpose, if required.***
- Formal written responses will be provided to Navy comments on the internal draft version, NOSSA comments on the draft version, and DDESB comments on the draft final version.

3.5.4 Work Plan and Appendices for Incinerator Disposal Site

Scope

The scope of work includes preparation of the Work Plan, including appendices, for the MEC characterization, including geophysics, emergency removal (ER), and the initial phase of investigation (Phase I) of soils for MC at the Incinerator Disposal Site.

Assumptions

General

- The TRIAD approach will be used as the basis for the development of the Work Plan. Specific elements related to the TRIAD approach will be MEC characterization and ERs, where data will be processed in the field and used to guide MEC clearance activities, the use of anomaly avoidance techniques during MC sampling activities, and field decisions in consultation with subject matter experts regarding modifications of sampling locations / analyses based on field observations. Includes the use of field XRF units for analysis of likely "markers" such as lead.
- Internal draft, draft, draft final, and final versions will be prepared.
- The internal draft version will be submitted to the Navy for review. The draft version will be submitted to NOSSA for review after Navy comments are addressed. The draft final version will be submitted to DDESB and the TCEQ for review after NOSSA comments are addressed. Minimal comments are expected from DDESB or TCEQ.
- Formal written responses will be provided to Navy comments on the internal draft version, NOSSA comments on the draft version, and DDESB and TCEQ comments on the draft final version.

MEC Elements

- The PA has identified MEC as a concern at the Incinerator Disposal Site. Therefore, elements specific to MEC will be included within the Work Plan.
- Chemical warfare materials (CWM) are not of concern at the Incinerator Disposal Site.
- The contents of the Work Plan will be based on information in the initial PA, site-specific information gathered during the Kick-off Meeting, Navy and DDESB requirements for development of Work Plans, and further reviews of archives and photos.
- One review meeting will take place to review / resolve Navy comments on the internal draft version. This meeting will take place over a period of two days including travel at NAS Corpus Christi. The meeting will be attended by the TOM, MRP Scientist, and the Senior UXO supervisor.
- The NOSSA and DDESB-approved ESS will be used as the basis for the development of the Work Plan elements for the MEC characterization including geophysics and ER.
- Work Plan appendices directly related to MEC will include the Conceptual Site Model, Accident Prevention Plan, Project Quality Control Plan (PQCP), Geophysics Prove-Out Plan, and the MEC Management and Contingency Plan.
- An accident hazard analysis (AHA) will be conducted as part of the development of the MEC Accident Prevention Plan.

MC Elements

- The Conceptual Site Model will also address MC.
- Work Plan appendices directly related to MC will include the Field Sampling and Analysis Plan (FSAP) and Quality Assurance Project Plan (QAPP).
- The MC FSAP and MC QAPP will be prepared in accordance with the Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002 and the Uniform Federal Policy for Quality Assurance Project Plans (UFF-QAPP) March 2005.
- The MC FSAP will include a Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP).
- The MC FSAP will identify sample locations and sample collection, documentation and field quality control procedures.
- The MC QAPP will include laboratory QA information and analytical methods.

3.5.5 Work Plan and Appendices for Skeet and Pistol Range

Scope

The scope work includes preparation of the Work Plan, including appendices, for the initial phase of investigation (Phase I) of soils for MC at the Skeet and Pistol Range.

Assumptions

- The PA states that MEC is not a concern at the Skeet and Pistol Range. Therefore, Work Plan elements specific to MEC will not be included within the Work Plan.
- MEC avoidance techniques will be used at the Skeet and Pistol Range. If MEC is encountered, its location will be documented and no intrusive work will take place in the immediate area.
- MEC avoidance techniques will be described in the HASP and the FSAP.
- The TRIAD approach will be used as the basis for the development of the Work Plan. Specific elements related to the TRIAD approach will include the use of XRF techniques for field analysis, establishment of criteria for establishing extent of contamination, and field decisions regarding modifications of sampling locations.
- The Conceptual Site Model will address MC.
- Work Plan contents will include the FSAP and QAPP.
- No onsite review meetings will be required. All Navy comments on the internal draft version will reviewed / resolved via teleconference.
- The MC FSAP and MC QAPP will be prepared in accordance with the Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002 and the Uniform Federal Policy for Quality Assurance Project Plans (UFF-QAPP) March 2005.
- The MC FSAP will include a SAP and QAPP.
- The MC FSAP will identify sample locations and sample collection, documentation and field quality control procedures.
- The MC QAPP will include laboratory QA information and analytical methods.
- Internal draft, draft final, and final versions will be prepared.
- The internal draft and draft versions will be submitted to the Navy for review. ***During negotiations, it was determined that TCEQ would not be reviewing this document.***
- Formal written responses will be provided to Navy comments on the internal draft and draft versions of the report.

3.6 WBS TASK 05 – FIELD INVESTIGATIONS

General Approach

The scope of work is divided into ***two*** events to complete the planned activities.

The first event will include fieldwork necessary for Phase I characterization and ER of MEC at the Incinerator Disposal Site, primarily using geophysical methods.

The second event will include fieldwork necessary for Phase I characterization of MC at the Incinerator Disposal Site ***and the Skeet and Pistol Range Site.***

During negotiations, it was determined that the third field event would be combined with the second event. Therefore, a reduction in labor hours was made to reflect the combined mobilizations.

General Assumptions

- The Navy will provide a staging area on concrete close to the front of the outlying field.

- No storage of hazardous materials or vehicle service will be permitted.
- Open access to NALF Cabaniss will not be permitted. Navy personnel will meet TtNUS staff to open the gate. No escorts will be required to go to the actual site or while field work is being conducted.
- The facility will provide a sufficient supply of potable water for drilling and decontamination.
- Navy operations will not limit fieldwork operations. ***The Air Operations group will be consulted prior to fieldwork and prior to certain site operations (i.e., blasting in place) to ensure that the activities are coordinated with the Base operations.***
- Facility electricity is not available.
- All sites will be identified prior to commencing field activities.
- All work will be conducted in 10-hour days in shifts lasting 10 consecutive days. TtNUS will have access to both sites during weekends and holidays.
- All fieldwork will be conducted during daylight hours.
- Demobilization is included with the proposed field activity (e.g., geophysical investigation, MEC clearance, characterization, drilling, sampling, etc.).
- Mobilization activities include coordination with the site, preparation of the Dig Permit Request, internal coordination, travel arrangements, procurement and shipping of equipment and supplies, travel to and from the site, etc.
- Demobilization activities include return of equipment, site cleanup, providing field documentation to the project manager, etc.
- TtNUS will prepare and submit a Dig Permit Request to NAS Corpus Christi for utility clearance. ***During negotiations, it was determined that a site meeting for the dig permit request was not required.***
- Intrusive sampling locations will be "cleared" via down-hole magnetometers.
- Monitoring wells will not be installed. However, ***groundwater*** samples may be collected, if encountered.
- ***Erosion and sedimentation control measures will be applied, as necessary, to protect Oso Creek.***

3.6.1 Field Coordination and Management

Assumptions

- Field coordination activities include a kickoff meeting among project personnel to review field work requirements, review of work plans by the field team, equipment rental and shipping, travel arrangements, purchase and shipping of consumables, coordination with the Base, coordination with the laboratory for sample bottle shipment, coordination with analytical subcontractors, preparation of sample bottle labels, etc.
- Effort required for field coordination between events is included within this task.

3.6.2 Event 1 – Munitions and Explosives of Concern Characterization and Emergency Response at the Incinerator Disposal Site

Scope

The scope includes fieldwork necessary for Phase I characterization and ER for MEC at the Incinerator Disposal Site.

Assumptions

- Limited surface clearance of MEC will be conducted at the 12.5 acre Incinerator Disposal Site. The surface clearance will take place to the extent necessary to obtain information to delineate boundaries of MEC, collect broad site information, and to assess the risk/hazard posed by any MEC found at the site. Specifically, the MEC characterization and ER will allow the MC investigation to take place and to allow Navy security patrols and ground keeping crews to operate safely along Perimeter Road.

- Limited clearing and grubbing will be required. No tree removal is included.
- Subsurface clearance of MEC will take place only to the extent that it is necessary to allow the MC investigation to take place.
- Any MEC that is encountered will be disposed of by blow-in-place techniques.
- NALF Corpus Christi Quantity-Distance (Q-D) arcs will allow for blow-in-place for MEC including storage of donor explosives.
- All work will be conducted in accordance with the NOSSA / DDESB-approved ESS and MEC Work Plan that is developed based on the approved ESS.
- The Navy will provide a suitable area for the geophysics-prove-out.
- The MEC fieldwork will proceed in a staged manner. The geophysics prove-out will be conducted first, followed by the geophysics investigation and ER.
- The hours for geophysics prove-out includes set-up of the test plot as well as the actual prove-out.
- Geophysical mapping will be included.
- Field data will be recorded electronically.
- The work will be conducted by the Senior Geophysicist, Staff Geophysicist, Senior UXO Supervisor and two UXO Technicians, and one additional Technician (primarily for clearing and grubbing activities).
- For the MEC investigation, field personnel will be onsite from TtNUS offices in Atlanta, GA, Oak Ridge TN, and Houston TX. It is expected that field activities will be completed in three 10-day shifts plus travel.

3.6.3 Event 2 – Munitions Constituent Investigation at the Incinerator Disposal Site

Scope

The scope includes fieldwork necessary for Phase I characterization of MC at the Incinerator Disposal Site ***and the Skeet and Pistol Range.***

Assumptions for the Incinerator Disposal Site

- The fieldwork will take place immediately after completion of the Phase I MEC characterization and ER.
- Fieldwork will be limited to locations that have been cleared for surface MEC.
- No clearing and grubbing will be necessary. Any clearing and grubbing will be accomplished during the MEC characterization and ER described in Section 3.6.2.
- MEC avoidance techniques will be used for intrusive sampling.
- DPT and hand-auguring techniques will be used to collect surface (0 – 2 feet) and near subsurface (4 - 6 feet) samples.
- The TRIAD approach will be used to help guide the number and locations of samples. Field XRF instruments will be used to analyze soil samples for lead, which is one of the primary contaminants that would be expected at locations where incineration of munitions may have taken place.
- A total of 80 soils samples at up to 40 locations will be collected for analysis of TAL metals, explosives, perchlorate, and PAHs.
- A total of 10 sediment samples will be collected from Oso Creek for analysis of TAL metals, explosives, and PAHs.
- A total of 4 surface water samples will be collected from Oso Creek for analysis of TAL metals, explosives, and perchlorate.
- A total of up to ten ***groundwater*** samples will be collected, if encountered, for analysis of TAL metals, perchlorates, and explosives.
- MC investigation fieldwork at the Incinerator Disposal Site will be conducted by the Senior Geologist, Support Technician, and UXO Technician over one ten-day shift, plus travel.
- Hours are included for mobilization and demobilization.

Assumptions for the Skeet and Pistol Range

- Limited clearing and grubbing will be necessary.
- MEC avoidance techniques will be used for intrusive sampling.
- DPT and hand-auguring techniques will be used to collect surface (0 – 2 feet) and near subsurface (4 - 6 feet) for TAL metals, explosives, perchlorate, and PAH analysis.
- The TRIAD approach will be used to help guide the number and locations of samples. Field XRF instruments will be used to analyze soil samples for lead, which is one of the primary contaminants that would be expected at skeet and rifle ranges.
- ***During negotiations, it was determined that explosives analyses were not required at the Skeet and Pistol Range. All laboratory analytical costs associated with these analyses at this site have been removed.***
- A total of 80 soils samples at up to 40 locations will be collected for analysis of TAL metals and PAHs.
- A total of 10 sediment samples will be collected from Oso Creek for analysis of TAL metals and PAHs.
- A total of 4 surface water samples will be collected from Oso Creek for analysis of TAL metals and perchlorate.
- A total of up to ten ***groundwater*** samples will be collected, if encountered, for analysis of TAL metals and perchlorate.
- For the MC investigation at the Skeet and Pistol Range fieldwork will be conducted by the Senior Geologist and Support Technician over one ten-day shift, plus travel.
- Hours are included for mobilization.

3.7 WBS TASK 06 – LABORATORY ANALYSES

Scope

The scope of work includes the fixed-based laboratory analyses of samples collected during the sampling activities described in Task 05.

Assumptions

- It will be necessary to obtain information from the analytical laboratory to develop the Work Plans. Therefore, the laboratory will be procured during development of the Work Plans. Hours for procurement and incorporation of laboratory information into the Work Plans are included respectively in Tasks 01 and 04 and are not included herein.
- The laboratory will be Navy approved and will meet the Navy IR QA Program requirements as presented in the Navy Installation Chemical Data Quality Manual, SP-02056-ENV.
- The samples will be analyzed for constituents outlined in Appendix B. The analytical method and number of environmental samples is also provided in Appendix B.
- ***Two soil samples and one water sample from each site will be analyzed for RCRA waste characterization parameters.***
- The laboratory turnaround time is 30 days.
- Hours are included for coordination with the laboratory throughout the fieldwork and laboratory activities. Coordination includes discussion and resolution of technical analytical issues identified by field and laboratory staff during the course of the fieldwork and laboratory analysis.
- The laboratory must comply with Texas Risk Reduction Program (TRRP) 13, Reporting Requirements.

3.8 WBS TASK 07 – DATA MANAGEMENT

3.8.1 Validation

Scope

The scope includes data validation of all fixed base laboratory data that is generated under Task 06.

Assumptions

- All data will be subjected to full validation as described in the QAPP (to be developed under Task 04).
- The laboratory electronic data deliverable will be modified to include results of data validation.
- ***During negotiations, the explosives analyses associated with the Skeet and Pistol Range were removed from this POA. The labor hours for data validation have been reduced in accordance with the reduction in number of samples.***

3.8.2 Database

Scope

The scope includes placing the data into the TtNUS data management system.

Assumptions

- A sample tracking system will be implemented prior to the field effort. After successful completion of all requested analyses, the laboratory will submit an electronic deliverable to TtNUS. After all electronic deliverables have been received from the laboratory, queries will be run to ensure that the laboratory performed all of the requested analyses. The TOM will be notified as to any discrepancies. All data validation will be conducted in the Pittsburgh office.
- Data (including sample specific data such as sample depths, water levels, etc.) will be loaded into the TtNUS data management system in order to preserve the referential integrity of the data.
- Analytical laboratory chemical data will be received electronically in a format compatible with routine TtNUS electronic data deliverables (EDD). Natural Attenuation data will be received via sample logs for transposition into the electronic database.
- Additionally, laboratory quality control data will be uploaded to the database.
- No historical analytical results will require hand entry.
- Hours for creating report tables are included in the respective report WBS.
- ***During negotiations, the explosives analyses associated with the Skeet and Pistol Range were removed from this POA. The labor hours for database have been reduced in accordance with the reduction in number of samples.***

3.8.3 Environmental Geographic Information System

Scope

The scope includes the update and maintenance of the existing EGIS.

Assumptions

- The Navy will provide all base mapping necessary to establish the project GIS
- Hours for creating report figures are included in the respective report WBS.
- TtNUS will incorporate data from PA and SI activities into the initial project GIS database, including geophysics data.

- TtNUS will update the existing EGIS for Corpus Christi. The EGIS will tie all environmental samples and associated analytical data to their respective sample locations. Through a user-friendly GIS interface, the system's intuitive query tools can be used to obtain specific environmental sampling results, analytical chemistry data, or any other facility information as needed.
- Two incremental updates of the analytical data associated with the current EGIS will be performed on the IR Collaboration Gateway, one each for the Incinerator Disposal Site and for the Skeet and Rifle Range.
- ***During negotiations, the explosives analyses associated with the Skeet and Pistol Range were removed from this POA. The labor hours for EGIS have been reduced in accordance with the reduction in number of samples.***
- TtNUS will produce 4-5 copies of the EGIS on CD-ROM at the close of the project. The CD-ROM will include EGIS project files that can be read using both ArcView and ArcGIS ESRI products.
- Hours for EGIS table generation are included.

3.9 WBS TASK 37 – MISCELLANEOUS

3.9.1 After Action Report

Scope

The scope includes data validation of the After Action Report (AAR) for submission to NOSSA and DDESB upon removal of MEC.

Assumptions

- An AAR will be required only for the Incinerator Disposal Site.
- The AAR will be prepared in accordance with guidelines for submittal of an AAR found in OPNAV Instruction 8020.x, Military Munitions Response Program Oversight Contractor.
- The AAR submission will be coordinated with the Safety Officer at NAS Corpus Christi.
- Draft and final versions will be prepared.
- Formal written responses will be prepared for Navy comments on the draft version of the AAR.

4.0 DELIVERABLES

The following table delineates the deliverables that TtNUS proposes to provide as part of the technical completion of the SOW. The deliverables shown in bold text represent those deliverables that will be tracked in the TFMR for purposes of showing CTO completion. The proposed due dates associated with these deliverables are shown in the project schedule included as Appendix A to this POA.

Project Deliverables
Draft Kickoff Meeting Minutes
Final Kickoff Meeting Minutes
Draft ESS Review Meeting Minutes
Final ESS Review Meeting Minutes
Draft Incinerator PA/SI Review Meeting Minutes
Final Incinerator PA/SI Review Meeting Minutes
Draft Skeet and Pistol Range PA/SI Report
Draft Final Skeet and Pistol Range PA/SI Report
Final Skeet and Pistol Range PA/SI Report
Draft Incinerator Disposal Site PA/SI Report
Draft Final Incinerator Disposal Site PA/SI Report
Final Incinerator Disposal Site PA/SI Report
Draft Abbreviated Health and Safety Plan
Final Abbreviated Health and Safety Plan
Draft Health and Safety Plans
Final Health and Safety Plans
Internal Draft Explosive Safety Submission
Draft Explosive Safety Submission
Draft Final Explosive Safety Submission
Final Explosive Safety Submissions
Internal Draft Incinerator Disposal Site Work Plan
Draft Incinerator Disposal Site Work Plan
Draft Final Incinerator Disposal Site Work Plan
Final Incinerator Disposal Site Work Plan
Internal Draft Skeet and Rifle Range Work Plan
Draft Final Skeet and Rifle Range Work Plan
Final Skeet and Rifle Range Work Plan
Draft After Action Report
Final After Action Report

ATTACHMENT C

PROJECT AND DATA QUALITY OBJECTIVES SUMMARY

Data Quality Objectives
MRP Incinerator Site
Kickoff Meeting
21 - 23 June 2006
NALF Cabaniss, Corpus Christi, Texas

1) Define Problem

- Is the presence of Munitions of Explosives Concern (MEC) suspected?
    - MEC is present based on visual observation and PA
- Is the presence of Munitions Constituents (MC) suspected?
    - MC is suspected based on presence of MEC
    - Have MCs Been Released to the environment?
    - What are the Migration Potential/Receptors?

2) Decisions Required/Goals

- Surface MEC
    - Complete Emergency Response (ER) for safety
        - Is there a need for further investigation?
        - Focus further investigation (footprint reduction)
- Subsurface MEC
    - Is there evidence of subsurface MEC that would warrant further investigation?
- MC
    - Will actions be required to protect off-site (Oso Creek) or on-site (Perimeter Road) receptors?
    - Do potential surface sources require further investigation?
    - How far has contamination spread from the boiler?

3) Inputs Required

- MEC
    - Determine the locations and general type of MEC
        - Surface investigation
        - Determine location of subsurface anomalies using geophysical investigation
            - Anomalies may not be MEC
- MC
    - Determine if contaminants of concern (COCs) are present in:
        - Sediments
        - Surface Water
        - Surface Soil
        - COCs
            - Perchlorate, Metals, Explosives, polynuclear aromatic hydrocarbons (PAHs) (Boiler Area)

4) Boundaries for Study

- MEC
  - Perimeter Road (Safety)
  - Two known MEC areas
  - Area identified in the Preliminary Assessment (PA) (red boundary)
  - Surface only
- MC
  - Soils
  - Same areas as MEC
  - Sediments/surface water
    - In creek along red boundary
    - Upgradient (background)
    - Downgradient

5) Field Approach

- First Mobilization
  - ER
    - Identify and surface clear MEC from Perimeter Road on north end of Incinerator Site from road centerline south to treeline (edge of mowed area)
    - Identify and surface clear MEC at the 2 known areas
  - Broad Transects 10' wide at 75' intervals
    - Identify surface MEC along transects
    - Select and mark subsurface anomalies along transects for later geophysical investigation
  - Fine Transects (determine width and intervals from data reviewed after initial surface clearance)

- Second Mobilization
  - Sample for MC with unexploded ordnance (UXO) avoidance
    - Sediments/surface water
    - Soil

- Third Mobilization
  - Geophysics with UXO avoidance
  - Land grubbing (Based on First Mobilization findings)
  - Geophysics at locations where anomalies are not visible at the surface

- Geophysical Prove-out (GPO)
  - Not a "true" GPO
  - "Sensor Demonstration" with Schonstedt's used in a "Blanket Test" for daily quality control (QC)
  - Transect Test (2 tests)

- Seed Items
    - 4ea. 20 mm - 2”, 4”, 6", 8”
    - 4ea. 30 mm - 2”, 6", 1’, 2’
    - 4ea. 40 mm - 2”, 6", 1’, 2’
    - 2ea. 5 lb - 6", 2'
    - 2ea. PYRO - 6", 2'
    - 2ea. 2.75” - 6", 2'
- QC tests/acceptance criteria per Interstate Technology and Regulatory Council (ITRC) and US Army Corps of Engineers (USACE)
    - Re-acquisition, false positives, etc.

- Groundwater
    - Use Direct-push Technology (DPT) to obtain samples
        - At 1 to 2 locations
        - Collect soil samples for soil pH analysis
        - Determine depth to groundwater
        - DPT will be easier than hand auger and provide better soils characterization

- Handling MEC/Scrap
    - Are explosives in MEC/scrap (known or possible hazard)
        - Identify/Log
        - Handle/Blow-in-Place (Perimeter Road and 2 known MEC areas)
        - MEC along transects will be left in place at this time
    - Scrap
        - Identify/Log
        - No removal action for scrap

- MC Sampling
    - Sediment
        - 2 upgradient samples / 8 on-site samples
        - COCs
            - Metals
            - Explosives
            - PAHs (one sample @ highest hit)
        - Centerline of creek (depth to be determined)
        - Biased sampling toward site,
        - Collect samples in staggered “W” pattern

- Surface Water
    - 2 upgradient (75' apart) samples / 8 on-site samples
    - Surface water samples collected at sediment sample locations
    - COCs
        - Metals
        - Explosives
        - Perchlorate
- Soil
    - Approx. 40 fixed-base surface (0 to 12") samples
    - Focus on known areas and newly found MEC (do not sample areas where blow-in-place was used)
    - Screen soil using TRIAD Approach and XRF
    - COCs
        - Metals
        - Perchlorate (identified "sources" only)
        - Explosives
        - PAHs (at approx. 10 locations, near the boiler)
    - Samples for fixed-based lab
        - 50% Known areas
        - 25% Newly found MEC
        - 25% Random

6) Schedule

- ESS
    - NOSSA Conference Call - week of July 4th
    - Submit to Navy - July 21st (includes conference call)
    - Navy review - August 18
    - Submit to NOSSA - September 1
    - NOSSA Review - October 13
    - DDESB Review - November 17
    - Final - December 1
- Work Plan
    - Submit to Navy - September 15
    - Navy Review - October 13
    - Submit to TCEQ - October 27
    - TCEQ Review - November 10
    - Comment Response - December 1
    - Final - December 15

MUNITIONS AND EXPLOSIVES OF CONCERN

WORK PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 1
March 2008

Munitions and Explosives of Concern Work Plan
for the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

NAVFAC
Naval Facilities Engineering Command
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

TETRA TECH NUS, Inc.

MEC WORK PLAN
Incinerator Disposal Site
NALF Cabaniss, Corpus Christi, Texas

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ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
µsec	microsecond
AICUZ	Air Installation Compatible Use Zone
ATF	Alcohol Tobacco and Firearms
ATFP	Alcohol Tobacco and Firearms Pamphlet
bgs	below ground surface
C/D	Class/ Division
CAD	Cartridge Actuated Device
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
cm	Centimeter
CQCP	Contractor Quality Control Plan
CTO	Contact Task Order
CWM	Chemical Warfare Material
DDESB	Department of Defense Explosive Safety Board
DID	Data Item Description
DOD	Department of Defense
DOT	Department of Transportation
DQO	Data Quality Objective
e.g.	for example
EGIS	Environmental Geographical Information System
EM	Electromagnetic
EMR	Electromagnetic Radiation
EO	Executive Order
EOD	Explosives and Ordnance Disposal
ESS	Explosive Safety Submission
FAR	Federal Acquisition Regulations
FOL	Field Operations Leader
FUDS	Formerly Used Defense Site
GIS	Geographical Information System
GPS	Global Positioning System
GSA	General Services Administration
GTD	Geophysical Technology Demonstration
HASP	Health and Safety Plan
HD	Hazard Division
HFD	hazardous fragmentation distance
HSM	Health and Safety Manager
HTRW	Hazardous, Toxic, or Radiological Waste
IAS	Initial Assessment Study
INRMP	Integrated Natural Resource Management Plan
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
MM CX	Munitions Mandatory Center of Expertise
mm	millimeter
MPPEH	Munitions Potentially Presenting an Explosive Hazard
MSL	Mean Sea Level
mV	millivolts
NAAS	Naval Auxiliary Air Station
NAD 83	North American Datum

MEC WORK PLAN
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ABBREVIATIONS AND ACRONYMS (Continued)

NALF	Naval Auxiliary Landing Field
NAS	Naval Air Station
NASCC	Naval Air Station Corpus Christi
NAVSEA OP	
NEW	Net Explosives Weight
NOSSA	Naval Ordnance Safety & Security Activity
NGVD 29	National Geodetic Vertical Datum
NSS	NASCC Safety Standards
nT	nanoteslas
OE	Ordnance and Explosives
OLF	Outlying Field
OPNAVINST	Office of Chief of Naval Operations Instruction
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAD	Propellant Actuated Device
PBXN	Plastic-Bonded Molding Powder
PLS	Professional Land Surveyor
POC	point of contact
QA	quality assurance
QC	quality control
RCWM	Recovered Chemical Warfare Material
RI	Remedial Investigation
RPM	Remedial Project Manager
SI	Site Investigation
SOW	Scope of Work
SUXOS	Senior Unexploded Ordnance Safety Officer
TAL	Target Analyte List
TCEQ	Texas Commission on Environmental Quality
TDEM	time domain electromagnetic
TOM	Task Order Manager
TtNUS	Tetra Tech NUS, Inc.
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQC	Unexploded Ordnance Quality Control
UXOSO	Unexploded Ordnance Safety Officer
WP	Work Plan
WWII	World War II

1.0 INTRODUCTION

This Work Plan (WP) describes the technical approach for performing Time Critical Removal Actions for munitions and explosives of concern (MEC) and MEC support for Site Inspection (SI) activities at the former Incinerator Disposal Site, Naval Auxiliary Landing Field (NALF) Cabaniss, located near Corpus Christi, Texas. The activities include a detector-aided surface sweep with a MEC removal operation of Perimeter Road, the boiler area, and the area near Perimeter Road (450 feet west of the boiler area). The SI activities include a detector-aided surface sweep of transects to determine MEC extent and level of MEC contamination of the remainder of the site, followed by selected area digital geophysical mapping and munitions constituents (MC) sampling. Tetra Tech NUS, Inc. (TtNUS) is performing this work under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract number N62472-04-D-0055, Contract Task Order (CTO) 0023. This Work Plan was prepared in accordance with CTO Plan of Action dated April 2006 which is contained in Appendix A. The scope of work and activities addressed in this Work Plan and the Site-Specific Health and Safety Plan (HASP) contained in a separate stand alone document have also been addressed in an Explosive Safety Submission (ESS). The ESS (Appendix B) has received conditional approval from Naval Ordnance Safety and Security Activity (NOSSA) (Navy 2007). Details of the MC sampling protocol are included in the Work Plan for the Incinerator Disposal Site (TtNUS, 2007), submitted under separate cover.

1.1 PROJECT OVERVIEW

NALF Cabaniss is an outlying field that supports naval air training operations out of Naval Air Station Corpus Christi (NASCC), Texas. A site visit, conducted by Malcolm Pirnie, Inc. to produce a Preliminary Assessment (PA) Report (April 2005), indicated that there is a former Incinerator Disposal Site, and also a former Skeet and Pistol Range, (addressed in a separate Work Plan), located at NALF Cabaniss. The former Incinerator Disposal Site was located southwest of Runway 31 and west of the former Skeet and Pistol Range, within the boundaries of a former sanitary landfill. Though the exact dimensions are unknown, the former Incinerator Disposal Site may have occupied approximately 17 acres.

The former Incinerator Disposal Site was used by the City of Corpus Christi and the Army to incinerate ordnance items, small arms, and confiscated drug material in a boiler. The Army used the eight-foot long by five-foot diameter boiler for the incineration of ordnance items including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and “possibly 80 [millimeter] mm rockets,” (likely 2.75-inch rockets). Incinerator operations began at an unknown date and were terminated in approximately 1980. The area is currently covered in dense vegetation and has no military use. A visual survey conducted by

Malcolm Pirnie, Inc. during a site visit to support the PA process indicated the presence of munitions scrap at the site in two discrete locations:

1. In and around the former boiler
2. On the ground surface near Perimeter Road, approximately 450 feet west of the boiler.

Malcolm Pirnie, Inc. observed the following thermally-treated munitions scrap during the visual survey performed on the site using a magnetometer to surface sweep the Incinerator Disposal Area: 7.62 mm small arms, 20 mm, 30 mm, and 40 mm projectiles, 5-pound practice bombs, and flares/pyrotechnics. One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed.

TtNUS conducted a site walk on 21 June 2006, in conjunction with the kick-off meeting for the Site Inspection phase of this project. TtNUS employees, and others, escorted by a TtNUS unexploded ordnance (UXO) technician and NASCC personnel, visually observed the presence of munitions inside the former boiler and on the ground surface near Perimeter Road west of the boiler as noted in the PA.

The visual survey confirmed the presence of MEC at the site. The presence of MC has not been evaluated up to this point, but sampling for MC will be part of the Site Inspection phase of this project. No records were found describing maintenance, closure, or remediation performed at the site for incinerated munitions.

1.2 WORK PLAN OVERVIEW

This Work Plan was prepared following the format, content, and preparation instructions specified in the *United Sates Army Corps of Engineers (USACE) Data Item Description (DID) Ordnance and Explosives (OE)-005-01-01* for a *Type II Work Plan* [U.S. Army Engineering and Support Center, Huntsville, Alabama; revised 1 October 2002 (USACE, 2002)]. Sections referenced in the DID that are not applicable to this Statement of Work (SOW) have been omitted from the Work Plan.

1.3 SITE DESCRIPTION

The NALF Cabaniss installation occupies 923 acres and was originally constructed with four 5,000-foot runways. Only two runways, oriented in north/south and northwest/southeast directions, are presently active and maintained. The primary role of the installation is to support flight training operations originating from NASCC. Training Air Wing FOUR, based at NASCC main installation, performs touch-and-go landing training between the main installation, and NALF Cabaniss. The airfield is lighted, so that night flight training, as well as daylight training, is possible.

1.3.1 Site Location

NALF Cabaniss is located on the eastern side of Nueces County, Texas, and lies approximately eight miles west of NASCC (see Figure 1-1). The installation is immediately bounded on the east by Brezina Road, on the north by Ayers Street and FM 286, to the west by Saratoga Road, and to the south by Oso Creek. The installation lies just outside the corporate bounds of the City of Corpus Christi. The installation boundary area includes Air Installation Compatible Use Zone (AICUZ) lands that extend northwest and southeast from the main acreage of the installation. These AICUZ lands are Navy property acquired to encompass noise zones and Accident Potential Zones in the event an accident were to occur on approach to or departing from the runways at NALF Cabaniss.

The Incinerator Disposal Site was located southwest of Runway 31, west of the former Skeet and Pistol Range, and north of Oso Creek. The site was a former sanitary landfill that also contained a boiler used to incinerate confiscated drug material, small arms, and ordnance items. Though its exact dimensions are unknown, the site may have occupied approximately 17 acres.

Nearby Populations

The former Incinerator Disposal Site is located west of the former Skeet and Pistol Range, approximately 750 feet southwest of Runway 31 and bounded to the south by Oso Creek. NALF Cabaniss has limited personnel on-site, primarily air traffic control and emergency personnel. There are no military residences at NALF Cabaniss. Non-military residential neighborhoods are located 4,800 feet east of the former range.

Buildings Near/Within Site

There are currently no buildings at the Incinerator Disposal Site. Runway 31 is 750 feet to the northeast of the range. Private industrial buildings are present approximately 800 feet across Oso Creek.

Utilities On/Near Site

Based on a review of installation Geographical Information System (GIS) files describing utilities located at NALF Cabaniss, there are no electric, gas, water, sewer, or other utilities near the Incinerator Disposal Site.

Land Use

The Incinerator Disposal Site is closed and no longer in use. The area is not currently used for any specified purpose, and land use is currently designated as open space. The area where the site is located is currently overgrown with dense vegetation dominated by trees exceeding 20 feet in height. The boiler and metal ladder structure remain in place. The property located across Oso Creek from the Incinerator Disposal Site is currently used for industrial purposes. NALF Cabaniss is used only to support air training

operations out of NASCC, and there are no plans for further development at the installation. Therefore, development in the area of the Incinerator Disposal Site is unlikely in the future. However, the fence line surrounding NALF Cabaniss is recommended to be repaired in the future according to the most recent Master Plan. Installation of a new fence could lead to intrusive activities near the munitions scrap located just off of Perimeter Road, which could represent a potential explosive safety hazard.

Access Controls/Restrictions

NALF Cabaniss is a fenced installation with a locked gate present on the north side of the installation. Oso Creek completely bounds the installation on its southern boundary. Security personnel are not regularly posted at the entrance to the installation. Sections of the southern fence, which acts as the northern boundary of the former Incinerator Disposal Site, are down. The most recent Master Plan for the installation recommends the construction of a new fence in this and other areas.

Security personnel patrol Perimeter Road by vehicle several times a day. However, as the site is in an unused portion of the installation, contains dense vegetation, and is not separately fenced, it is possible that trespassers could gain entry to the site.

The former Incinerator Disposal Area is located within the flightline control area of NALF Cabaniss. Visitors to areas within the flightline control zone require escorts and approval from Air Operations. However, operations in the vicinity of the former Incinerator Disposal Site are typically limited and may include activities such as maintenance (occasional mowing) and periodic environmental or ecological surveys.

1.3.2 Installation History

In December 1938, the Navy recommended the Flour Bluff area south of Corpus Christi Bay as a potential site for the construction of a new aviation training station. The Flour Bluff area was selected due to the sparse population, the favorable location, and the potential for year-round flight operations. Additionally, the City of Corpus Christi offered to donate the land required for the installation and to compensate the 100 families and residents for relocation. The installation received Congressional approval, and an appropriations bill was signed on June 13, 1940, authorizing construction of NASCC and 25 Out Lying Fields (OLFs) to support the main installation. Construction began June 30, 1940, and the installation was officially commissioned on March 12, 1941. Six of the OLFs were constructed as auxiliary bases.

Naval Auxiliary Air Station (NAAS) Cabaniss Field was commissioned on July 9, 1941, in honor of Commander Robert W. Cabaniss, Naval Aviator No. 36, a World War I veteran killed in a plane crash in 1927. NAAS Cabaniss Field was established for the purpose of intermediate and advanced flight training

for naval aviators. As an auxiliary station, NAAS Cabaniss Field was outfitted with landing fields, runways, hangars, shops, barracks, a mess hall, and a recreational center.

The Navy also acquired tracts of land to the south of Corpus Christi and on Mustang Island to perform practice bombing and other military operations. Some bombing also occurred in the bays surrounding the region. These former bombing ranges are currently being evaluated by the USACE as part of the Formerly Used Defense Site (FUDS) program.

Flight instruction at NASCC began on April 1, 1941. Cadets performed their initial flight training on the N3N "Yellow Peril" trainer aircraft. Flight training was then broken down into specific divisions, including primary, basic, instrument, and advanced flight classes. With the December 1941 attack on Pearl Harbor, flight training efforts were doubled from 300 cadets per month to 600 cadets per month by utilizing the auxiliary fields. Following primary and instrument training, cadets were assigned to other types of advanced training, depending on their performance through the first two stages of training. This advanced aerial training was performed at the auxiliary fields. With the main installation and the six auxiliary fields, NASCC became the Navy's largest air training center during World War II (WWII).

Following the conclusion of WWII, NASCC's mission was reduced to include only primary and instrument flight training. As a result, NAAS Cabaniss Field was temporarily decommissioned in 1947.

The start of the Korean War in 1950 marked an increase in flight training at NASCC. NAAS Cabaniss was re-opened to support the increased training mission. In 1958, NAAS Cabaniss Field was converted from an auxiliary air station, which required personnel housing and support facilities, to an OLF, which required only the landing field proper. As a result, approximately 346 acres in the northern section of the installation were determined to be excess and given over to the General Services Administration (GSA) for disposal. This portion of the property was comprised mainly of administrative and housing facilities; there was no known use of munitions within this portion of the installation. The installation was commissioned as a NALF in June 1969. NALF Cabaniss is currently in use as an OLF for primary flight training out of NASCC. Current flight training includes touch-and-go, night training, and other student training operations.

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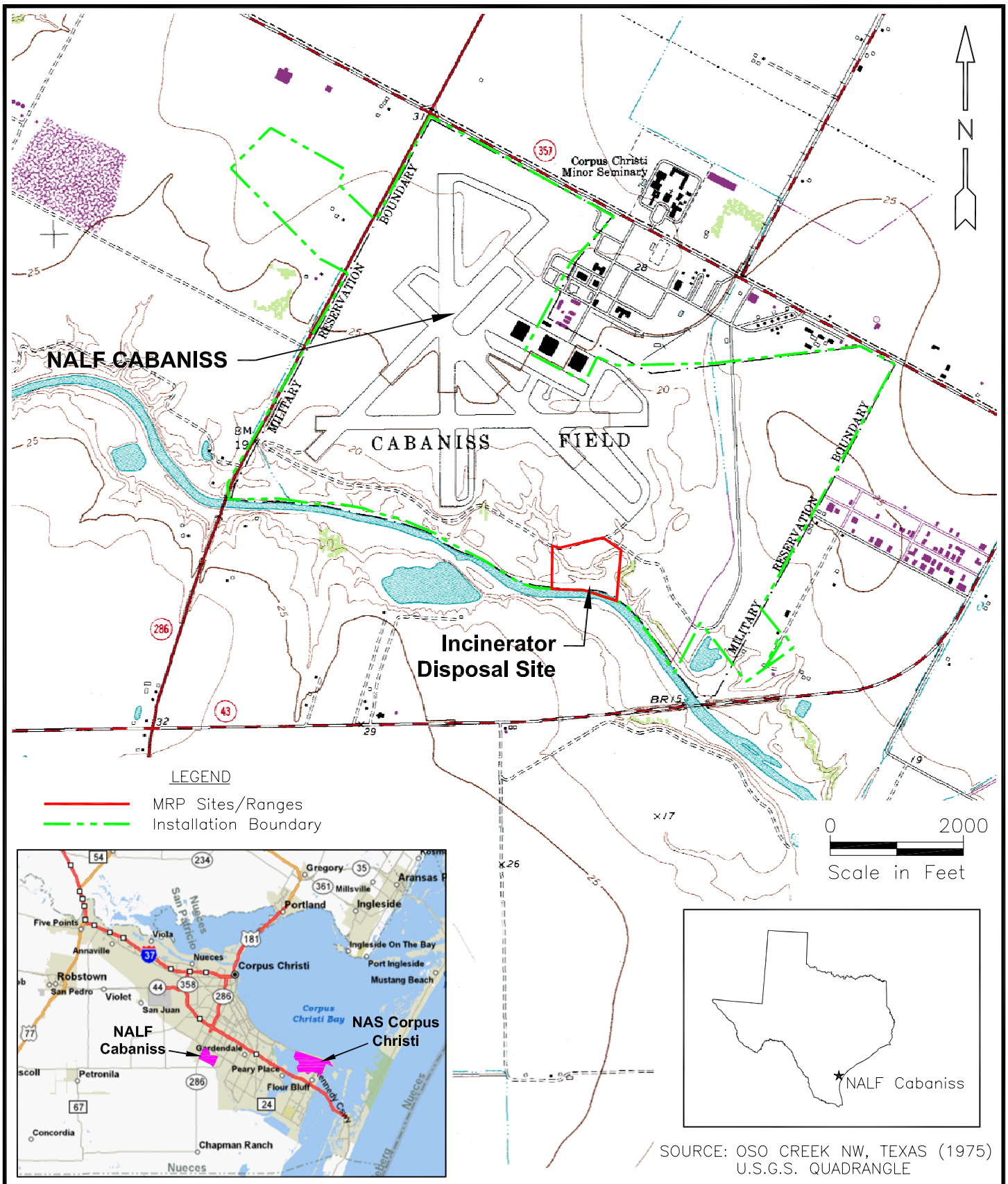

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1.3.3 Munitions Related Training/Storage/Usage

NAAS Cabaniss station records from the 1940s indicate the presence of an armory next to the Skeet and Pistol Range and a small arms magazine in the northeast quadrant of the installation, east of the barracks. Based on the historical use of the range, the armory likely stored only small arms ammunition (e.g., 12-, 16-, and 20-gage and .410 caliber shot, .22 caliber, .38 caliber, .45 caliber, 9-millimeter [mm]). The armory associated with the Skeet and Pistol Range is no longer present at the installation, and the date of decommissioning is not known. The former small arms magazine remains in place in an open field east of a drainage canal on property no longer owned by the installation. During the April 2004 site visit conducted by Malcolm Pirnie, the data collection team visually inspected the building, which was locked and appeared to be empty.

A February 1984 Initial Assessment Study (IAS) for the Naval Energy and Environmental Support Activity indicated an aircraft de-arming area at the end of Runway 31 near the taxiway. The report indicates that the area was used to de-arm aircraft returning from training missions through the 1970s. No ordnance was disposed of at this site; only munitions de-arming and transfer activities took place. This area is no longer used for de-arming operations. The same assessment study identified the Incinerator Disposal Site, located in a former sanitary landfill southwest of Runway 31, which was used to incinerate small arms and ordnance items. The ultimate disposition of the ash and debris generated from the burning operations is not known.

There are no currently operating ordnance/munitions storage facilities at NALF Cabaniss.

Information regarding the Incinerator Disposal Site is generally limited. However, visual evidence at the Incinerator Disposal Site indicated the presence of munitions scrap.

1.3.4 Incinerator Disposal Site

The Incinerator Disposal Site was located in the southern portion of the installation, 750 feet southwest of the eastern end of Runway 31 and bounded to the south by Oso Creek. Perimeter Road runs along the western and northern boundary of the site. The site is covered in dense vegetation, with open sections of wetlands on the south end near Oso Creek.

The site was identified as a result of interviews and document reviews from the 2004 site visit conducted by Malcolm Pirnie. Deputy Fire Chief Gonzalez indicated during the first site visit that munitions had been buried in or near an old sanitary landfill at NALF Cabaniss; fire crews working in the area were instructed to exercise caution when operating in these areas. He provided a map showing the general location of the landfill, but was not aware of the specific burial locations. Later, a review of the IAS for NASCC and its

OLFs indicated that the Army had used an eight-foot long by five-foot diameter boiler for the incineration of "small ordnance items", including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and "possibly 80 mm rockets" (likely 2.75-inch rockets) at a six-acre sanitary landfill facility. The City of Corpus Christi also burned confiscated drug material in the boiler. The site was located in the same area indicated by Assistant Chief Gonzalez. The PA report submitted by Malcolm Pirnie concluded that operations at the site ceased by 1980 and that "burned remains of ordnance cover an area less than 200 square feet". No confirmation study of the site was recommended in the IAS, "since only innocuous materials were disposed at this site and only limited residual was generated from ordnance burning". This area of investigation was assumed to be approximately 17 acres (the approximate size of the former sanitary landfill) due to the unknown location of the boiler and the intent to investigate the boundaries of the former landfill. The boiler is located on the northern portion of the site, approximately 170 feet south of Perimeter Road in dense vegetation.

No property records were found describing the opening, operations, closure, or demolition of the sanitary landfill or incineration site. The period of use of the area for munitions incineration is unknown. A review of aerial photography for the area indicates the area of the site is disturbed as early as 1942, and an area was identified as "sanitary fill" as early as 1958 on the Master Shore Station Development Plan. No aerials or plans were available for the period of the boiler use. The site is not currently used for any military purpose, and the area is covered in dense vegetation. Land use in the area is designated as open space. Land use is not expected to change.

1.3.5 Visual Surveys at the Incinerator Disposal Site

A visual survey was performed by Malcolm Pirnie in 2004 using a magnetometer to surface sweep the walked area for ordnance avoidance purposes. The field team attempted to walk the perimeter of the site boundary, followed by transects across the middle of the site in an effort to locate the boiler and visually survey the maximum possible amount of the interior area of the site. The dense trees and shrubs made passage through the area difficult. The Malcolm Pirnie visual survey for the Incinerator Disposal Site resulted in approximately 20 percent walked coverage and approximately 60 percent visual coverage of the former site. During the site walk, the following conditions were noted:

- The installation fence line along Perimeter Road near the site boundary was down.
- Perimeter Road was covered in mid-sized grasses up to three feet in height.
- The area east and south of Perimeter Road and the installation fence was covered with dense shrub thickets and trees. Shrub thickets reached heights of up to eight feet. Trees with closed canopy exceeded 20 feet in height.

- A wetland area containing tall grasses and shrubs was present on the southern end of the site, near the edge of Oso Creek.

- An old culvert (possibly associated with a former road) and stagnant water were observed in the northeastern corner of the Incinerator Disposal Site, in dense vegetation.

- A metal ladder structure was located approximately 70 feet south of Perimeter Road in dense vegetation.

- The boiler was located approximately 100 feet south of the metal ladder, also in dense vegetation. The boiler was of cylindrical shape and contained a chimney structure extending out of the top with an opening at the end. The interior and exterior of the boiler were corroded. The boiler was found lying on its side with a large hole with jagged edges in the bottom.

- Some trees surrounding the boiler are charred on the trunk and on some low-hanging branches.

- Thermally treated munitions scrap was observed inside the boiler, as well as on the ground surface surrounding the boiler. These items included:

  - 7.62-mm small arms ammunition
  - 20-mm projectiles
  - 30-mm projectiles
  - 40-mm projectiles
  - 5-pound practice bombs
  - Flares/pyrotechnics (cartridge actuated device [CAD] and propellant actuated device [PAD])

- Thermally treated munitions scrap was also observed on the ground surface along the fence and tree line approximately 10 feet from Perimeter Road in an area approximately 450 feet west of the boiler. A significant number of metallic anomalies were detected using a magnetometer along Perimeter Road in this area. The specific munitions items observed at this location included:

  - 20-mm projectiles
  - 5-pound practice bombs
  - 2.75-inch rockets

- The site is currently not in use and has no military purpose.

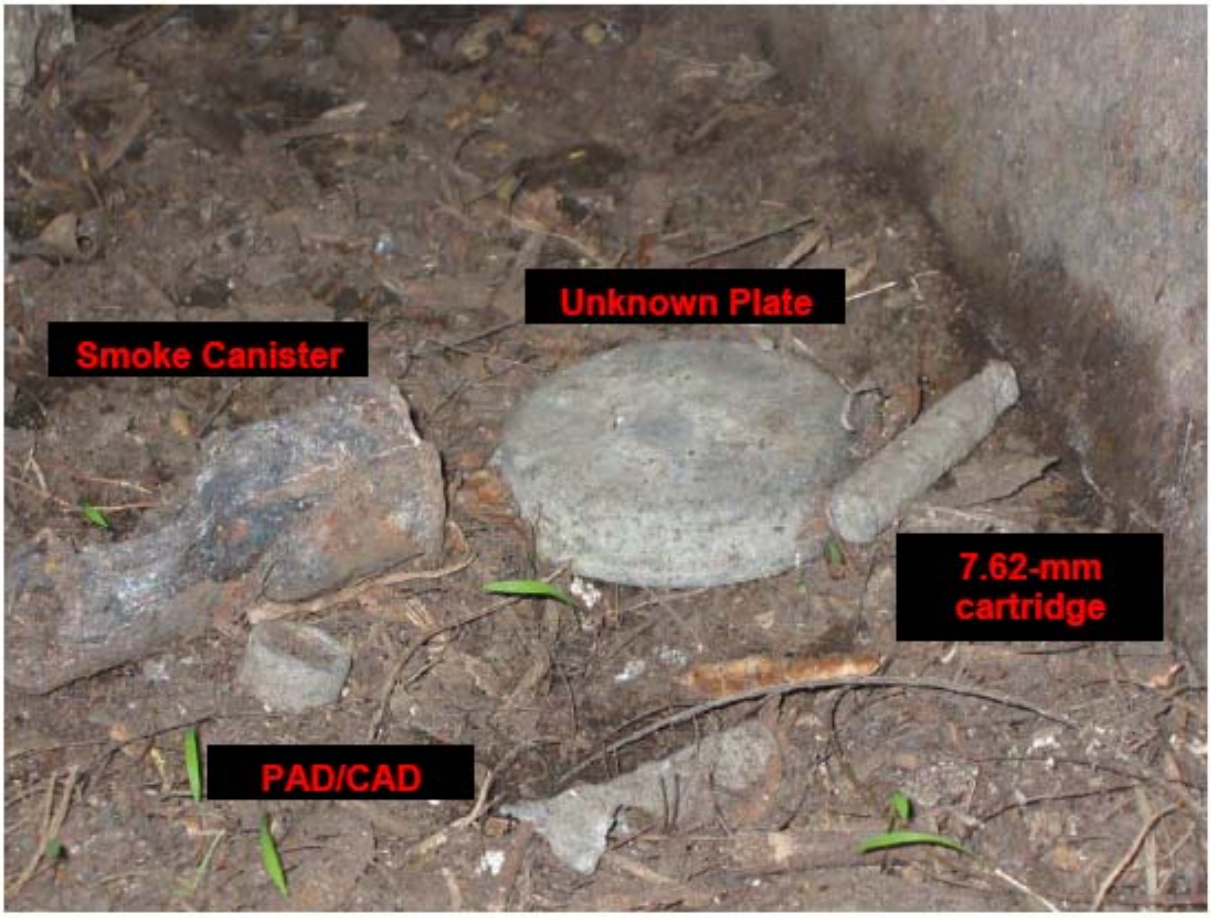
An inspection of the metal ladder structure north of the boiler could not determine the function of the item; it may be excess military property that was deposited in the area. The boiler was found on its side with a large hole in the bottom (Figures 1-2 and 1-3), suggesting a possible explosion may have occurred within the boiler during incineration activities. Trunks and branches of trees surrounding the boiler were observed to be charred. If the structural damage to the boiler was caused by an explosion, it is possible the nearby trees were burned as a result.

FIGURE 1-2

BOILER LOCATED AT FORMER INCINERATOR DISPOSAL SITE
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS

FIGURE 1-3

MEC AND MUNITIONS DEBRIS INSIDE BOILER INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS



Thermally-treated munitions scrap (Figure 1-4) was also observed on the ground surface along the downed installation fence and tree line approximately 10 feet from Perimeter Road, in an area approximately 450 feet west of the boiler. It is not known why these items are located this far from the boiler. The munitions scrap included thermally treated 20-mm projectiles, 5-pound practice bombs, and 2.75-inch rockets. One 20-mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed (in the judgment of the UXO Technicians present). A magnetometer used during the site walk for avoidance purposes indicated several metallic anomalies along Perimeter Road. The anomalies may indicate the presence of buried metallic items beneath the grass road.

FIGURE 1-4

**THERMALLY TREATED ROCKET FINS
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS**

Non-hazardous munitions scrap, including thermally treated rocket base plates and fins, were observed at the site. Rocket base plates were observed within the boiler. Rocket fins were observed in the group of munitions scrap near Perimeter Road.

TtNUS conducted a site walk on 21 June 2006, in conjunction with the kick-off meeting for the Site Inspection phase of this project. TtNUS employees, and others, escorted by TtNUS UXO personnel and NASCC personnel, visually observed the presence of munitions inside the former boiler and on the ground surface near Perimeter Road west of the boiler as noted in the PA.

The visual surveys and site walks confirmed the presence of MEC at the site. The presence of the split 20-mm projectile containing what appeared to be Explosive D compound, and the presence of munitions scrap suggests that other MEC may be present at the site.

Based on the information obtained during the data collection process (e.g., interviews, records search) and observations made during the visual surveys and site walks, no special consideration munitions are known or suspected to have been used at the site. Therefore, the Incinerator Disposal Site is not suspected to contain items such as chemical warfare materiel filled munitions, electrically-fused munitions, or depleted uranium associated munitions.

1.3.6 MEC Presence

The entire site has been subdivided and categorized into one of three levels of MEC presence including: known MEC areas, suspect MEC areas, and areas where no evidence exists to indicate that MEC are known or are suspected to be at the site. The MEC presence is discussed below.

1.3.6.1 Known MEC Areas

MEC were confirmed in both the boiler location and the ground surface just off Perimeter Road and the installation fence line (see Figure 1-5). The total combined acreage of these areas is approximately 0.4 acres.

1.3.6.2 Suspected MEC Areas

Very little is known about the operation of the Incinerator Disposal Site, including period of operation, frequency of incineration of munitions items, potential for buried or abandoned munitions items, and whether any closure activities were performed. Additionally, there is uncertainty as to how the group of thermally treated munitions scrap reached the area just off of Perimeter Road, a distance of 450 feet. The immediate areas surrounding the two locations of munitions scrap and the land in between both locations are suspected to contain MEC, due to the finding of MEC in the area and the unknown operations of the site. The total acreage suspected to contain MEC is approximately three acres.

1.3.6.3 Areas Not Suspected to Contain MEC

Based on available documents, conversations with Environmental Division personnel at NASCC, and the site walk of the 17-acre area, it was concluded that no areas other than the boiler location, the ground surface just off Perimeter Road, and the land between these two locations were suspected of containing MEC.

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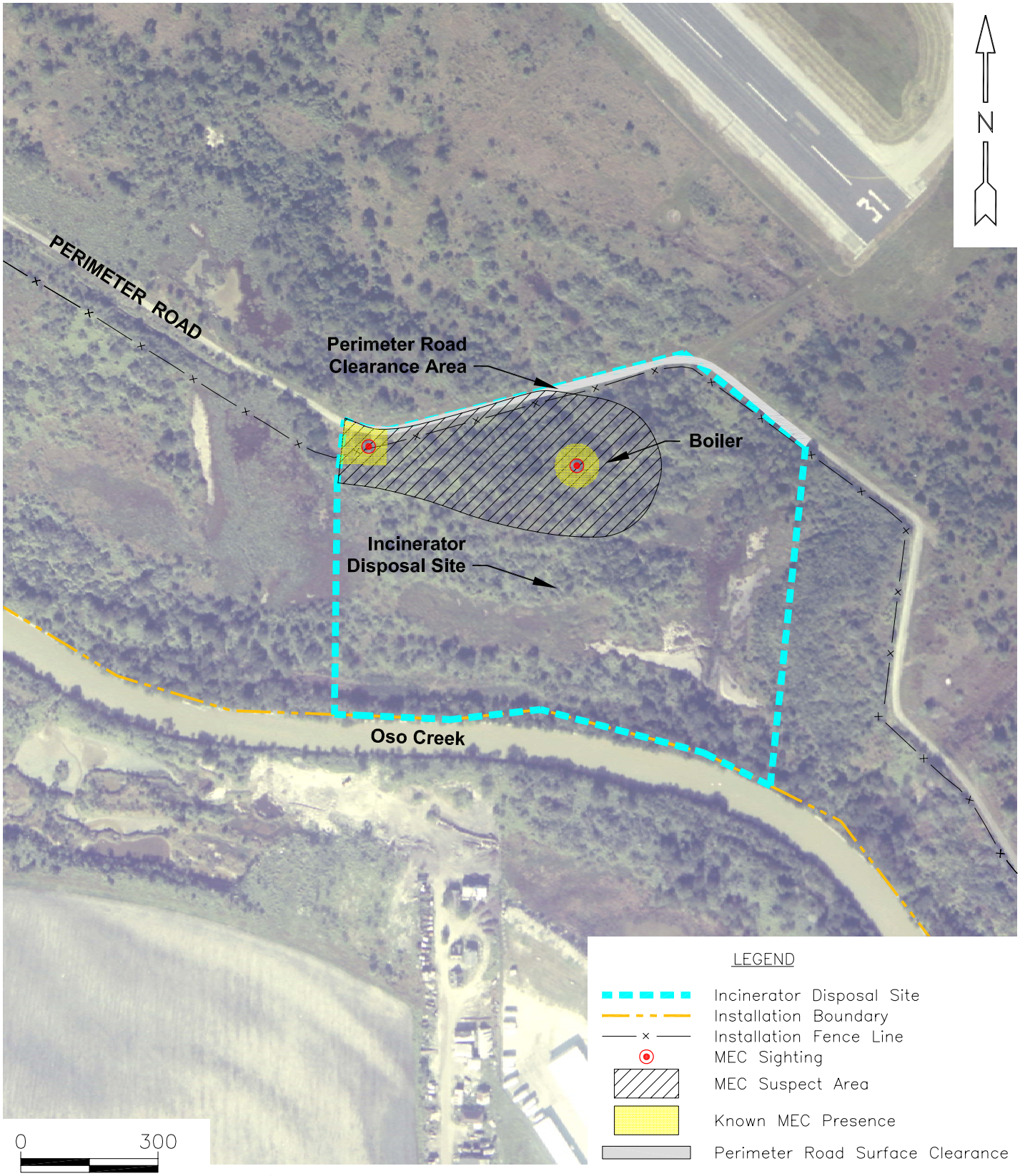

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

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1.3.7 Ordnance Penetration Estimates

Based on the known uses of the site (i.e., incineration activities), it is unlikely that munitions were dropped or fired at the Incinerator Disposal Site. Therefore, ordnance penetration estimates are not appropriate for this site. However, it is possible that munitions were buried at the site based on the known prior use of the site as a sanitary landfill. Potential burial depths of thermally treated munitions scrap could reach six feet below ground surface (bgs). Additionally, if an explosion occurred within the boiler during incineration operations, it is possible that ordnance items were thrown from the boiler such that the “kick-outs” would have been deposited on the surface.

1.4 POTENTIAL WORKER HAZARDS

Potential safety hazards are detailed in the Incinerator Disposal Site HASP (TtNUS, 2007), under separate cover. UXO-trained personnel will be present on-site throughout the operation to implement the requirements of the HASP. A UXO Team Leader will be responsible for ensuring UXO worker safety, and will also be responsible for documenting and reporting any health and/or safety infractions to the TtNUS Health and Safety Manager (HSM). The UXO Team Leader will also perform any necessary notifications to the UXO Manager and Project Manager / Task Order Manager (TOM).

Based on the potential hazards identified at the site, all field employees will be required to have 40-hour Hazardous Waste Operations training and a current Occupational Safety and Health Administration (OSHA) 8-hour refresher course in addition to applicable UXO-specific training.

1.5 SITE CONDITIONS

1.5.1 Topography

NALF Cabaniss is covered with tall grasses, shrubs, trees, and other low-lying vegetation. Grasses and other vegetation near the operational runways are maintained through periodic mowing in support of flight training operations. NALF Cabaniss is bounded to the south by Oso Creek, a perennial water body that ultimately flows into Oso Bay. Beyond Oso Creek are agricultural and industrial properties. The area east of the installation is comprised of a mix of agricultural, industrial, and residential areas. North of the current boundary are former buildings and recreational areas that were once a part of the installation, were transferred to the GSA for disposal in 1958, and are now the property of the local school district. Residential zones lie beyond these buildings to the north. A former landfill is located directly west of the installation.

The general topography of the mainland areas of Nueces County around Corpus Christi Bay can be described as a low-lying coastal area consisting of flat coastal prairies, chaparral pastures, and farmland.

Elevations range between 15 and 30 feet above mean sea level. The topographic profile of NALF Cabaniss is generally flat with a mean elevation of 30 feet above mean sea level (MSL), with some steep downward slopes near Oso Creek.

The site topography is flat near Perimeter Road and steep at the concrete disposal areas near the center and eastern portion of the site of the former landfill. The lowest elevation point at the site is the mud flat area in the southern end of the site, approximately 180 feet north of Oso Creek.

1.5.2 Climate

The climate at NALF Cabaniss is a moderate to semi-tropical marine climate with hot, humid, breezy summers and mild winters. The wind direction is predominantly from the southeast during the warmer months and from the northwest and north during periods of higher pressure and cold fronts during cooler months. Average low and high temperatures are 42 degrees Fahrenheit (°F) (January) and 86°F (July), respectively. The number of clear days averages 114 days per year. Annually, there are more than 100 days of high temperatures of 90°F or higher and fewer than seven days of low temperatures at or below 32°F. Cold fronts, periodic thunderstorms, and hurricanes generally have the greatest impact on rainfall, which averages 34 inches annually. Extremes in precipitation can occur, ranging from drought to torrential rains associated with tropical storms and hurricanes. Nine hurricanes have made landfall in the Corpus Christi Bay area since 1900. The hurricanes of 1919 and 1945 and Hurricane Celia (1970) caused widespread property damage in the region; a portion of NALF Cabaniss was used as a disposal area for debris from Hurricane Celia. Storm surges associated with hurricanes and tropical storms can greatly affect the Corpus Christi Bay area. On average, a tropical storm or hurricane makes landfall in the Corpus Christi Bay area once every 10 years, with a major storm once every 30 years.

1.5.3 Geology

The coastal plain of the Corpus Christi area is underlain by Pleistocene river, delta, and shoreline sediments deposited during the interglacial periods. NALF Cabaniss is underlain by the Beaumont Formation, characterized by barrier island and beach deposits composed of fine-grained sands. Numerous pimple mounds and poorly defined relic beach ridges characterize the land surface. Locally active sand dunes are present in undisturbed areas. The barrier island and beach deposits of the Beaumont Formation are typically less than 60 feet thick. Other stratigraphic units, in order of increasing age, include the Montgomery Formation, Lissie Formation, Willis Formation, and the Goliad Sand.

1.5.4 Soil and Vegetation Types

NALF Cabaniss is underlain by Victorian Association soils. The Victoria series soils are dark, clayey sand, calcareous, crumbly soils that are referred to as blackland. These soils are deep, nearly level, and have

developed over clayey materials of the coastal terrace. The soils exhibit very slow internal drainage when wet and crack to depths of several feet when dry. Surface drainage from these soils flows into Oso Creek to the south of the installation. Principle vegetation types at NALF Cabaniss were identified in the 2001 Integrated Natural Resource Management Plan (INRMP) for NASCC and its associated auxiliary fields. Vegetation in the NALF Cabaniss area consists primarily of tall grasses and copses of shrubs, trees, and other low-lying vegetation. Original vegetation at the site likely consisted of mid- to tallgrass prairie grassland with minimal tree coverage. However, agricultural use and later development of the installation have left no native grasslands and natural vegetation; only disturbance-related species remain. Six vegetative communities were identified at NALF Cabaniss in the INRMP and include:

- Bluestem – Johnson Grass Herbaceous Vegetation
- Sugar Hackberry Woodland
- Honey Mesquite – Sugar Blackberry – Roosevelt Weed Woodland
- Blackbrush Shrubland
- Gulf Cordgrass Seasonally Flooded Herbaceous Vegetation and Key Grass Herbaceous Vegetation
- Popinac Forest

Operational requirements and mission safety for NALF Cabaniss have created the need to maintain portions of the installation as open grassland. Grass species may include grasses such as Kleberg bluestem (*Dicanthium annulatum*), silky bluestem (*D. sericeum*), Angleton bluestem (*D. aristatum*), johnsongrass (*Sorghum halepense*) and rhodegrass (*Chloris gayana*). These areas are maintained through periodic mowing.

Freshwater and brackish water jurisdictional wetlands have been delineated at NALF Cabaniss, primarily concentrated at the southern end of the installation along Oso Creek. The wetland areas are considered ecologically sensitive areas because they act to filter sediments and dissolved nutrients from runoff entering the creek and bay system, provide wildlife habitat, and stabilize shoreline areas. The wetlands at NALF Cabaniss cover a total area of 28.2 acres.

1.5.5 Hydrology

Surface water resources at NALF Cabaniss include open drainage ditches, which drain south and southeast into Oso Creek. The eastern-most drainage ditch intersects the Skeet and Pistol Range near the former locations of the armory and trap arcs. An abandoned drainage ditch was present west of the former range, but does not currently contain water. An unnamed pond associated with the former Sewage Disposal Plant is present 100 feet southeast of the NALF Cabaniss property.

1.5.6 Hydrogeology

The average depth to groundwater at NALF Cabaniss is six feet bgs. The site is underlain by low permeability clays, which cause the majority of precipitation to run-off with only a small percentage recharging the groundwater. The water table aquifer (six to 250 feet bgs) is predominantly sandy material overlying a clay zone with low permeability. Regional groundwater flow in the Corpus Christi area is to the northeast; local flow paths at NALF Cabaniss are unknown. Artesian aquifers located 250 to 2,800 feet bgs in the Corpus Christi area are moderately to highly saline and, therefore, have limited potential use. Therefore, potable water for the NALF Cabaniss and the City of Corpus Christi is supplied from Lake Corpus Christi, 38 miles to the northwest.

1.5.7 Cultural and Natural Resources

The freshwater and brackish water jurisdictional wetlands that have been delineated at NALF Cabaniss represent a natural resource. Executive Order (EO) 11990 and Office of Chief of Naval Operations Instruction (OPNAVINST) 5090.1B require Naval facilities to manage and protect lands with the goal of no net loss of wetland areas. All federal agencies are required by EO 11990 to use reasonable efforts to preserve and enhance the natural and beneficial values of wetlands. Therefore, the wetland areas within NALF Cabaniss are considered ecologically sensitive areas.

According to the 2000 Integrated Cultural Resources Management Plan, cultural resources at NALF Cabaniss are limited. A Phase I Archaeological Investigation performed in 1994 identified three potential archaeological sites of interest at NALF Cabaniss, only one of which was recommended for further investigation. The current status of this site, including its location, is not known.

1.5.8 Endangered and Special Status Species

The 2001 INRMP provides a survey of the presence of rare, threatened, and endangered species, their relative abundance, and the locations of identified critical habitats at NALF Cabaniss. During the study, plant, herpetofauna, bird, and mammalian surveys were completed. The surveys included all state or federally listed species, as well as those species that are candidates for listing.

The surveys conducted at NALF Cabaniss did not indicate occurrences of threatened or endangered species. However, edaphic and geographic factors point to the strong possibility of several rare plant species. These species may occur on Victorian soils and could include the slender rushpea (*Hoffmannseggia tenella*), South Texas ambrosia (*Ambrosia cheiranthifolia*), Lila de los llanos (*Antericim chandleri*), plains gumweed (*Grindelia oolepis*), and the yellow-show (*Amoreuxia wrightii*).

While not documented during the most recent survey, the INRMP indicates that the protected species listed in Table 1-1 have the potential to inhabit NALF Cabaniss:

TABLE 1-1

**SUMMARY OF KNOWN OR POTENTIALLY PROTECTED SPECIES
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS**

Ecological Receptors	Species
Federal Endangered	None
Federal Threatened	None
State Endangered	None
State Threatened Texas	Indigo Snake, Texas Tortoise, Black-Spotted Newt, South Texas Siren, Sheep Frog
Other Ecological Receptors	Common fauna/flora such as large mammals (e.g., deer), small mammals, reptiles/amphibians, grassland birds, and fish in nearby surface waters

The maritime pocket gopher (*Geomys personatus maritiums*), a species of concern, is present at NASCC and NALF Waldron and may be the most significant species for wildlife management and protection at those installations. The species is under consideration for federal listing as a threatened species. However, the heavy clay soils present at NALF Cabaniss are unsuitable to gopher populations. The INRMP noted no gopher holes at NALF Cabaniss.

2.0 TECHNICAL MANAGEMENT PLAN

The Technical Management Plan was prepared to document the approach and procedures to be used to execute the tasks required under this task order.

2.1 APPLICABLE GUIDANCE AND REGULATIONS

All UXO support activities, to include UXO sweeps, clearance, and avoidance activities, will be performed in accordance with all local, state, and federal regulations and will include all applicable Department of Defense (DOD) requirements including Engineer Pamphlet EP-75-1-2, dated August 1, 2004, and DID OE-005-01.02 (USACE, 2002).

All activities involving work in areas potentially containing MEC hazards shall be conducted in full compliance with the NASCC, Munitions Mandatory Center of Expertise (MM CX), Department of the Navy, and Department of Defense requirements regarding personnel, equipment, and procedures.

2.2 TECHNICAL SCOPE

This work falls under the Defense Environmental Restoration Program. The SI will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 104 and 121.

The first phase of the project is a time critical removal action for removal of limited surface MEC. The surface clearance of MEC along Perimeter Road shall be performed to the extent necessary to mark safe pathways through the area for mowing crews, security patrols, and others to pass along Perimeter Road. Surface clearance of the two known MEC areas (on the surface around the boiler and near Perimeter Road, 450 feet west of the boiler), will remove/reduce MEC hazards and exposure to personnel passing near or through the area. The scope of work and activities addressed in this Work Plan and the Site-Specific HASP (under separate cover, TtNUS, 2007), have also been addressed in an ESS. The ESS has received conditional approval from NOSSA (Navy 2007).

The second phase of the project is an area delineation for MEC. The UXO Team will divide the former Incinerator Disposal Site into transects and conduct a detector-aided surface sweep of each transect. The detector-aided surface sweep shall be performed to locate MEC and Munitions Potentially Presenting an Explosive Hazard (MPPEH) on the surface and identify areas for follow-on geophysical mapping of subsurface anomalies. No MEC will be moved or disturbed during this part of the project, therefore this work is not included in the ESS.

The third phase of the project is a geophysical investigation of selected areas in the former Incinerator Disposal Site. The Project Management Team will select areas for geophysical mapping using information from the UXO detector-aided surface sweep and other information. UXO Technicians will be on site during geophysical mapping to conduct UXO avoidance activities. No MEC will be moved or disturbed during this part of the project, therefore this work is not included in the ESS.

The fourth phase of the project is MC investigation and sampling of selected areas in the former Incinerator Disposal Site. The Project Management Team will select the investigation and sampling sites using information from the PA, UXO detector-aided surface sweep, and other information. UXO Technicians will be on site during MC investigation and sampling to conduct UXO avoidance activities. No MEC will be moved or disturbed in this part of the project, therefore this is not part of the ESS.

During all phases of the project, if a complete MEC item or ordnance related material is encountered, the Senior Unexploded Ordnance Supervisor (SUXOS), Unexploded Ordnance Safety Officer (UXOSO), Unexploded Ordnance Quality Control (UXOQC), and UXO Technicians will attempt to identify the type and/or condition of the ordnance and its location, and will report its finding to the NASCC point of contact (POC). The former Incinerator Disposal Site has historically been used for the thermal treatment of military munitions, consequently, complete munitions, and partial items, that might contain boosters, bursters or components, may be encountered. If the MEC item cannot be identified as a conventional munition by type, and/or if the MEC is suspected to be potentially Chemical Warfare Material (CWM), personnel will withdraw upwind from the area, assemble at the pre-designated rally point, secure the site, and request assistance from the NASCC point of contact. If directed by the NASCC POC, UXO personnel will take emergency non-invasive actions such as covering the item with plastic sheeting and securing the area until the appropriate exclusion and safety zones have been determined. Potential exposure to CWM on this site is not anticipated. In the event that Hazardous, Toxic, or Radiological Waste (HTRW) is encountered on-site, the work site will be evacuated until the Project Health and Safety Officer, with concurrence of the NASCC POC, identifies and implements appropriate protective measures.

2.2.1 Mobilization and Site Preparation

Site Accessibility and Traffic Control

The site is a controlled area, accessible only through an access gate. Safety requires a minimum 302 foot active exclusion zone (EZ) be established and maintained before any MEC activities occur due to the potential of encountering live explosively configured/fused munitions. Because of the potential for inhabited buildings south of the MEC site, two feet of sand bags will be utilized during MEC treatment to eliminate primary fragments and reduce the exclusion zone to 200 feet. Therefore the 302 ft exclusion zone, based on the hazardous fragmentation distance (HFD) for the 2.75 inch rocket which is the known and/or suspected munition in accordance with the Department of Defense Explosive Safety Board

(DDESB) Technical Paper 16, is reduced to 200 feet. If non-site personnel or non-essential non-UXO personnel enter the exclusion zone, all MEC operations will cease, until the exclusion zone is reestablished. However, essential personnel and authorized visitors (as determined by the Navy RPM and the Tetra Tech TOM with SUXOS recommendations) may visit the exclusion zone while MEC procedures are being conducted and will not require operations to cease.

Both routine and time critical response actions dictate the need for prevention of unauthorized site access, and for the protection of vital records and equipment. All equipment will be secured and brought to a designated location each day.

Site Security

Site Security will be maintained to ensure that non-essential personnel do not access the exclusion zone during the MEC Detector-Aided Surface Sweep or MEC removal operations.

2.2.2 MEC Detector-Aided Surface Sweep to Remove MEC Hazards

Metal detectors will be used to aide in locating surface metal and debris. If a MEC item is encountered, its location will be recorded and/or marked using a Global Positioning System (GPS) or other grid coordinate location system. The UXO Team will determine its condition prior to proceeding with the surface sweep. The UXO Team Leader will maintain a site logbook with information on each MEC item located and daily information about the site.

Every effort will be made to identify a MEC item. Under no circumstances will any MEC be moved in an attempt to make a definitive identification. All military munitions will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown military munition is encountered, the TOM and Navy POC / Remedial Project Manager (RPM) will be notified. Prior to any action being performed on an ordnance item, all fusing will be definitively identified if it is possible to safely do so without disturbing the ordnance item. This identification will consist of fuse type by function and condition (armed or unarmed), and the physical state/condition of the fuse, i.e., burned, broken, parts exposed/sheared, etc.

Only UXO-qualified personnel will perform MEC procedures. As an exception, a UXO Technician I may assist in the performance of MEC procedures when under the supervision of a UXO Technician III or higher. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform UXO-related procedures when supervised by a UXO Technician III or higher. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed to standards, all field personnel will be under the direct supervision of a UXO Technician III or higher. All

ordnance items will be handled, recorded, and disposed of following the requirements of this Work Plan, the project HASP (submitted under separate cover), applicable ordnance operations procedural safety guidelines, and industry accepted safe work practices and procedures.

All fused MEC items will be disposed of in-place unless it can be determined that no explosive hazard remains. Unfused MEC items which may contain explosive residue may be consolidated for later disposal. MPPEH will be removed from the area of concern and secured for later disposition. All other surface metal scrap will be removed from the area of concern and consolidated.

At a minimum, all MEC disposal sites will be restored to the extent possible to their original condition after explosive treatment operations. The following details the three MEC sites that require detector-aided surface sweeps.

Phase 1-1

The UXO Team will establish the northern boundary of the area of concern as the center line of Perimeter Road along the northern and eastern edge of the former Incinerator Disposal Site. Using that boundary, the UXO Team will conduct a detector-aided surface sweep of the area south of the center line of Perimeter Road to the tree line/edge of the road. This will include the area of the road that is maintained by the grounds mowing crew and security patrols. The UXO Team will proceed with the surface sweep until Perimeter Road along the northern and eastern edge of the former Incinerator Disposal Site has been surface cleared of MEC.

Phase 1-2

The UXO Team will establish an area of concern around the former boiler. Using the boiler as the center of the area of concern, the UXO Team will conduct a detector-aided surface sweep of the open area from the boiler to the tree line in all directions. The area inside the boiler will receive a visual sweep by the UXO Team because the metal of the boiler will interfere with the operation of the detectors. The UXO Team will proceed with the detector-aided surface sweep around the boiler until the area has been surface cleared of MEC, or the UXO Team reaches a 250 foot radius from the boiler.

Phase 1-3

The UXO Team will establish the center of the known MEC area near Perimeter Road, 450 feet west of the boiler. The UXO Team will conduct a detector-aided surface sweep of the open area from the center of the known MEC area near Perimeter Road to the tree line in the south, east, and west directions and to the center of Perimeter Road to the north direction. The UXO Team will proceed with the detector aided surface sweep in the known MEC area until the area has been surface cleared of MEC, or the UXO Team reaches a 250 foot radius from the established center point.

2.2.3 UXO Detector-Aided Surface Sweep to Delineate Boundary of MEC

During Phase 2 of the operation, the UXO Team will divide the former Incinerator Disposal Site into transects. Each transect will run north to south from Perimeter Road to Oso Creek. The starting point of each transect will be 75 feet apart. Each transect will be marked with a wooden stake and labeled consecutively starting with "T-1" on the southern edge of Perimeter Road. The UXO Team will start from the first labeled stake on Perimeter Road and proceed in a generally south direction using a GPS or compass as a guide. The UXO Team will conduct a detector-aided surface sweep of a 5-10 feet (approximate) wide transect. Metal detectors will be used to aide in locating surface metal and debris. If a MEC item is encountered, its location will be recorded and/or marked using a GPS or other grid coordinate location system. The UXO Team will attempt to determine its condition without moving or disturbing the item prior to proceeding with the surface sweep. Each item will be marked with engineer flagging/Pin flag, given a unique number starting with the transect, followed by the item number (i.e., "T-1-1" for the first item in the first transect). All available information about the MEC item will be recorded in the log book including location, identification, and item number. A digital photograph will be taken of each MEC item. The UXO Team will not move or otherwise disturb the item in an attempt to collect information. After all available information is recorded, the UXO Team will proceed with the detector-aided surface sweep. The UXO Team will record significant information on each transect. In addition to the MEC records stated above, this record will include general information on MPPEH, munitions debris, and other finds deemed appropriate to bring to the project management team's attention for decision making during follow-on work.

Every effort will be made to identify a MEC item. Under no circumstances will any MEC be moved in an attempt to make a definitive identification. The military munition will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown military munition is encountered, the TOM will be notified. Prior to any action being performed on an ordnance item, all fusing will be definitively identified if it is possible to safely do so without disturbing the ordnance item. This identification will consist of fuse type by function and condition (armed or unarmed) and the physical state/condition of the fuse, i.e., burned, broken, parts exposed/sheared, etc.

Only UXO-qualified personnel will perform MEC procedures. As an exception, a UXO Technician I may assist in the performance of MEC procedures when under the supervision of a UXO Technician III or higher. Non-UXO-qualified personnel who have been determined to be essential for the operations being performed may be utilized to perform UXO-related procedures when supervised by a UXO Technician III or higher. All personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards of the procedures being performed. To ensure that these procedures are performed

to standards, all field personnel will be under the direct supervision of a UXO Technician III or higher. All ordnance items will be recorded following the requirements of this work plan, the project HASP (submitted under separate cover), applicable ordnance operations procedural safety guidelines, and industry accepted safe work practices and procedures.

All items discovered during the detector-aided surface sweep of the transects will be left in place. No MEC or MPPEH will be moved during this part of the project.

2.2.4 UXO Escort Operations

All activities involving work in areas potentially containing MEC hazards will require an escort and shall be conducted in full compliance with this Work Plan regarding personnel, equipment, and procedures:

1. If a complete munition or ordnance related material is encountered, the material will be avoided during this phase of the project. The UXO Technician will not attempt to identify the type or condition of the ordnance. Its location will be reported to the UXO Team Leader/SUXOS. MEC avoidance procedures will be practiced at all times. Potential exposure to CWM on this site is not anticipated. In the event that HTRW is encountered on-site, the work site will be evacuated until the TOM, with concurrence of the Navy POC, identifies and implements appropriate protective measures.

2. The UXO Escort will clearly mark any area with visible ordnance or MEC and the area will be avoided. The visible ordnance or MEC will be noted in the field logs. The UXO Escort will report the MEC to the UXO Team Leader/SUXOS.

3. No ordnance, munitions, explosives, or ordnance related materials will be moved, removed, or disposed of during UXO Escort duties.

4. The UXO Escort will conduct a UXO avoidance survey for any proposed survey stake location using a metal detector to check for possible ordnance or ordnance related material. If an anomaly is encountered or if the UXO Technician suspects the presence of MEC, the proposed stake location will be relocated to an area free of concerns/anomalies.

5. At the two subsurface munitions constituents sampling locations, the UXO Escort will conduct a UXO avoidance survey using a downhole magnetometer or other appropriate method to check for possible ordnance or ordnance-related material.

2.2.5 Geophysical Investigation

During Phase 3 of the operation, the geophysical team will conduct a geophysical survey of selected areas. A UXO Technician II or above will be on site during this phase of the operation to provide UXO Escort/Avoidance to all Non-UXO personnel.

Prior to the geophysical investigation, the UXO Team will conduct a detector-aided surface sweep. While no organized vegetation removal is planned, some hand removal of vegetation by the UXO technicians may be required for the completion of the surface sweep. All MEC items on the surface will be marked for identification and UXO avoidance. All MEC items will be left in place. Non-MEC items and metal scrap will be removed and consolidated at the edge of the selected area. No MEC or MPPEH will be moved during this part of the project.

2.2.5.1 Anomaly Validation

The Geophysical activities will generate geophysical contour maps depicting the areas surveyed and any anomalies detected. The geophysical contour maps will be transmitted electronically and be compatible with ArcView® version 8 or the specific Geographical Information System (GIS) platform in use. The contour maps will be oriented to a coordinate system designated by TtNUS [using Texas State Plane Coordinated System, South Zone, North American Datum 1983 (NAD 83) and National Geodetic Vertical Datum 1929 (NGVD 29)]. The results of the geophysical survey will be used to develop a target anomaly sheet identifying the location of subsurface anomalies. These anomalies will be compared to the results from the Geophysical Technology Demonstration (GTD) Plot and possible MEC items identified. Details on the GTD are presented in Section 5.0.

2.3 CHANGED SITE CONDITIONS

TtNUS will keep NASCC updated constantly via daily reporting and communications of on-site conditions. In the event that adverse weather conditions exist or a change in site conditions is identified, TtNUS will notify the NASCC point of contact immediately. The potential for changed site conditions (besides weather) is highly unlikely. The area is known to contain MEC and/or MPPEH therefore these are not changed site conditions. The greatest obstacles that may impede the Time Critical Removal Action or SI operations are likely to be areas which include non-munitions debris [scrap] such as concrete, large metal scrap, and other ferrous scrap and heavy vegetation. These areas will be difficult to collect MEC information, and geophysical data.

2.4 UXO SURVEY INSTRUMENTATION

A magnetometer such as the Schonstedt® GA-52 Cx or similar instrument is the detector that will be used for detector-aided surface sweep operations. These instruments are metal locators that only detect ferrous or magnetic material. The detection depth is limited by the size and orientation of a target and soil characteristics of the work area. These magnetometers do not require calibration. They have a GO/NO-GO field operational check. This check is achieved by using a target of similar size and characteristic as the expected type of UXO. Failure to detect the test target is reason to reject an instrument. Magnetometers will be checked daily using surrogates at varying orientation before starting the UXO activities or after battery changes. The UXO Technician will conduct random checks during daily operations.

2.5 PROJECT ORGANIZATION

Mr. Larry Basilio is the TOM and will provide overall management of this Task Order. He will be responsible for TtNUS' performance from project inception to completion. All site work activities will be coordinated through the personnel listed in Table 2-1.

TABLE 2-1

PROJECT ORGANIZATION
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS

Representative	Phone Number
Ms. Larry Basilio (TtNUS Task Order Manager)	(832) 251-6018
Mr. Larry Basilio (TtNUS Field Operations Leader)	(832) 251-6018
Mr. Matthew M. Soltis (TtNUS Health and Safety Manager)	(412) 921-8912
Mr. Ralph Brooks (TtNUS UXO Manager)	(770) 413-0965 ext 231
Mr. James K. Laffey (TtNUS On-site Health and Safety Officer)	(412) 921-8678
Ms. Helen Lockard (NAVFAC Remediation Project Manager)	(904) 542-3991 x4522
Mr. Mike Hilger (NASCC Environmental Management POC)	(361) 961-5354
Mr. Gary LeFlore (NASCC Environmental Management POC)	(361) 961-3704
Mr. Hal Resides (NASCC Explosives Safety Officer)	(361) 961-3673
Ms. Caroline Scheible (NASCC Safety Officer)	(361) 961-4470

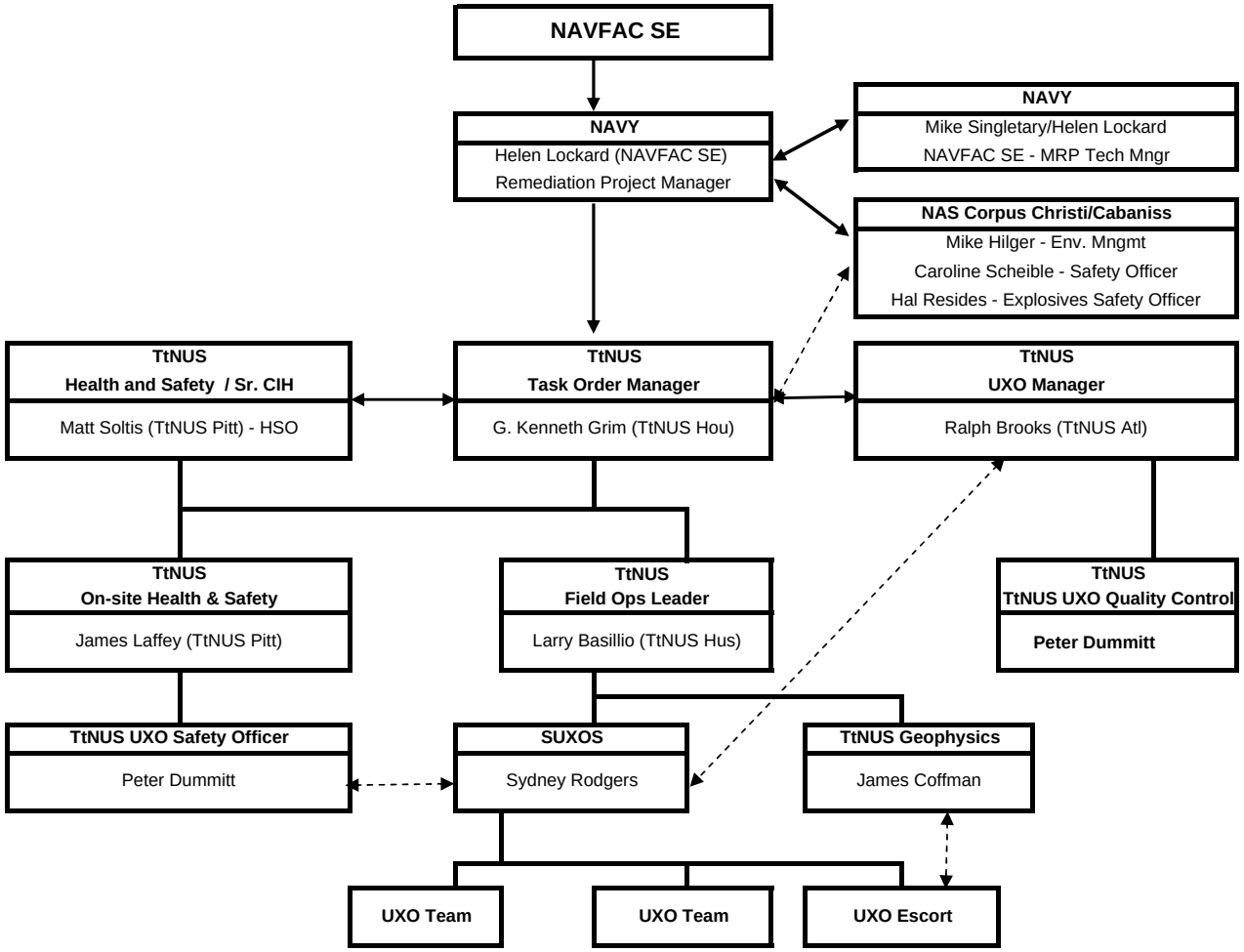
The following subsections contain details pertaining to project schedule, submittal requirements, and personnel. Figure 2-1 presents a project organization chart for TtNUS employees and a detailed description of personnel responsibilities is provided in Section 2.6. Additional Project and NASCC local personnel contact information is included in Appendix C.

2.5.1 Project Schedule

Following approval of the Work Plan, TtNUS personnel will mobilize to the site for preparation of the UXO Time Critical Removal Action activities. After the initial safety briefing and project review, the UXO Team will conduct the detector-aided surface sweep of the known MEC areas. This should require approximately 10 work days. The detector-aided surface sweep of the transects should take approximately 10 additional work days. The geophysical survey should take approximately 10 additional work days. This schedule is based on 10 hour days including daily briefings, reports, end of day clean-up, and traveling to and from the site. A work week will be comprised of five ten-hour work days. Overtime work (i.e. greater than 40-hours per week) may be required and work days and/or the work week may be extended if it is determined to be beneficial to the project and achieving project objectives. The project

FIGURE 2-1

**PROJECT ORGANIZATION CHART
INCINERATOR DISPOSAL SITE
NALF CABANISS, CORPUS CHRISTI, TEXAS**



schedule will be adjusted as necessary throughout the project, as the duration is only an estimate due to the unknown quantity of anomalies that may be encountered.

2.5.2 Submittals

No firm schedule of deliverables has been established for this project. NASCC is currently conducting internal coordination of activities and reviewing facility and management priorities, which will determine the schedule for this project. The major milestones and deliverables associated with this project are listed below.

TABLE 2-2

REQUIRED SUBMITTALS
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS

Deliverable	Due Date
Draft Explosive Safety Submission ESS	12/01/06 A
Receipt of Navy/NOSSA comments	01/04/07 A
Final Explosive Safety Submission ESS	03/15/07
Draft Work Plan and HASP	03/29/07
Receipt of Navy/NOSSA Comments	04/15/07
Final Work Plan and HASP	05/15/07
Field Work Start	06/15/07
Draft After Action Report	6 weeks after completion of field work
Receipt of Navy Comments	4 weeks after receipt of Draft report
Final After Action Report	2 weeks after Receipt of Comments

A = actual date

2.6 PERSONNEL

Personnel involved with the UXO support will include the following TtNUS employees: SUXOS, UXOSO/UXOQC, UXO Team Leader, and UXO Technicians assigned from the Stone Mountain, Georgia office, a Field Operations Leader (FOL) assigned from the Houston, Texas office, a Geophysical Lead assigned from the Oak Ridge, Tennessee office, and a Geophysical Survey Team. The UXO Site personnel will provide full-time field support. The TOM will provide support off-site throughout the project duration. The project organization is illustrated in the Project Organization Chart. The UXO Technicians on site will meet or exceed the minimum qualification standards as stated in DDESB TP18, Table 4-1. At least one UXO Technician will be a UXO Technician III. The other UXO Technicians may be UXO Technician I or higher.

All personnel will be required to comply with the medical, training, experience, and educational requirements specified in *USACE DID OE-025.01, Chapter 29 Code of Federal Regulations 1910.120*, and the HASP.

2.6.1 Project Manager / Task Order Manager

The TtNUS TOM will have the primary responsibility for implementing and managing the SI, and notifying regulatory agencies of field activities or schedule modifications. Additionally, the TOM will have overall responsibility for the management and completion of the project, which includes at a minimum: resource allocation; financial reporting; schedule control; review and approval of deliverables; invoice review and approval; and overall management of the project.

2.6.2 Field Operations Leader

The FOL will be responsible for directing on-site field activities and will report directly to the TOM. The FOL will coordinate efforts of the field sampling staff, the subcontractors, and the lead technical staff and will be responsible for identifying problem areas and bringing them to the attention of the TOM for resolution. The FOL also has immediate stop work authority.

2.6.3 Project/Site Geophysicist

The Geophysical Manager has overall responsibility for design, implementation, and management of all geophysical investigations required for the work effort, but may not be on-site full time. This responsibility may be assigned to a subcontractor, if necessary.

The Site Geophysicist shall have the same education requirements as the Project Geophysicist, except the 5 year minimum experience requirement is waived, if working under the general supervision of the Project Geophysicist. This individual is responsible for day-to-day operations of the site geophysical investigations. This individual may also be the Project Geophysicist if he/she meets the qualifications of "Project Geophysicist."

The Geophysical Survey Team will perform duties as assigned by the TOM and be under the supervision of the FOL while in the field.

2.6.4 UXO Manager

The UXO Manager is responsible for ensuring all UXO issues are addressed and resolved to include equipment, staffing and administrative requirements. The UXO Manager will provide support off-site

throughout the project duration unless requested on-site by the TOM, or may also act on-site as the SUXOS.

2.6.4.1 Senior UXO Supervisor (SUXOS)

The SUXOS will direct daily implementation and enforcement of the Task Order requirements as they apply to UXO support and safety during site activities. The SUXOS will have the overall responsibility for the day-to-day UXO operations at the site, and will direct subcontractors, FOL and other personnel resources at the site on UXO support issues to ensure their safety. The SUXOS will be responsible for all site MEC documentation. The SUXOS will meet the qualifications as stated in *DDESB TP 18 dated 20 Dec 2004.* Other responsibilities of the SUXOS include:

- Assist in the review of site-specific Work Plans and initiate Field Change Requests as needed.
- Ensure site activities are scheduled and executed with adequate personnel and equipment resources to perform the job safely with required quality and in a timely manner.
- Ensure that adequate communication between field personnel and emergency response personnel are available.
- Ensure site personnel are trained in accordance with the HASP.
- Ensure all notifications are given prior to beginning work.
- Ensure required exclusion zones are established and maintained.
- Ensure all intrusive operations are conducted in accordance with the MEC Work Plan (WP) and state and federal regulations.
- Implement the approved UXO safety program in compliance with all federal, state, and local regulations.
- Analyze UXO and explosives operational risks, hazards, and safety requirements.
- Enforce personnel limits and safety exclusion zones for UXO operations.
- Conduct safety inspections to ensure compliance with UXO Safety Standards/Regulations.
- Implement quality control (QC) requirements including QC inspections of all UXO related work.
- Direct and approve corrective actions to ensure that UXO related work complies with contractual requirements.

The SUXOS will have a minimum of 10 years of Explosive Ordnance Disposal (EOD)/UXO experience, including UXO clearance operations and supervision of personnel. The SUXOS will have the authority to stop site activities if an immediate/dangerous/hazardous situation exists. The dangerous situation will be immediately reviewed with the UXOSO, and the FOL, and reported to the TOM and NASCC point of contact.

2.6.4.2 UXO Safety Officer/UXO Quality Control

The UXOSO/UXOQC shall be on-site at all times during UXO related work and has immediate stop work authority. The UXOSO/UXOQC will meet the qualifications as stated in *DDESB TP 18 dated 20 Dec 2004.* Other responsibilities of the UXOSO/UXOQC include:

- Ensure site personnel are trained in accordance with the HASP.
- Ensure that adequate communication between field personnel and emergency response personnel are available.
- Ensure required exclusion zones are established and maintained.
- Ensure intrusive operations are conducted in accordance to the MEC WP.
- Implement the approved UXO safety program in compliance with all federal, state, and localregulations.
- Analyze UXO and explosives operational risks, hazards, and safety requirements.
- Enforce personnel limits and safety exclusion zones for UXO operations.
- Conduct safety inspections to ensure compliance with MEC Safety Standards/Regulations.
- Conduct quality control inspections to ensure compliance with the MEC WP.

The UXOSO/UXOQC will have a minimum of 8 years of EOD/UXO experience in all phases of munitions response actions or range clearance activities, as appropriate for the contracted operations, and applicable safety standards.

2.6.4.3 UXO Team Leader (UXO Tech III)

The UXO Team Leader (UXO Tech III) will have a minimum of 8 years of EOD/UXO experience including prior military EOD and/or commercial UXO experience in munitions response actions and/or range clearance activities. The UXO Team Leader may supervise up to 6 UXO Technicians. The UXO Team Leader will conduct UXO activities as directed by the SUXOS or UXO Manager in his absence. The UXO Team Leader will meet the qualifications as stated in *DDESB TP 18 dated 20 Dec 2004* and be under the direct supervision of the SUXOS or UXO Manager is his absence.

The UXO Team Leader will direct implementation and enforcement of the project requirements as they apply to UXO support and safety during site activities. The UXO Team Leader will have the responsibility for the UXO Team operations at the team's work site, and will direct other personnel resources at the team's work site on UXO issues to ensure their safety. The UXO Team Leader will be responsible for the team's work site MEC and MPPEH documentation and will submit all documentation to the SUXOS at the end of each work day.

Other responsibilities of the UXO Team Leader include:

- Make all required notifications prior to beginning work.
- Establish required exclusion zones and ensure they are maintained.
- Ensure all MEC operations are conducted in accordance with the Work Plan and state and federal regulations.
- Implement the approved Site Safety and Health Plan in compliance with all federal, state, and local regulations.
- Analyze MEC and explosives operational risks, hazards, and safety requirements.
- Enforce personnel limits and safety exclusion zones for MEC operations.

The UXO Team Leader will have the authority to stop site activities if an immediate, dangerous/hazardous situation exists. The dangerous situation will be immediately reviewed and reported to the SUXOS, TOM, and NASCC POC.

2.6.4.4 UXO Technician (UXO Escort)

The UXO Technician will be assigned UXO Escort/Avoidance activities as needed to prevent accidental exposure to potentially hazardous ordnance items. The UXO Technician will ensure areas of intrusive operation, to include the installation of survey stakes, are free of anomalies and UXO concerns. The UXO Technician will conduct UXO escort duties for all non-UXO personnel. The UXO Technicians will meet the qualifications of a UXO Technician II at a minimum, and be under the supervision of the SUXOS or UXO Manager in his absence.

2.6.4.5 UXO Technician (UXO Tech II or I)

The UXO Tech II will have prior military EOD experience or a minimum of 3 years experience in munitions response actions or range clearance activities. The UXO Technician I will have training as stated in DDESB TP 18 dated 20 Dec 2004 and have a valid UXO Training Certificate. The UXO Technicians will conduct UXO activities as directed by the UXO Team Leader and the SUXOS. The UXO Technicians will conduct the anomaly investigation effort to clear all non UXO items, to identify all UXO and munitions debris items. The UXO Technicians will meet the qualifications of a UXO Technician as stated in *DDESB TP 18 dated 20 Dec 2004* and be under the direct supervision of the UXO Team Leader.

2.7 MUNITIONS RESPONSE OPERATIONS

By their nature, MEC procedures are hazardous and certain calculated risks will be taken. Ingenuity, judgment, common sense, and above all, the mastery of UXO techniques and observance of UXO

principles will determine success or failure. UXO-qualified technicians will be alert at all times and be in observance of UXO safety precautions. UXO-qualified personnel are the most experienced and best qualified to perform these operations.

Specific Procedures for Anomaly Inspection

1. Start all inspections from the side of the anomaly. Carefully remove surface debris from the side until identification of the anomaly is made. No excavation operations are authorized under this work plan.

2. Clear debris/dirt from the surface anomaly only enough to permit identification of the anomaly and to apply the necessary UXO procedure. UXO will be reported to the TOM (or her designee) and any required support will be requested.

3. All MEC items discovered during the Time Critical Removal Action operation will be treated in place when possible. The SUXOS will supervise this phase of the operation. MEC items discovered during the SI operation will be photographed, identified if possible with out moving the item, located with GPS or other technique, and entered into the MEC log.

4. Move with slow, deliberate motions; avoid abrupt moves.

5. Avoid impacting, jarring, or striking MEC items.

6. Do not subject MEC items to shock, rough handling, heat, or any other force.

7. Observe electromagnetic radiation (EMR) precautions in accordance with *DA Pam 385-64*.

The suspected type of ordnance contamination at the site is discussed in Section 1.1. The suspected amount of ordnance at the site is unknown.

TtNUS is not responsible for the treatment of MEC discovered during the detector-aided surface sweep of the transects. Discovered MEC and MPPEH will be left in the location found and reported to NASCC for management and treatment.

2.7.1 MPPEH Management Operations

If, during the Time Critical Removal Action phase of the detector-aided surface sweep operation, MPPEH is encountered, two UXO Technicians will inspect the MPPEH. If the MPPEH cannot be certified as explosive free it will be handled as MEC and treated in place. If MPPEH is determined to be explosive

free, the items will be reported to the SUXOS as explosive free and secured on site. MPPEH to be certified as explosive free will be inspected by the SUXOS, and at least one other UXO Technician. After confirming that the MPPEH is explosive free it may be consolidated in a container located near the site or other location as determined by the NASCC POC. If the item is placed in a container, it will be entered into an inventory of the container contents. The container will be kept under the custody of the SUXOS and will be sealed at the close of business every day. Prior to opening the container the custody seal will be inspected and its condition noted in the site records/log books. At the end of the project, all MPPEH determined to be explosive free will be certified in accordance with NOSSA OP5 13-15.8 and offered under chain of custody to NASCC. NASCC will be responsible for the custody of the material, transportation, maintaining the accompanied certification paperwork, and demilitarization / shredding / smelting if required.

All other scrap may be consolidated if necessary for the SI operation, but will be left at the site.

2.8 MUNITIONS CONSTITUENTS

While a number of specific munitions types were identified during the visual survey, records were not available documenting the exact types of munitions disposed of in the incinerator. Therefore, it is conservatively estimated that other types of munitions may also have been incinerated at the site. Subsequently, a number of different types of MC could be present. Based on this uncertainty, the primary MC of concern at this site could include:

- Target Compound List (TCL) Explosives (1,3,5-TNB; 1,3-DNB; 2,4,6-TNT; 2,4-DNT; 2,6-DNT; 3,4-DNT; 2-AM-4,6-DNT; 4-AM-2,6-DNT; 2-NT; 3-NT; 4-NT; HMX; NB; RDX; Tetryl; 2,4,6-TNP; PETN)

- Target Analyte List (TAL) Metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc)

- Ammonium perchlorate

- White phosphorus (from practice bomb spotting charges) Other possible MC of secondary concern may be associated with the following munitions components:

- Pyrotechnics (red phosphorus, PBXN-5, zirconium, titanium, tungsten, boron, hexachlorobenzene, hexachloroethane, chlorates, chromates, dichromates, halocarbons, iodates, nitrates, and oxides)

- Gun propellants (diphenylamine, ethyl centralite, n-nitroso-diphenylamine, nitrocellulose, nitroglycerine, nitroguanidine, and phthalates)

- Primary explosives (lead azide, lead styphnate, mercury fulminate, tetrazene, and diazodinitrophenol)

Based upon observations made at the Incinerator Disposal Site, MC associated with the munitions scrap at the site would likely be found in the upper six inches of surface soil. If munitions scrap or ash from the incinerator were buried at the site, MC may also be present in the subsurface to approximately six feet bgs.

No sources of information were found that might indicate whether soil sampling had been performed at the former Incinerator Disposal Site to confirm the presence of MC in surface soil. Groundwater monitoring wells have not been installed within or nearby the Incinerator Disposal Site. However, based on the known historical use of the former site, it is likely that MC is present at the site.

2.9 LESSONS LEARNED

Lessons learned will be recorded in the site logbook and will be discussed with the UXO team during the next day's safety meeting, or sooner as necessary. The TOM will be briefed on lessons learned as soon as necessary.

3.0 EXPLOSIVE MANAGEMENT PLAN

This Explosive Management Plan has been prepared to document the approach, procedures, and requirements for managing explosives required for the detonation of MEC identified on site.

3.1 GENERAL REQUIREMENTS AND LICENSING

The explosives acquired for and used for this project will be managed in accordance with Federal Acquisition Regulations (FAR) 45.5, local and state laws and regulations, Alcohol Tobacco and Firearms Pamphlet (ATFP) 5400.7, DOD 6055.9-STD, Department of Transportation (DOT) regulations, NASCC Safety Manual/NASCC Safety Standards (NSS) 1740.12, and NASCC NPR 1600.1.

TtNUS shall have and, upon request, make available to any local, state, or federal authority a copy of the Alcohol Tobacco and Firearms (ATF) license/permit authorizing the purchase, storage, transport, and use of explosives.

3.2 EXPLOSIVES ACQUISITION AND MANAGEMENT

3.2.1 Acquisition

The quantity of explosives to be used will be kept to a minimum determined by the storage capabilities of the NASCC supplied bunker, and the needs of the UXO Team.

Explosives for this project will be acquired from OMNI Distributions, Inc., (1-800-277-6664). If another vendor is used, that vendor's name and phone number will be provided to NASCC.

The explosives to be acquired for this project consist of:

TABLE 3-1

EXPLOSIVES TO BE ACQUIRED
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS

ITEM	QUANTITY
16 FT Non-El with caps attached	25 Ea.
200 FT Non-El with caps attached	6 Ea.
Helix 1.1 lb.	24 Ea.
Non-El Shock Tube Lead Line	2500 Ft.
Primers for Shock Tube	1000 Ea.

3.2.2 Initial Receipt

The SUXOS and UXOSO/UXOQC will be responsible for receipt of explosives from the commercial vendor and will follow all applicable NASCC procedures. The SUXOS will coordinate all receipt and management of explosives with the NASCC POC before receipt and transportation of explosives to the site.

The NASCC POC will provide TtNUS with a copy and an understanding of all NASCC explosive management requirements before the transportation of any explosives and will provide access to a NASCC bunker for the storage of explosives required for this project.

The explosives delivered to the site will be inspected to the level necessary to confirm the content and quantity of the delivery. Discrepancies will be reconciled at the time of receipt with the SUXOS, vendor, UXO Manager, and TOM. Documentation will address the discrepancy and the resolution.

3.2.3 Storage

NASCC will provide explosives storage facilities. NASCC will also provide for physical security of explosives storage facilities.

3.2.4 Transportation

Explosives will be issued by the SUXOS and transported from the storage facility to disposal locations at the project site in accordance with NASCC procedures and ATF licensing requirements (See Appendix D). The transportation vehicle will have a wooden bed liner and be equipped to secure the containers in the vehicle.

3.2.5 Receipt Procedures

Each item of explosives will be receipted from initial delivery to NASCC until the item is expended. TtNUS will provide a list of individuals authorized to receive, issue, transport, and use explosives by position, title, and those individuals shall assume accountability by signing the receipt documents. The end user of explosives shall certify in writing that the explosives were used for their intended purpose. Receipt documents shall be reconciled at time of delivery, issue, disposal, and during each week's inventory. Any discrepancies will be documented by the SUXOS and reported to the UXO Manager, TOM, NASCC POC and others as required by law. Contact personnel are listed in Appendix C.

3.2.6 Inventory

All explosives will be physically inventoried by the SUXOS and UXOSO/UXOQC. Any discrepancies will be documented by the SUXOS and reported to the UXO Manager, TOM, NASCC POC and others as required by law. Inventories of explosives in stock shall be conducted weekly, at a minimum.

The following procedures will be followed upon discovery of lost, stolen, or unauthorized use of explosives:

1. Immediately notify the UXO Manager, TOM, NASCC POC and Contracting Officer by telephone and follow up with a written report within 24 hours.
2. Report the incident to the ATF Stolen Explosives and Recoveries (SEAR) system at (800) 800-3855 within 24 hours of the event as well as the TCEQ Project Manager.

Any explosives not expended during the daily demolition operations will be returned to the storage facility and added to the receipt document.

All explosives remaining in storage at the end of the project will be issued and used during a final cleanup shot. There will be no excess explosive inventory to warehouse or ship. Documents will be completed showing final disposition of all explosives.

3.2.7 Forms and Documents

TtNUS will use corporate designed forms and documents to comply with the requirements of this plan. Forms are located in Appendix G of this document.

4.0 EXPLOSIVES SITING PLAN

The following Explosives Siting Plan has been prepared to direct TtNUS activities in the performance of this Task Order.

4.1 UNEXPLODED ORDNANCE SAFETY PROVISIONS

During all initial fieldwork and all intrusive activities, a UXO Technician II or higher will accompany the survey crew. The UXO Technician II shall conduct visual surveys for surface ordnance prior to the survey crew entering a suspected area, and a magnetometer survey of each intrusive activity site to ensure the site is anomaly-free prior to the surveying crew setting monuments or driving stakes. The UXO Technician II shall not be assigned additional survey tasks which would interfere with the MEC safety aspects of area clearance for driving stakes, iron pins, monument establishment or other survey control, which will penetrate the surface in a potentially MEC contaminated area. The UXO Technician II may not be required on a full time basis for non-intrusive activities.

4.2 ORDNANCE AND EXPLOSIVES AREAS

The minimum separation distance for nonessential personnel, (based on DDESB Technical Paper 16 and the known/suspected munitions) during MEC operations shall be 302 feet, as illustrated in Figure 4-1. The minimum separation distance shall be an arc of 302 feet from the outermost boundary of the area of operation, and will move as the operation moves. Due to the potential for inhabited buildings south of the MEC site, engineering controls will be utilized to reduce the exclusion zone to 200 feet. The engineering controls will consist of two feet of sand bags placed around the MEC item with plywood and two feet of sand bags on top during MEC treatment. Appendix H contains a copy of the MSD calculations.

At a minimum, the exclusion zone distance shall be maintained during all active MEC operations. If an item is identified, or encountered during the operations that has a greater maximum fragment distance (MFD), other than the 2.75 inch rocket anticipated, the separation zone will be adjusted to be the maximum fragmentation distance for that munition. The ESS for this project is based on the 2.75 inch rocket and will be amended if a munition with a greater fragmentation distance is encountered, (Navy 2006a). If such a munition with a greater fragmentation distance is encountered, all work will cease and the TOM and Navy POC will be notified. No further work will be conducted unless authorized by designated Navy explosive safety personnel.

4.3 PLANNED OR ESTABLISHED DEMOLITION AREAS

There is not a planned or established demolition area for this project.

4.4 BLOW-IN-PLACE

Since engineering controls will be used to reduce the exclusion zone, the minimum separation distance for all personnel shall be the greater of 200 feet or the maximum fragmentation distance for intentional detonations.

The maximum fragmentation distance arcs for 2.75 inch rockets are shown on Figure 4-1 for information purposes.

4.5 COLLECTION POINTS

Collection points, if used, shall have the same minimum separation distance as identified above. The UXO Technicians will maintain custody of MEC at the collection points until final treatment. Recovered MEC will be managed as Hazard Division (HD) 1.1.

See NAVSEA OP (Define)-5, to determine the arc created by the placement of MEC at a collection point. A 658-foot Hazard Fragmentation Distance arc is generated by the placement of 100 lbs hazard Class/ Division (C/D) 1.1 Net Explosives Weight (NEW) per NAVSEA OP-5, Table 7-9.

4.6 CONSOLIDATED SHOTS

The minimum separation distance for all personnel shall be the greater of 200 feet or the maximum fragmentation distance as identified above, unless engineering controls are applied.

4.7 EXPLOSIVES STORAGE MAGAZINES

TtNUS will use established magazines on NASCC as directed by the NASCC POC. All explosives will be stored in accordance with established NASCC procedures. Generally, recovered MEC is considered HD 1.1 unless there are obvious reasons it should not be. No explosives will be stored at NALF Cabaniss.

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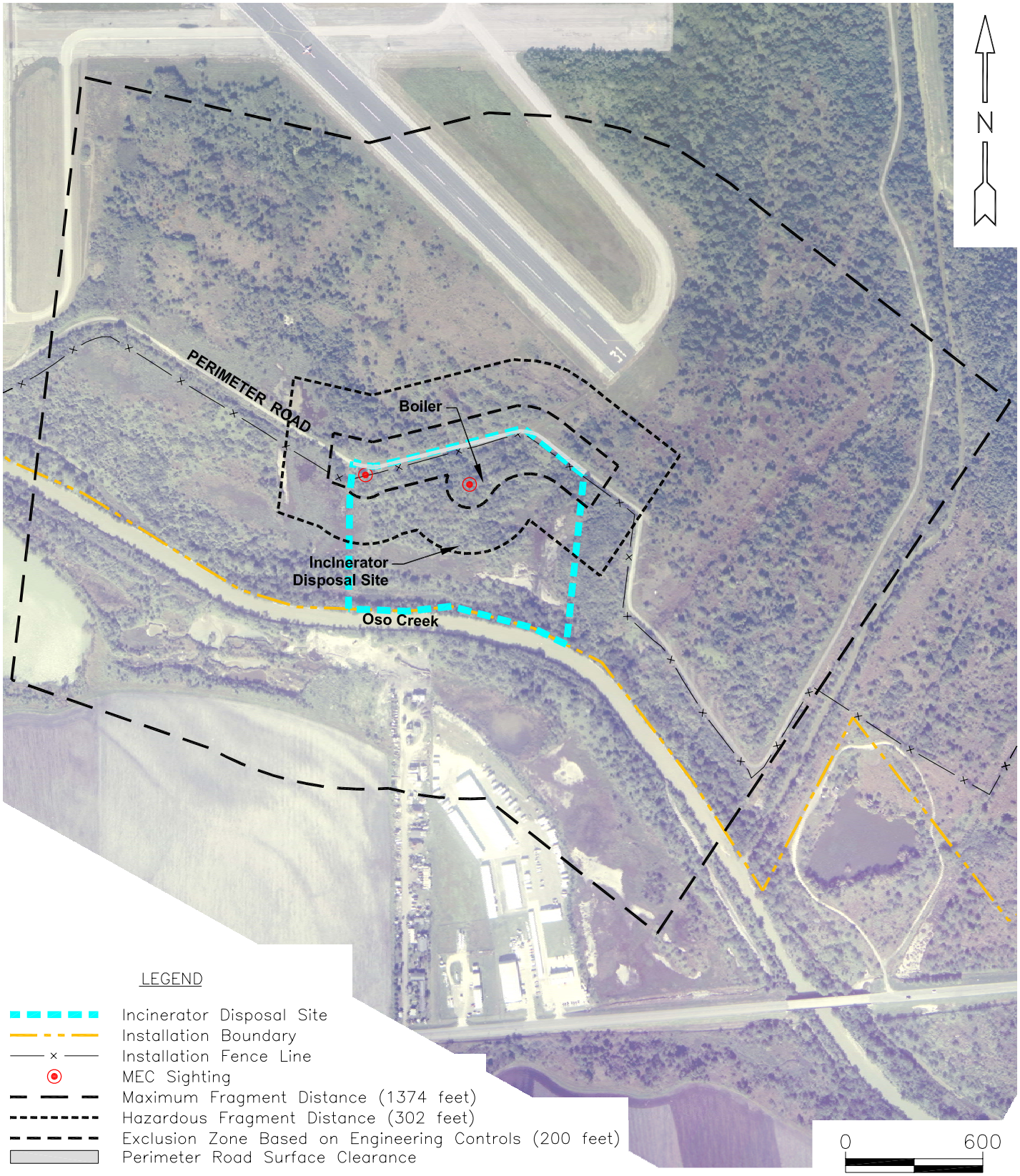

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF	DATE 7/05/06	NONESSENTIAL PERSONNEL MINIMUM SEPARATION DISTANCES INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB	DATE 7/05/06		OWNER NO. 0023
REVISED BY JF	DATE 2/19/07		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-1 / REV. 0

5.0 GEOPHYSICAL TECHNOLOGY DEMONSTRATION PLAN

5.1 OBJECTIVE

The project requires a site-specific GTD for the purpose of evaluating geophysical instruments and developing a standard response for the selected instruments, instrument configuration, and techniques. The purpose of the GTD is to demonstrate and document the site-specific capabilities of the proposed geophysical equipment, navigation equipment, data analysis, data management and associated equipment, and personnel to operate as an integrated system capable of meeting the project goals. The GTD will be performed in general accordance with the guidance provided in DID 005-O5A.01. All data collected (including QC data) will be submitted to NASCC following completion of the project. Mobilization to begin Geophysical Mapping will not occur until the TtNUS TOM, or his designee, accepts the results and recommendations stemming from the GTD. The specific Data Quality Objectives (DQOs) for the GTD will be:

- Demonstrate that the geophysical investigation systems/equipment is operating properly.
- Provide a safe area with a known set of isolated objects (e.g., single inert UXO items or UXO surrogates) and fragments/clutter. The sensor signatures from these items will be used to determine the equipment limitations in the site geologic setting and optimize equipment, procedures, and data analysis.
- Assess the operators' performance and update related procedures to assist in the development of operator measurement techniques.
- Establish a baseline of performance capabilities for the selected instrument.
- Evaluate average speed, minimum along track sampling, and line separation distance required to detect all target items.
- Evaluate all data processing, including latency and other corrections, map production, and target selection to produce final datasets.
- Evaluate target reacquisition methods.
- Evaluate detection depth capabilities.

5.2 PERSONNEL QUALIFICATIONS

The GTD and geophysical investigation will be managed and performed by a qualified geophysicist meeting the qualification requirements as stated in DID OE-025.01. A UXO Technician II or higher will be present throughout the GTD and geophysical investigation.

5.3 TEST PLOT DESIGN

TtNUS will construct one Test Plot to be located in an area where man-made interferences are minimal (open area). TtNUS will work with NASCC personnel to locate a Test Plot area adjacent to the site (see Figure 5-1 for proposed location). The plot location will be identified by TtNUS and approved by NASCC during the GTD mobilization. TtNUS will establish a site Test Plot that encompasses an approximate 25 foot by 25 foot area, or equivalent area laid out in a manner to simulate transects if the project team determines that the geophysical survey will be conducted using the transect approach. The transects will be approximately 10 feet wide by 25 feet long, or as determined based on the UXO Team's results. The SUXOS will direct the establishment of the Test Plot and establish a numbering and coordinate system that will be used to record all findings during the GTD operation. The corner stakes of the Test Plot will be established by GPS or a licensed Professional Land Surveyor (PLS). The Test Plot will be seeded by TtNUS prior to the initiation of the GTD. This activity will be conducted following the area setup and performance and evaluation of a background (pre-seed) geophysical survey. Approximately 21 inert or surrogate items (four each 20 mm ammunition, 30 mm ammunition, 40 mm ammunition, and two each 5lb practice bomb, Pyrotechnic/flare, 2.75 inch rocket), and three (3) non-UXO clutter items will be seeded in the Test Plot at varying depths and orientations (e.g., four inert or surrogate items and two clutter items in the 0 to 6 inch range with inert items or surrogates placed in the north-south and east-west orientation, and in the vertical orientation; with a similar approach for the 6 inch to 12 inch range). Each seeded item will be located by a PLS or GPS unit to determine the position within the Test Plot. At a minimum, GPS or a PLS will be used to locate the corner stakes of the Test Plot and the northern points of each transect line. Survey accuracy of the Test Plot corners and all seed items buried in the Test Plot should be 3 cm horizontally and 5 centimeter (cm) vertically. In addition, the distance from the ground surface to the seed item will be measured after burial, to accurately determine depth below ground surface. The geophysical survey team will use the same coordinate and grid system during their survey and data processing. The anomalies identified during data processing will be located using GPS procedures. The maximum required detection depth for all seeded targets at the site is 1 foot below ground surface. Four inert item or surrogate locations (one 20 mm, one 30 mm, one 40 mm, and one pyrotechnic/flare) will be identified to the geophysical survey team at the start of the survey for the purposes of defining target signatures. Based on a review of available information for the site, TtNUS will seed inert items or surrogates of similar shape, size, and mass for ammunition suspected on site.

5.4 SITE PREPARATION

Vegetation removal and site preparation is anticipated. The Test Plot area will be located in an easily accessible area adjacent to the former Incinerator Disposal Site. The TtNUS will request a utility clearance and Dig Permit from NASCC prior to conducting GTD activities. The UXO survey team and FOL will conduct a survey of the proposed Test Plot Grid area and will select a location free of utilities and anomalies (if available). The UXO Team will conduct a UXO surface sweep of the Test Plot area.

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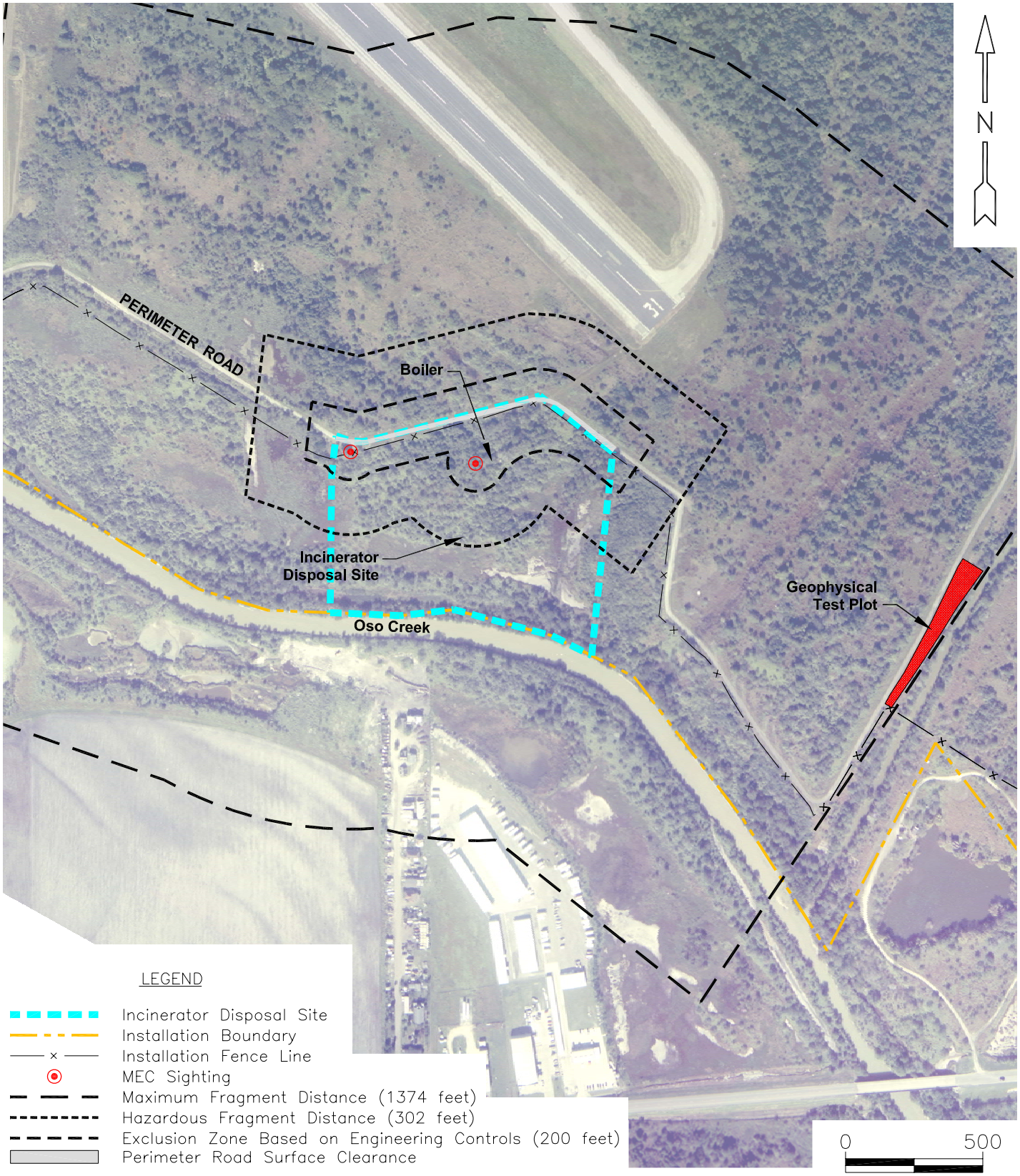

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF DATE 2/23/07	NAVFAC	PROPOSED GEOPHYSICAL TEST PLOT LOCATION INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB DATE 2/23/07			OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 5-1 REV. 0

Metal detectors will be used to aide in locating and removing surface metal and debris. Subsurface utilities (if encountered) will be located and marked on the ground surface. If a utility is at a location of a planned seed item a new location will be selected.

5.5 QUALITY CONTROL

All documentation will be available to NASCC personnel. Operational and test procedures shall conform to the manufacturer's standard instructions. QC of the instrument's data will be achieved daily by field testing, checking the sensor and navigation system against a known target to ensure that they are operating properly. All geophysical instruments and equipment used to gather and generate field data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of the results are consistent with the manufacturer's specifications. Calibration, repair, or replacement records will be filed and maintained by the site Geophysicist and may be subject to Audit by the quality assurance (QA) manager. Audits will be conducted at the discretion of the TOM. Data processing QC is required to assure data quality. The field geophysicist (under the supervision of the project geophysicist) or project geophysicist will manage, process, and interpret geophysical data from surveys. Standard data processing procedures, including (target picking and analytic signal when applied), and standard corrections (for data positioning and filtering when applied), will be followed correctly and tracked for QA. Fail criteria will be any data processed without following standard procedures or without generating QC tracking. QC tracking will be accomplished through daily QC reports, equipment check documentation, field editing checklists, and data processing logbooks, Geosoft Oasis Montaj Workflow and QC records, checklists. QC review performed by the Senior Project Geophysicist, and documentation will be recorded on the data processing QC forms. See Appendix G of the Work Plan for appropriate forms. Potential data problems include source data errors, data entry errors, data editing errors, and user errors. All data will be reviewed to identify and correct any of these errors should they occur.

5.6 EQUIPMENT STANDARDIZATION

Various tests and checks of geophysical sensors and support equipment, navigation equipment, and operator performance will be conducted at specific intervals. The field geophysicist will ensure that all geophysical and associated navigational equipment checks are performed at the required frequency and meet acceptance criteria. QC tests will be documented in the QC Logbook and on the daily equipment check form. These tests are detailed below and presented in Table 5-1.

5.6.1 <u>Out-of-Box Tests</u>

The following out-of-box tests will be conducted when the geophysical equipment is delivered to the site:

- Inventory and inspect all components.
- Assemble the equipment and power up.

5.6.2 First Day Tests

The following tests will be conducted at the beginning of the first day (note that Static Background and Static Standard Response tests are also conducted at the end of the first day) of the survey:

Equipment/Electronics warm-up. The purpose of this test is to minimize sensor drift due to thermal stabilization. Most instruments need a few minutes to warm up before data collection begins. All manufacturer instructions will be followed or, if none are given, data reading will be observed until they stabilize. **Acceptance Criteria**: Equipment Specific (typically 5 minutes). This test will be conducted each time the unit is started.

- Record Relative Sensor Positions. The purpose is to document relative navigation and sensor offsets, detector separation, and detector heights above the ground surface. This will ensure that the detector offset corrections and gradient calculations can be done correctly and that the surveys are repeatable. **Acceptance Criteria**: +/- 1 inch. This test will be conducted at the beginning of each day.

- Null the instrument [Electromagnetic (EM)] equipment only] prior to performing the remaining tests. This action will be performed at the beginning of each day.

- Personnel Test. The purpose of this test is to ensure survey personnel have removed all potential interference sources from their bodies. Common interference sources are ballpoint pens, steel-toe boots, or large metallic belt buckles, which can produce data anomalies similar to OE targets. All personnel who will be coming within close proximity of the sensor during survey operations must approach the sensor and have a second person monitor and record the results. **Acceptance Criteria**: EM 61 +/- 2 millivolts (mV); magnetometer +/- 3 nanoteslas (nT). This test will be conducted at the beginning of each day.

- Cable Shake Test (Vibration Test). This is to identify and replace shorting cables and broken pin-outs on connectors. With the instrument held in a static position and collecting data, shake all cables to test for shorts and broken pin-outs. If shorts are found the cable should be immediately replaced or repaired. After repair, cables need to be rigorously tested before use. **Acceptance Criteria**: data profile does not exhibit data spike responses. This test will be conducted at the beginning of each day.

TABLE 5-1

GEOPHYSICAL SURVEY APPROPRIATE TESTS, REQUIRED FREQUENCIES, AND ACCEPTANCE CRITERIA
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS

Test Description	Acceptance Criteria	Frequency/Time of Test				
		Power on	Beginning of Day	Beginning & End of Day	1st Day of Project	1 Line per Grid or 100 ft. per Linear Mi.
Out of the Box Tests						
Inventory/Inspect Components	All components present and in good condition	X				
Assemble and Power Up	Equipment assembles correctly and powers up	X				
First Day Tests and Beginning of Each Day Tests						
Equipment Warm-up	Equipment specific (typically 5 min)	X	X		X	
Record Sensor Positions	+/- 1 inch (2.54 cm)		X		X	
Null Instrument (EM Only)	Instrument nulls properly		X		X	
Personnel Test	EM61 2mV p-p (channel 3 on MkII), Mag 3nT p-p		X		X	
Cable Shake Test (Vibration Test)	Data profile does not exhibit data spikes		X		X	
Static Background & Static Spike	Background: EM61 2.5 mV p-p, Mag 1nT p-p;		X	X	X	
	Spike : +/- 20% of standard item response, after background correction.		X	X	X	
Azimuth Test *	Sensor orientation that minimizes drop-outs				X	
Height Optimization *	Maximum S/N ratio that reliably detects smallest target objective.				X	
6 Line Test	Repeatability of response amplitude +/-20%, Positional Accuracy +/-20cm				X	
Octant Test (Heading Error Test) *	Document heading error for post-processing correction for each platform and each operator				X	
Pull-Away Test	Document effects of navigational equipment on geophysical readings, effects should be very small				X	
Per Grid Tests						
Repeat Data	Repeatability of response amplitude +/-20%, Positional Accuracy +/-20cm					X

* Magnetometer Only

- Static Background and Static Standard Response (or Static Spike) Test. The purpose of this test is to quantify instrument background readings, electronic drift, locate potential interference spikes in the time domain, and determine impulse response and repeatability of the instrument to a standard test item (2" diameter steel ball). Improper instrument function, the presence of local sources of ambient noise (such as EM transmissions from high-voltage electric lines), and instability in the earth's magnetic field are all potential causes of inconsistent, non-repeatable readings. A minimum of three minutes static background collection after instrument warm-up, followed by a one minute standard test followed by a one minute static background data will be performed. The Site Geophysicist must review the readings to confirm their stability prior to continuing with the geophysical survey. **Acceptance Criteria**: Static Background test EM 61 +/- 2.5 mV, magnetometer +/- 1 nT; Static Response Test EM 61 and magnetometer +/- 20% of standard item response after background correction (see Section 5.9 for further details regarding the EM 61). **This test will be conducted at the beginning and end of each day.**

- Azimuth Test (magnetometer only). The purpose of this test is to optimize the sensor orientation to avoid optically pumped magnetometer sensor "dead zones". This test is performed to document the differences in readings based on sensor orientation with respect to the earth's local magnetic field. Identify an area free of sources of geophysical noise. The sensor must be rotated 360 degrees around a fixed point. Placing the head of the sensor into the top of a vertical section of PVC pipe driven into the ground will help stabilize it. Mark the four cardinal directions on the ground using paint or pin flags. Record fiducial marks at the moment the operator is facing in the cardinal directions will aid in determining the heading error for particular survey line directions. **Acceptance Criteria**: sensor orientation that minimizes the observed deviation in amplitude and occurrence of drop-outs. This test will be conducted at the beginning of the first day of the project.

- Height Optimization Test (magnetometer only). A line is established with at least one object along its length. Data are collected with the instrument using a minimum of three different sensor heights. **Acceptance Criteria**: maximum signal to noise ratio that reliably detects smallest target objective. This test will be conducted at the beginning of the first day of the project.

- Six-Line Test. This test is conducted in an area that has little background noise and no sources of anomalous responses. The test line will be well marked to facilitate data collection over exactly the same line each time the test is performed. Background response over the test line is established in Lines 1 and 2. A standard test item, such as a steel trailer hitch ball, will be used for Lines 3 through 6. Heading effects, repeatability of response amplitude, positional accuracy,

and latency are evaluated in Lines 3 through 6. **Acceptance Criteria**: repeatability of response amplitude +/- 20 %, positional accuracy +/- 2 feet. The typical position accuracy requirement has been modified based on the scope of the work being performed. The specified accuracy is sufficient to meet the project objectives. This test will be conducted at the beginning of the first day of the project.

- Octant Test (magnetometer only). The purpose of this test is to determine heading effects. A magnetometer's response to ferromagnetic objects varies slightly according to the orientation of the sensor in relation to the console electronics and the operator. This test will be performed for all equipment and operator combinations. A total of eight lines of magnetic data are collected, passing over the same central point. The difference in the response over the central point documents heading effects. **Acceptance Criteria**: document heading error for post-processing correction. This test will be conducted for each operator at the beginning of the first day of the project.

- Pull-Away Test. This test demonstrates the effects of the navigational equipment. All equipment will be powered up and operating as it will be during survey activities. **Acceptance Criteria**: document the effects of the navigational equipment on the geophysical readings. Effects should be very small.

5.6.3 Beginning of Each Day Tests

The following tests (details provided above) will be conducted at the beginning of each day (note that Static Background and Static Standard Response tests are also conducted at the end of each day) of the survey:

- Equipment/Electronics warm-up.
- Record Relative Sensor Positions.
- Null the instrument (EM equipment only) prior to performing the remaining out-of-box tests.
- Personnel Test.
- Cable Shake Test.
- Static Background and Static Standard Response (Static Spike) Test.

5.6.4 Per Grid Test

The following test will be conducted on a per grid or per linear mile basis during the entire survey:

- Repeat Data. The purpose is to determine positional and geophysical data repeatability. After data collection on the Test Plot, 1 line per grid (at least one per day) or 100 feet per linear mile will be repeated. The repeat data will be reviewed and evaluated immediately following data download from the survey. Acceptance Criteria: Repeatability of Response Amplitude +/- 20%, and for Positional Accuracy +/- 20 cm.

5.7 ANOMALY AVOIDANCE

TtNUS plans to seed targets in one (1) Test Plot. TtNUS will have a UXO Tech II or higher onsite during the intrusive seeding to perform anomaly avoidance. The UXO Tech will utilize a Schonstedt®, such as the GA-52 CX or similar magnetometer, to assist in MEC avoidance.

5.8 SEEDING

The Test Plot will be seeded with known targets of similar size to suspected site MEC (20 millimeter to 2.75 inch). TtNUS will dig the holes for items to be seeded. See Section 5.3 for details of Test Plot design.

5.9 DATA COLLECTION VARIABLES

TtNUS will test the Geonics® Mark 2 EM 61 (EM 61 MK2) which is a time domain electromagnetic (TDEM) system. The EM 61 MK2 generates 150 EM pulses per second and measures during the off time between pulses. After each pulse, secondary EM fields are induced briefly in moderately conductive soils and for a longer time in metallic objects. Between each pulse, the EM 61 MK2 waits until the response from the conductive earth dissipates and then measures the prolonged buried metal response. This response is recorded in millivolts (mV). By sensing only the buried metal response, the EM61 MK2 detects metallic targets that might otherwise be missed. The EM61 MK2 is able to detect all types of metallic objects (not just ferrous material). This capability is important for detection of potential targets at the site that are likely to contain more aluminum than iron or steel (e.g., pyrotechnics). The EM 61 MK2 measures multiple time gates (216, 366, 660, and 1266 µsec) to provide a more complete measurement of the response decay rate. The EM 61 MK2 can record up to 12 records per second, four (4) time gates per record, or three (3) time gates of better channel data coupled with one reading for top channel per second. The sampling rate for the EM 61 MK2 for the GTD will be 8 times per second for the man portable sensor.

TtNUS will utilize a Trimble® 5800 RTK GPS (or similar) unit during data collection for precise navigation. The GPS unit will be used to integrate location data with the Geonics® EM 61 MK2 during the GTD

activities. The Geonics® data logger will be utilized to obtain real-time integration between the EM 61 MK2 and the GPS data streams. Data will be collected along traverses 2.5 feet apart for the GTD.

5.10 DATA ANALYSIS AND INTERPRETATION

The GTD activities will generate geophysical contour maps depicting the area surveyed and any anomalies detected. The geophysical contour map will be transmitted electronically and compatible with ArcView® version 8 or the specific GIS platform in use. The contour map will be oriented to the coordinate system designated by TtNUS. The results of the GTD survey will be used to develop a target list identifying the locations of seeded anomalies as possible UXO items. TtNUS will perform data file QC review and correction as necessary.

5.11 REACQUISITION

Targets on the Test Plot will be reacquired using the Trimble® 5800 GPS. The distance from the reacquired targets and known location of each anomaly in the test plot will be measured and recorded to evaluate the effectiveness of the reacquisition process.

5.12 RECORDS MANAGEMENT

Field data sheets shall be maintained for all GTD activities. Project documentation will be collected and managed on-site during the life of all field activities for inspection by NASCC personnel. Geophysical data will be recorded digitally and downloaded periodically to a field computer for review in the field. In addition to the copy of data placed on the field computers hard drive, a copy of the data will be placed on a CD for backup before the data are erased from the equipment. The Project Geophysicist will review the downloaded data to verify that the download system is functioning properly. This review will also serve to check the field data for QC review purposes. The review will verify that the data is valid and useable for the intended purpose.

5.13 GTD REPORT

After the GTD field work has been completed, TtNUS will prepare a GTD report including the following:

- As-built drawing of the GTD plot.
- Seed item location map including control points.
- All raw and processed geophysical data.
- Summary of the GTD results including geophysical equipment used, techniques, and methodologies.

6.0 GEOPHYSICAL INVESTIGATION PLAN

6.1 GENERAL

This Geophysical Investigation Plan describes in detail the approach, methods, and operational procedures TtNUS will use to collect geophysical data to identify anomalies potentially related to MEC. Specifically, this work plan documents the site-specific application of the geophysical sensors, navigation equipment, data analysis, data management, and associated equipment and personnel in a manner capable of meeting data quality objectives and project performance goals. DQOs for the geophysical investigation will be:

- Detect and provide location data for as close to 100% of subsurface geophysical anomalies as possible to a depth of 1-foot that are potentially associated with MEC.

- Provide maps and dig sheets to the Project Management Team within 24 hours. of data collection.

This will enable the team to analyze the data and make decisions using the TRIAD approach for further investigation in the area.

The former Incinerator Disposal Site consists of approximately 17 acres. The exact dimensions of the Incinerator Disposal Site are unknown, and it is thought to be located within the boundaries of a former sanitary landfill.

Vehicle access to NALF Cabaniss is controlled through padlocked access gates.

The Time Critical Removal Action area to be surface cleared of MEC consists of the following:

- Perimeter Road, along the north side of the former Incinerator Disposal Site, from the center-line of the road south to the tree line.
- The known MEC items in the former boiler, and on the surface around the former boiler.
- The known MEC items 450 feet west of the boiler near Perimeter Road.

While no organized vegetation removal is planned, some hand removal of vegetation by the UXO technicians may be required for the completion of the geophysical investigation. The lithology of the soils at the former Incinerator Disposal Site is described in Section 1.5.4. The hydrology and hydrogeology of the site are described in Sections 1.5.5 and 1.5.6, respectively.

Based on available information, anticipated MEC items expected to be encountered include 20 mm, 30 mm, and 40 mm projectiles, 5-pound practice bombs, 2.75 inch rockets, and flares/pyrotechnics. Remnants of these items have been observed on the ground surface at the site.

The geophysical survey activities will be conducted to 1-foot below ground surface at the site. TtNUS will establish the center of the site area to be investigated. The Project Management Team will direct the establishment of the site and establish a site numbering and coordinate system that will be used to record all findings during the Geophysical Investigation. The center of each area mapped will be staked and located by GPS, and/or survey techniques.

Man made features that may affect the geophysical investigation include the wire fence on the north of the site, metal scrap objects, and steel reinforced concrete scrap left on site. Adverse geophysical conditions (if any) will be determined during the GTD activities. In areas where digital geophysical data is unobtainable (near large pieces of buried scrap, fences) the Team Leader will make notes in the field log book and obtain the position of the obstruction.

The UXO Team will conduct a surface sweep of the area where the geophysical investigation is to be conducted. Metal detectors will be used to aid in locating surface metal and debris. If a suspected a MEC item is encountered, its location will be recorded using the established site grid system, and the UXO Team will determine its condition (if possible) prior to proceeding with the sweep. All suspect MEC items will be left in place. No MEC items will be moved or disturbed during this phase of the project. Surface munitions debris may be removed from the area of concern, provided it is inspected by two UXO Technicians, determined to be free of explosives, and its location and identification information is added to the team log book. This will improve the data collected of subsurface anomalies during the geophysical mapping. Other metal scrap will be removed from the area of concern and consolidated to aide in the follow-on geophysical effort.

During fieldwork and geophysical mapping activities, the geophysical crew shall be accompanied by a UXO Technician II or higher. Prior to the geophysical crew entering an area potentially containing MEC, the UXO Technician shall conduct a visual survey for surface ordnance and a magnetometer or electromagnetic survey of each site to ensure the surface is anomaly-free and/or each surface MEC anomaly has been marked. Prior to the crew setting monuments or driving stakes, the UXO Technician will conduct a visual survey for surface ordnance and a magnetometer or electronic survey of the site to ensure it is free of anomalies. The UXO Technician may no longer be required on a full time basis for non-intrusive activities after the site has been cleared.

There are no known site-specific dynamic events that may interfere with the geophysical surveys. Aside from the potential to encounter UXO, there are no known unique potential worker hazards associated with the geophysical activities.

6.2 GEOPHYSICAL INVESTIGATION

TtNUS plans to use one geophysical method for detection of UXO at the site. A single Geonics® EM 61 MK2 with GPS will be utilized. An analog handheld detector (Schonstedt®) will be utilized to complete the detector-aided surface sweep of the area of concern.

A Trimble® 5800 RTK GPS unit will be used during data collection for precise navigation. Depending on the amount of interference from the tree canopy, use of other navigation systems (e.g., total station or fiducial marks) may be necessary to meet project objectives. The GPS accuracy will be checked by verifying position dilution of precision or horizontal dilution of precision and two known GPS points daily, before data collection. If the GPS is reading more than 2 feet different than the known point, data will not be collected until more satellites are available and the accuracy is within 2 feet. This requirement has been modified so that the objectives of the SI can be accomplished, but allows more flexibility in survey execution. If interference from the tree canopy is unacceptable, a survey using fiducial markers may be implemented. Depending on the accuracy of the GPS for locating fiducial stakes, a total station may be used to determine the position location data for the fiducial stakes. If the project team agrees that it is acceptable, a compass (or GPS) and a tape measure may be used to establish fiducial markers along the traverses.

All equipment tests, acceptance criteria, and test frequencies are the same as those for the GTD and are described in Section 5.6.

Geophysical EM 61 MK2 data will be collected after the area designated for investigation has been defined by the project team. Daily QC tests of all equipment will be performed (see Section 5.6 for details concerning QC procedures). Geophysical data will be downloaded to TtNUS' office after completion of initial data processing. The geophysical team will prepare a detailed map and anomaly investigation report (dig sheet, DID OE-005-05.01) depicting the northing and easting location of all anomalies that meet the identification criteria of potential ordnance items for the site. Each anomaly will be assigned a unique reference number for field reacquisition. Any change in personnel or equipment will result in re-testing the GTD with the new configuration. A qualified geophysicist will manage all geophysical activities. Specific field activities, such as laying out traverse lines, data collection, and reacquisition, shall be supervised by a person well trained in geophysical operations. UXO-qualified personnel who meet all qualification requirements will perform all UXO Avoidance activities.

It is anticipated that approximately 1 acre of geophysical data will be collected and processed daily. All geophysical data will be processed after the day of collection or as soon as possible.

6.3 INSTRUMENT STANDARDIZATION

Data recorded in the geophysical instruments will be downloaded to processing computers and copied to storage media for backup purposes. Once copied to the processing computer, the data will be imported into geophysical data processing and mapping software (Geosoft Oasis Montaj™). This software will be used to process, analyze, and present the findings of the geophysical survey. The processing and analysis will consist of applying standard corrections to the data and producing contour maps for the purpose of interpreting the data. The data analysis performed by the Project Geophysicist will focus on identifying anomaly responses that could be associated with individual anomalies that represent MEC. All downloaded data will be checked by the Geophysicist for accuracy, completeness, and the various parameters defined in the Field Editing Checklist located in Appendix G.

6.4 TARGET LIST DEVELOPMENT

Target lists will be developed in accordance with DID OE-005-05.01.

6.5 ANOMALY REACQUISITION

When necessary to meet project objectives, TtNUS will perform anomaly reacquisition and verification with the same positioning and grid system that were used during data collection. The Trimble® 5800 may be used once the anomaly investigation sheet (target list) has been developed/reviewed by the Project Geophysicist. All measurements after reacquisition will be recorded on the target list sheet. The GPS will be tested daily before use (Section 5.6) and GPS information will be compared to the known location data and the results recorded in the geophysical log book. See Section 6.2 for daily checks.

6.6 QUALITY CONTROL

Quality control measures will be implemented to ensure the geophysical investigation objectives are met. The required equipment tests and frequency of testing have been detailed in the GTD plan (see Section 5.6).

6.7 RECORDS MANAGEMENT

All raw data files, final processed data files, hard copies, and field notes will be maintained for the duration of the project. TtNUS will transmit data to NAVFAC SE and NASCC personnel following

completion of the project. All raw files will be available on-site for quality control checks to assure field and data processing procedures during site activities.

6.8 REPORTING

As soon as practical after data collection, the geophysical field data shall be provided in delineated fields as x,y,z,v(1), etc., for delivery to the Project Management Team. All final processed data, geophysical maps, dig-sheets, and supporting geophysical interpretations shall be provided to NAVFAC SE and NASCC personnel at the completion of the project.

7.0 GEOSPATIAL INFORMATION AND ELECTRONIC SUBMITTALS

7.1 GENERAL

The recorded information will be incorporated into an Environmental GIS (EGIS) established for NASCC and a geo-referenced map showing all coordinates and MEC findings will be included in the Summary Report. In addition, the area of concern surface cleared/investigated under this MEC WP will be entered into the Land Use Control Module contained within the EGIS and the area designated as a controlled area of special concern. The Land Use Control Module will contain references to the appropriate reports and NASCC POCs for information regarding the area. The information will also be provided to NASCC to allow for incorporation into the Facility Master Plan.

7.2 MEC DOCUMENTATION

TtNUS will establish a location surveying and mapping system to record the finding of MEC in the area of concern. The SUXOS will direct the establishment of this system for numbering each MEC item and collecting the coordinates for each item. The location of each area for geophysical investigation will be established using the GPS, Survey Instrument, or tape measures to determine the XYZ coordinates of the area. Each piece of MEC will be located using the GPS, Survey instruments, or tape measures to determine XYZ coordinates for the item. The geophysical survey team will use the same coordinate and numbering system during their survey and data processing. The anomalies identified during data processing will be located using GPS, Survey Instrument, or tape measures procedures, if required.

Field log books will be used during each phase of the operation to record significant findings and information using the established numbering and coordinate system. The Summary Report will present a geo-referenced map of the area investigated, provide the Northing and Easting coordinates of the area in a coordinate system consistent with the system used by NASCC to record and manage areas of concern, and will detail the location of each MEC item found/removed. A Trimble® GPS Pathfinder Pro XRS or similar system will be used by TtNUS to determine the horizontal (XY) location of the MEC items found/removed. Accuracy of locations will be to approximately one-half meter in the horizontal axis and one and one-half meters in the vertical axis. Coordinate data recorded in the field will be converted, as necessary, to the Texas State Plane Coordinate System North American Datum 1983 (NAD 83) to be consistent with existing NASCC mapping. The Summary Report will also provide observations made by the UXO Team and recommendations for future maintenance activities, if appropriate.

8.0 WORK, DATA, AND COST MANAGEMENT PLAN

The technical reports and submittals under task orders may include Project WPs, Corrective Action Reports, HASPs, QC Plans, permit applications, Regulatory Compliance Reports, and Remedial Action Reports. TtNUS will use Microsoft Office™ software, specifically Word™ and Excel™ to prepare these documents, and PowerPoint™ to prepare formal and informal presentations.

9.0 PROPERTY MANAGEMENT PLAN

No Government Property will be purchased or acquired in the performance of this Task Order. Subcontractors will not be authorized to acquire or control government property. TtNUS will use Government furnished bunker at the NASCC Weapons Complex to store explosives and a Ready Storage Locker at NALF Cabaniss to store equipment and associated materials.

10.0 CONTRACTOR QUALITY CONTROL PLAN

This Contractor Quality Control Plan (CQCP) was developed to identify and implement quality requirements to ensure that overall project activities are accomplished using an acceptable level of internal controls and review procedures. The intent of such controls is to eliminate conflicts, errors, and omissions and ensure the technical accuracy of all deliverables. Field work under this task order shall include the following:

- Mobilization of equipment and personnel to the project site.
- Time Critical Removal Action/Limited Surface Clearance of area of concern.
- UXO Escort/Avoidance to identify potential MEC and warn non-UXO personnel of hazards.
- UXO Site Inspection operations for the identification of MEC and munitions debris type and/or condition of the ordnance and reporting to Navy POC.
- Disposal of MEC discovered during the limited surface sweep operations.
- MPPEH Certification operations.
- Demobilization of equipment and personnel.

The requirements presented in this CQCP are intended as overall QA and QC requirements that are applicable to all administrative, engineering, and technical activities associated with the Task Order. The requirements of this plan are applicable to all TtNUS personnel and their subcontractors unless an alternate QC Plan, which is consistent with or exceeds the requirements of this document either in whole or in part, is used.

10.1 PROJECT ORGANIZATION AND RESPONSIBILITIES

Under the direction of the Navy, TtNUS will provide a staff of experienced administrative and technical professionals to serve as key personnel responsible for implementing QC requirements associated with this project. These personnel will be selected for their management and technical abilities, and will include the following core employees:

- Project Manager / Task Order Manager (TOM)
- UXO Manager
- SUXOS
- Field Operations Leader
- UXOSO/UXOQC
- UXO Team Leader
- UXO Technicians

10.2 QUALITY REQUIREMENTS

The quality requirements associated with field activities in support of this task order are defined in Table 10-1. These requirements apply to all field activities that affect the quality of work and work products. Quality Control checks will be conducted as follows:

- Daily Briefings - The SUXOS/UXO Team Leader will ensure that daily safety and operational briefings are conducted routinely.

- Communications - Communications with the Navy POC and site personnel will be maintained throughout the workday.

  - At a minimum communication checks will be conducted each morning prior to starting work. Additional checks will be performed as necessary throughout the workday to monitor progress, safety, and/or QC.
  - Teams will not start operations until satisfactory checks have been achieved.

- Training - The SUXOS/UXOSO will ensure that initial site-specific training is performed for all field personnel prior to startup of field activities, and that all safety control measures have been established. Training will be accomplished using only approved training materials. The UXOSO will ensure that all certifications are filed on-site and are available for Navy inspection.

- Documentation - The SUXOS/UXOQC will ensure the completion of all documentation listed in Section 10.3.

- Review - The SUXOS and FOL will be responsible for supervising all site activities including the following:

  - Supervision of TtNUS personnel and subcontractor staff.
  - Compliance with project WPs, CQCP, and HASP.
  - Adhering to the contract schedule.
  - Review and submission of all daily and job status reports and documentation.
  - Direct daily communication with the TOM.

10.3 FIELD DOCUMENTATION

All field activities affecting QC will be performed in accordance with documented procedures, instructions, or drawings identified in the SOW, Work Plan, or applicable DIDs. During all field activities, TtNUS will use a Field Log Book and the following reporting forms (see Appendix G):

- Quality Control Daily Report
- Daily Activities Checklist
- Daily Equipment Checklist

The SUXOS will maintain a field logbook of all inspection and testing activities. This daily logbook will be used in preparing the QC Daily Report. The QC Reports will be submitted with the Summary Report. Reports will not be prepared for days on which no work is performed. At a minimum, one report will be submitted for every seven days of no work and on the last day of a period of work stoppage. Daily Reports will be signed and dated by the SUXOS and Field Operations Leader. Summary Reports will be signed by the TOM.

The QC Daily Reports and the Summary Report shall include summaries of the following:

- TtNUS personnel/Subcontractors and responsibilities.
- Equipment used, with any idle or downtime noted.
- Location, personnel, and description of work for each day.
- Safety evaluations including a description of inspections, results, and any corrective actions.
- QC inspections performed.
- Results of QC inspections with corrective actions.
- Results of final QC inspections of completed work sites with running total of completed work to date.

TABLE 10-1

**QUALITY REQUIREMENTS FOR UXO SUPPORT
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS
Page 1 of 3**

Objective	Activity	Activity Quality Requirement	Quality Control Verification
Prepare Site	Mobilization and Site Preparation	Mobilize equipment and personnel, and prepare site as described in the Work Plan.	▪ Daily Site Health and Safety Meeting Report ▪ Field Logbooks
Site-work	Time Critical Removal Action Limited Surface Clearance	UXO Technicians, supervised by a SUXOS, will remove MEC on the surface along Perimeter Road, in/near the former boiler, and at location 450 ft. west of former boiler to improve safety in the area. QC checks will be performed to ensure UXO Team removes all surface MEC. Fail criteria will be any MEC discovered in cleared areas.	▪ QC Daily Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Field Logbooks ▪ QC 10% of area cleared during limited surface clearance.
Site-Work	UXO Escort/Avoidance Operations	UXO Technician will conduct avoidance while conducting UXO Escort Duties. QC checks will be performed to ensure no anomalies are moved or disturbed during this phase of the project. Fail criteria will be any anomaly moved or disturbed.	▪ QC Daily Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Field Logbooks ▪ QC/observe UXO Escort duties
Site-Work	UXO Site Inspection Operation	UXO Technicians, supervised by a UXO Team Leader, will complete a transect based surface sweep to collect data on the type and location of MEC at the remainder of the site. QC checks will be performed to ensure MEC have been located, identified, and data collected and reported. No MEC will be moved or disturbed during this phase of the project. Fail criteria will be any MEC moved or disturbed, or MEC discovered in transect that was not reported in the data logs.	▪ QC Daily Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Field Logbooks ▪ QC 10% of transects for MEC

TABLE 10-1

**QUALITY REQUIREMENTS FOR UXO SUPPORT
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS
Page 2 of 3**

Objective	Activity	Activity Quality Requirement	Quality Control Verification
Site-Work	MEC Disposal	UXO Technicians supervised by a SUXOS will conduct MEC disposal/treatment operations. QC checks will be performed to ensure MEC disposal is conducted in a safe and effective manner. Fail criteria will be any unsafe or ineffective MEC disposal operation.	▪ QC Daily Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Field Logbooks ▪ QC/observe MEC disposal operation ▪ QC check on transportation vehicle inspection ▪ QC observation of established formal explosive transportation route ▪ QC check on qualifications of explosive vehicle driver
Site-Work	MPPEH Certification	UXO Technicians supervised by the SUXOS will conduct MPPEH certification. QC checks will be performed to ensure no energetic material remains in the Certified MPPEH. Fail criteria will be any energetic material discovered in the certified MPPEH.	▪ QC Daily Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Field Logbooks ▪ QC/inspect MPPEH during certification process
Site-Work	Demobilization	Demobilize equipment and personnel according to schedule.	▪ Daily Site Health and Safety Meeting Report ▪ Health and Safety Compliance Inspection ▪ Field Log Books

QUALITY REQUIREMENTS FOR UXO SUPPORT
INCINERATOR DISPOSAL SITE, NALF CABANISS, TEXAS
Page 3 of 3

Objective	Activity	Activity Quality Requirement	Quality Control Verification
Off-Site Work	Geophysical Data Processing and Interpretation	Project geophysicist or field geophysicist (under the supervision of the project geophysicist) will manage, process, and interpret geophysical data from surveys. Standard data processing procedures (target picking and analytic signal when applied), and standard corrections (for data positioning and filtering when applied), will be followed correctly and tracked for QC. Fail criteria will be any data processed without following standard procedures or without generating QC tracking. QC tracking will be accomplished through field editing and data processing checklists. QC review performed by the Project Geophysicist, and documentation on the data processing QC forms.	▪ QA Audit Checklist and Audit Form (if performed) ▪ QC review by Project Geophysicist ▪ Field Editing and Data Processing QC Forms
Site-Work	Geophysical Surveys (GTD survey, and AOC surveys)	Field geophysicist and geophysics technicians, under supervision of the project geophysicist, will perform EM 61 geophysical surveys for the GTD and AOC's. QC checks by the field geophysicist will be performed to ensure all geophysical and navigation equipment is functioning correctly and within acceptance limits. Fail criteria will be any checks failed to be performed, or data collection activities conducted when check results do not meet acceptance criteria.	▪ QA Audit Checklist and Audit Form (if performed) ▪ Field Editing QC Forms ▪ Geophysical field logbook notes

10.4 AUDITS

Field performance will be evaluated to ensure that the quality standards and objectives of the Work Plan are met. The evaluation will be accomplished through audits of the QC Daily Reports. Audits will be conducted and corrective actions will be implemented when non-conformances or deficiencies are identified. Additional audits will be conducted periodically. The audits will be planned and conducted by the Program or Project QC Manager. Procedures for auditing activities will be identified prior to implementation of the audits.

The audit process will involve identifying non-conformances or deficiencies, reporting and documenting them, initiating corrective actions through appropriate channels, and following up with a compliance review. Records will be kept of all auditing tasks and findings on the QA Audit Checklist and Audit Notes. In addition, copies of the audit findings will be provided to the Navy POC within one week of completion of the audit.

The field teams involved with all site work are responsible for reporting any suspected technical non-conformances or deficiencies to the Program QC Manager. The Program QC Manager is responsible for evaluation of the situation and taking action, if any is required, after following the notification protocol.

11.0 ENVIRONMENTAL PROTECTION PLAN

An Environmental Protection Plan is not required for the performance of this Task Order. The project team will not be disturbing wetlands and will not be conducting excavations of the size and type that warrant an Erosion Control Plan.

TtNUS will avoid all environmentally sensitive areas, such as wetlands and breeding areas, where possible. If MEC is suspected in an environmentally sensitive area, the area will be noted in maps and documentation for further evaluation during the Remedial Investigation (RI). If wetlands or sensitive areas will need to be entered or crossed, TtNUS will notify the Navy prior to this activity to discuss mitigation measures.

12.0 INVESTIGATIVE DERIVED WASTE PLAN

An Investigative Derived Waste Plan is not required for the performance or completion of this Task Order. The project team will not be producing investigative derived waste. Scrap metal removed from the site will be placed in an area designated by NASCC for disposition by NASCC. Munitions Debris handling requirements are described in Section 2.8.

13.0 INTERIM HOLDING FACILITY SITING PLAN FOR RCWM

No Recovered Chemical Warfare Material (RCWM) is expected under this Task Order. A RCWM Interim Holding Plan is not required for this Task Order.

14.0 PHYSICAL SECURITY PLAN FOR RCWM PROJECT SITES

No RCWM are anticipated under this Task Order. A RCWM Security Plan is not required under this Task Order.

15.0 REFERENCES

Office of the Federal Register National Archives and Records Administration. *Code of Federal Regulations, Part 1926*, Revised as of 1 July 1999.

Office of Toxic Substances Guidance Document for the Preparation of Quality Assurance Project Plans *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans*, 9 September 1987.

Guidance Documents from U.S. Army Engineering and Support Center, Huntsville, AL. (USACE):

Safety and Health Requirements Manual, EM 385-1-1, 3 September 1996.

Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations, EP 385-1-95a, 27 August 2004.

Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities, EP 75-1-2, 01 August 2004.

Type ll Work Plan OE-005-01.01, Revised 1 October 2002.

Technical Management Plan OE-005-02.01, Revised 1 October 2002.

Explosives Management Plan, OE-005-03.01, Revised 1 October 2002.

Site Safety and Health Plan, OE-005-06.01, Revised 1 October 2002.

Monthly Status Report New Number OE-080, Revised 3 March 2000.

Quality Control Plan USACE DID OE-005-11.01, Revised 1 October 2002.

Geographic Information System Plan OE-005-14.01, Revised 1 October 2002.

Department of Defense Explosives Safety Board. *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel,* TP 18, 20 December 2004

Department of Defense Explosives Safety Board. *Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH),* 3 December 2004

Director of Commander, Naval Sea Systems Command, *Ammunition and Explosives Safety Ashore,* NAVSEA OP 5 VOLUME 1, 15 January 2001, W/Change 4 - 1 June 2005.

Navy, 2006a. Department of the Navy Office of the Chief of Naval Operations, letter from Chief of Naval Operations to Commanding Officer Naval Weapons Station Earle. February 13.

Navy, 2006b. Department of the Navy Naval Ordnance Safety and Security Activity, letter from Commanding Officer Naval Ordnance Safety and Security Activity to Commanding Officer Naval Facilities Engineering Command, Northeast. February 23.

APPENDIX A

TASK ORDER SCOPE OF WORK / PLAN OF ACTION

PLAN OF ACTION

To Support Confirmation of Negotiation

SITE INSPECTION
MUNITIONS RESPONSE PROGRAM
NAVAL AUXILIARY LANDING FIELD (NALF) CABANISS
CORPUS CHRISTI, TEXAS

CTO 0019
SOW #1191

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Submitted to:
Southern Division
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APPENDICES

A PROJECT SCHEDULE
B ESTIMATED BUDGET

1.0 INTRODUCTION

1.1 PURPOSE

This Plan of Action (POA) was prepared by Tetra Tech NUS (TtNUS) under the Comprehensive Long-term Environmental Action Navy (CLEAN IV) Contract Number N62467-04-D-0055. The Statement of Work (SOW) #1191 dated 24 January 2006 details the following objective:

The objective for this task order is to perform an Emergency Response (ER) with respect to Munitions and Explosives of Concern (MEC) for the Incinerator Disposal Site at Naval Auxiliary Landing Field (NALF) Cabaniss, Corpus Christi, TX. In addition, the objective for this task order is to perform a Site Inspection (SI), upon removal of MEC, for Munitions Constituents (MC) at the Incinerator Disposal Site and a SI at the Skeet and Pistol Range at NALF Cabaniss. As used in this document, the term MEC includes Discarded Military Munitions (DMM) and Unexploded Ordnance (UXO), and MC in high enough concentrations to pose an explosive hazard. All work under this task order shall be completed in accordance with all applicable Department of the Navy policies, regulations and guidance, and Federal, State, and local laws.

Based on discussions with the Navy Remedial Project Manager (RPM), the following changes were made for the Task Order Requirements in Section 4 of the SOW:

In Section 4.1, under Perform Emergency Removal, the existing fence repair in the vicinity of the incinerator disposal Site to restrict access to the site, has been removed from the scope of work.

Additionally under Section 4.1, it was agreed that the following be performed:

Contractor shall perform a limited surface clearance of MEC including a geophysical survey of the site (lead by UXO safety technicians) to locate MEC hidden by vegetation or visible on the surface, followed by surface removal actions (clear and grub site of vegetation, as required, and remove MEC Items.). The surface clearance shall be performed to the extent necessary to mark safe pathways through the area for mowing crews, security patrols, and others to pass and to allow the initial Phase of fieldwork (soil sampling) to take place.

Under Section 4.4.1.4 (laboratory qualifications), it was agreed that the requirement for identification of the laboratory in the POA was revised to the following statement:

The analytical laboratory must be identified in the SAP and hold applicable state certifications to perform the analytical methods required (if available).

This POA describes TtNUS' technical approach and assumptions for executing the SOW, provides the project schedule, and includes the basis of the cost estimate.

1.2 PLAN OF ACTION ORGANIZATION

This POA consists of four sections, plus two appendices. Section 1.0 is this brief introduction. Section 2.0 describes the general management approach and key personnel. Section 3.0 addresses the project-specific SOW and presents assumptions associated with the SOW that represent the basis of the cost estimate. Section 3.0 is organized by the standard Work Breakdown Structure (WBS) tasks that were provided by the Naval Facilities Engineering Field Division South (NAVFAC EFD SOUTH). Section 4.0 details the project deliverables that will be submitted in performing the SOW. These deliverables will be tracked in the Technical and Financial Monthly Report (TFMR) to reflect Contract Task Order (CTO) completion. Appendix A includes the project schedule and Appendix B presents the cost estimate; both the schedule and cost estimates are organized by standard WBS tasks. All proposed Other Direct Costs (ODCs) are included in Appendix B.

For each subtask included within this POA, the summary labor estimate and associated ODCs are provided in Appendix B, Table 5-1. The applicable direct labor estimating rates are presented in Table 5-2. The detail of the ODCs and travel cost is provided in the support tables included as Table 5-3 and 5-4, respectively. Table 5-5 presents the subcontractor, field equipment, and expendable supply summaries (if applicable to this SOW). The subtask reference number in the text (e.g. 3.3.1 – Day-to-Day Project Management) is provided on the Appendix B tables for cross-reference to the assumptions provided for each subtask.

2.0 PROJECT STAFFING

The Houston, Texas office is the lead for this project. Staff from the Houston, TX, Atlanta, GA, and Pittsburgh, PA offices are planned to provide the majority of the staffing for this project.

Ms. Diane Lindsay, from TtNUS' Houston Texas office will be the Task Order Manager (TOM). The TOM can be reached at 832.251.6019 by telephone, 832.251.5190 by facsimile, and diane.lindsay@ttnus.com by e-mail. The TOM will coordinate tasks with other TtNUS offices and subcontractor personnel as necessary.

3.0 BASIS OF ESTIMATE

3.1 SITE BACKGROUND AND HISTORY

NALF Cabaniss is an outlying field that supports naval air training operations out of Naval Air Station Corpus Christi (NASCC). A site visit, conducted by Malcolm Pirnie, Inc., to produce a PA Report, indicated that there is a Skeet and Pistol Range located at NALF Cabaniss and also an Incinerator Disposal Site. The former Skeet and Pistol Range is an approximately 17-acre area located in the southeast corner of NALF Cabaniss. The former Incinerator Disposal Site was located southwest of Runway 31 and west of the former Skeet and Pistol Range, within the boundaries of a former sanitary landfill.

The work required under this SOW falls under the Defense Environmental Restoration Program. MEC and MC may exist on property formerly occupied or leased by the Department of the Navy. MEC is a safety hazard and may constitute an imminent and substantial endangerment to personnel and the local population. This action will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121; Executive Order 12580; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). All activities involving work in areas potentially containing MEC hazards shall be conducted with approval from the Naval Ordnance Safety and Security Activity (NOSSA), and in accordance with the Department of the Navy (DON) and DoD requirements regarding personnel, equipment, and procedures. Federal Regulation 29 CFR 1910.120 (HAZWOPER) also applies to all actions taken at the site.

Skeet Range. The former skeet range was comprised of three skeet firing arcs facing southwest toward Oso Creek, with "high" and "low" skeet houses positioned at the end of each arc. Three trap firing arcs were also present, with trap houses centered in the middle of each arc. The pistol range contained 15 firing positions and an earthen target butt. The Skeet and Pistol Range was used for cadet and security personnel weaponry training and qualification, moving target orientation training of Naval aviators and, likely, for recreation. The range was constructed in 1942 and demolished sometime between 1958 and 1964. Station records from the 1940s indicated the presence of an armory next to the range and a small arms magazine in the northeast quadrant of the installation, east of the barracks. The armory is no longer present at the installation and the date of decommissioning is unknown. The former small arms magazine remains in place in an open field east of a drainage canal on property no longer owned by the installation. The area is currently covered in vegetation and is not used for military purposes. Future use is not expected to change.

Sources. Based on historical use of the Skeet and Pistol Range, the armory likely stored only small arms ammunition (e.g. 12-, 16-, and 20-gage and .410 caliber shot, .22 caliber, .38 caliber, .45 caliber, 9 mm,

and other small arms). Due to the nature of historical operations at the Range, it is possible for MC contamination [lead, antimony, arsenic, copper, zinc, black powder, and polycyclic aromatic hydrocarbons (PAHs)] to exist in surface soil, up to two feet below ground surface, at the site.

Incinerator Disposal Site. The former Incinerator Disposal Site was used by the City of Corpus Christi and the Army to incinerate confiscated drug material, small arms, and ordnance items in a boiler. Incineration operations began at an unknown date and were terminated in approximately 1980. The area is currently covered in dense vegetation and has no military use. A visual survey conducted at the site indicated the presence of munitions scrap at the site in two discrete locations: in and around the former boiler and on the ground surface near Perimeter Road approximately 450 feet west of the boiler. The visual survey confirmed the presence of MEC and MC at the site. No records were found describing maintenance, closure, or remediation activities performed at the site for incinerated munitions.

Sources. The Army used an eight-foot long by five-foot diameter boiler at the Incinerator Disposal Site for the incineration of "small ordnance items," including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and "possibly 80 mm rockets" (likely 2.75-inch rockets) at a former sanitary landfill facility. The City of Corpus Christi also burned confiscated drug material in the boiler. The following thermally-treated munitions scraps were observed during a visual survey performed using a magnetometer to surface sweep of the Incinerator Disposal Area: 7.62 mm small arms, 20 mm, 30 mm, and 40 mm projectiles, 5-pound practice bombs, and flares/pyrotechnics. One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed.

Based on historical operations at the Incinerator Disposal Site, it is possible for MC contamination [explosives, metals, ammonium perchlorate, white phosphorus, pyrotechnics, gun propellants, and primary explosives] to exist in surface soil, up to six feet bgs, at the site.

3.2 PROPOSED ACTIVITIES

The following activities are proposed to fulfill the SOW requirements:

- Task 01 – Project Management
- Task 03 – Preliminary Assessment/Site Investigation Report
- Task 04 – Work Plans
- Task 05 – Field Investigations
- Task 06 – Laboratory Analyses
- Task 07 – Data Management
- Task 37 – Miscellaneous

These activities are detailed in the following sections.

3.3 WBS TASK 01 – PROJECT MANAGEMENT

3.3.1 Day-to-Day Project Management

Scope

The scope includes day-to-day project management.

Assumptions

- Day-to-day project management includes resource planning, monitoring, and control; TFMR preparation and review; routine internal review meetings and weekly reports; general communication with SOUTHDIV Navy, the Installation, and subcontractor personnel; and overall project oversight.
- Because this is considered to be a large installation restoration (IR) project, 8 percent of the total labor hours (minus Task 01) are estimated to be required for TOM day-to-day project management.

- In addition, one hour per week is required for administrative staff for filing, typing, photocopying, and mailing.

3.3.2 Project Controls Support

Scope

The scope includes the effort for project controls personnel to perform all monthly financial and schedule analyses.

Assumptions

- The project controls team will conduct monthly financial and schedule analyses to measure project performance.
- For a large IR type project, two hours per month will be required for a Senior Project Controls Specialist, and one half hour per month will be required for a Project Controls Expert.

3.3.3 Document Archiving

Scope

The scope includes the archiving of all supporting documents generated under this CTO.

Assumptions

- Document archiving efforts include CTO closeout preparation for all documents, scanning, conversion to PDF, and transfer to CD-ROM.
- These efforts will require seven hours per CTO for a Senior Administrative Assistant and eight hours for an Administrative Assistant.
- ***The NAVFAC Living CD format guidelines will be followed when archiving documents.***

3.3.4 Subcontractor Procurement

Scope

The scope includes subcontractor procurement.

Assumptions

- Subcontracts for direct push technology (DPT), fixed-base analytical laboratory, and surveyor support are required. Hours are included for technical staff to prepare technical specifications, perform technical evaluations of bids, and make an award recommendation.
- A pre-bid site walk will be required as part of the DPT procurement. This site walk will be attended by the senior UXO Supervisor and the Senior Geologist. The site walk will take place over a period two days, including travel.
- One analytical subcontract will be procured.
- Deliverables will be submitted via an express mail service.

3.3.5 Procurement Support

Scope

The scope includes the effort for procurement personnel to perform all subcontract procurement activities.

Assumptions

- Each subcontract proposed above requires the initial procurement action to secure a subcontract agreement, routine subcontract administration during the period of performance, and subcontract closeout activities.
- For a large IR type project, ten hours per subcontract will be required for subcontract procurement support, as well as eight hours per field event for the procurement of expendable supplies and rental equipment.

3.3.6 Kickoff Meeting

Scope

The scope of work includes attendance at the kickoff meeting.

Assumptions

- The TRIAD approach (systematic planning, dynamic work plans, and real-time analysis) will be used for the MEC and MC investigation. The kickoff meeting will include a data quality objective (DQO) planning session as part of the TRIAD systematic planning activities.
- The objective of the meeting will be to gather site-specific information and to develop DQOs that are necessary to prepare the following documents: the Explosive Safety Submission (ESS) (SOW Task 1a) for the Incinerator Disposal Site; the Site Inspection Work Plan, including an Emergency Response (ER) with respect to MEC, for the Incinerator Disposal Site (SOW Task 1); the Site Inspection Work Plan for the Skeet and Pistol Range (SOW Task 2); and the Sampling and Analysis Plan for the Incinerator Disposal Site and the Skeet and Pistol Range (SOW Task 4a).
- TtNUS will prepare an agenda seven days prior to the meeting.
- The meeting will take place over a period of four days, including travel, at Corpus Christi.
- NAS Corpus Christi security, safety, and environmental personnel will be available to provide information / identify site requirements as related to the Preliminary Assessment (PA)/Site Investigation (SI).
- Both the Skeet Range and Incinerator Disposal Site will be visited.
- The Kickoff meeting will be attended by the TOM, Senior UXO Supervisor, Senior Geologist, Senior Geophysicist and the Munitions Response Program (MRP) Scientist (Technical Consultant). Representatives of the Navy including the Navy RPM, Environmental coordinators and others from the site, and various EFD South Personnel will attend. Regulators may also attend.
- Site visits will be made to the Skeet Range and the Incinerator Disposal Site.
- After the site visits are conducted, a DQO meeting will be held at Corpus Christi on the second and third days. Representatives of the Navy, including the Navy RPM, Environmental coordinators and others from the site, and various EFD South Personnel will participate. Regulators may also participate.
- Hours are included for each attendee to review the Site Inspection Reports prior to traveling to Corpus Christi.
- Potential sampling locations will be marked (staked) in the field.
- A trip report will be issued, which will include a summary of the DQO meetings. Hours are included for preparation of the trip report.

3.3.7 Partnering Meeting Support

Scope

The scope includes Partnering team meeting support.

Assumptions

- TtNUS will participate in four partnering meetings during the performance period.
- Technical presentations will be made for work conducted by TtNUS.
- TtNUS will not be responsible for any partnering meeting set-up (including meeting notices, arranging for and setting up the meeting rooms), obtaining equipment (slide and overhead projectors, laptop computers, etc.), preparing overheads, or disassembling and returning the meeting equipment at the end of the meeting. ***During negotiations, it was determined that TtNUS will be responsible for these items for one of the four partnering meetings.***
- TtNUS will be responsible for preparation of meeting material (overheads and handouts) for technical material presented by TtNUS personnel.
- TtNUS will be responsible for preparation and distribution of meeting minutes.
- Each meeting will be attended by the TtNUS TOM and one meeting will be attended by the TtNUS Senior UXO Supervisor and the MRP Scientist.

3.4 WBS TASK 03 – PRELIMINARY ASSESSMENT/SITE INVESTIGATION REPORT

3.4.1 Skeet and Pistol Range Preliminary Assessment / Site Investigation Report

Scope

The scope of work includes preparation of the PA/SI report for the Skeet Range. The contents of the report will be based on the information collected during Tasks 05, 06, and 07.

Assumptions

- The Skeet and Pistol Range PA/SI Report will be developed as draft, draft final, and final versions. The draft and draft final versions will be submitted to the Navy for review. The draft final version will be prepared for submittal to regulatory agencies after incorporation of Navy comments on the draft version. The final version will be submitted to the Navy after incorporation of agency comments.
- Formal written responses will be prepared for comments received on the draft version and draft final versions.
- Fieldwork will be conducted in phases. Phase I will consist of soil sampling. This report will address the results of Phase I sampling.
- The Texas Commission on Environmental Quality (TCEQ) format for Affected Property Assessment Report (APAR) will be utilized to the extent practical for reporting data. The Report will contain the following information.
    - Executive Summary
    - Updated Conceptual Site Model
    - Conclusions and Recommendations
    - Review of Existing Information
        - Site description
        - Site Setting
        - Operation history including hazardous waste management activities, if any
        - Data collection activities
        - Archive search report
        - Results of preliminary assessment
    - Exposure Pathways and Groundwater Resource Classification
    - Discussion and Results of Site Inspection Survey
        - Detailed conceptual site model
        - Survey Design and methods
        - Assessment of potential MEC and MC risks/ hazards
        - Migration Pathways
        - Results of initial munitions hazard screening
    - Conclusions and Recommendations

  - Potential or existing MEC risk/hazards
  - Recommendations for future action (phases of investigation)
- A cost-to-complete estimate for each MEC and/or MC site identified for further action.

3.4.2 Incinerator Disposal Site Preliminary Assessment / Site Investigation Report

Scope

The scope of work includes preparation of the PA/SI report for the Incinerator Disposal Site. The contents of the report will be based on the information collected during Tasks 05, 06, and 07.

Assumptions

- The Incinerator Disposal Site PA/SI Report will be developed as draft, draft final, and final versions. The draft and draft final versions will be submitted to the Navy for review. The draft final version will be prepared for submittal to regulatory agencies after incorporation of Navy comments on the draft version. The final version will be submitted to the Navy after incorporation of agency comments.
- ***During negotiations, it was determined that a face-to-face meeting to discuss the comments on the draft report will not be required; a conference call will be scheduled for this purpose.***
- Formal written responses will be prepared for comments received on the draft version and draft final versions.
- Fieldwork will be conducted in phases. Phase I will consist of limited surface MEC clearance, limited subsurface clearance of MEC, and limited soil sampling. This report will address the results of Phase I sampling.
- The Texas Commission on Environmental Quality (TCEQ) format for Affected Property Assessment Report (APAR) will be utilized to extent practical for reporting data. The Report will contain the information detailed in Section 3.4.1.

3.5 WBS TASK 04 – WORK PLANS

3.5.1 Abbreviated Health and Safety Plan

Scope

The scope of work includes preparation of an abbreviated Health and Safety Plan (HASP) to conduct initial site inspection activities during the Kickoff Meeting Site Visit (Task 01, Project Management).

Assumptions

- It is not necessary to develop a HASP or SSHP satisfying all Navy or US COE requirements for the non-intrusive and limited activities that will take place during the site visit.
- The abbreviated HASP will address only those activities that would take place during the site visit.
- No intrusive activities will be conducted during the kickoff meeting site visit.
- All MEC will be avoided.
- Draft and final versions will be prepared.

3.5.2 Health and Safety Plan

Scope

The scope of work includes preparation of the detailed Health and Safety Plan (HASP).

Assumptions

- Two HASPS will be prepared, one each for the Skeet and Pistol Range and the Incinerator Disposal Site.
- The HASPs will be prepared to satisfy the minimum requirements specified in Section 28 of US ACE COE EM 385-1-1 and OSHA 29 CFR 1910.120.
- The HASPs will not address activities specifically related to munitions and explosives of concern (MEC). These activities will be addressed in the Accident Prevention Plan, which will be included in the Work Plan for Site Characterization and Emergency Response.
- The HASPs will address fieldwork activities directly related to the investigation of munitions constituents (MC).
- The HASP for the Incinerator Disposal Site will include information on the identification of asbestos-containing-material (ACM) and procedures to be followed in the event that asbestos-containing material (ACM) is encountered during the field investigations.
- Each HASP will be prepared in draft and final versions.
- The HASPs will include UXO avoidance during intrusive sampling activities.
- Formal written responses will be prepared for comments received from the Navy on the draft version.
- No comments are expected from regulatory agencies.

3.5.3 Explosive Safety Submission

Scope

The scope of work includes preparation of an Explosive Safety Submission (ESS) for the Incinerator Disposal Site.

Assumptions

- No ESS is required for the Skeet and Pistol Range because MEC is not of concern. Anomaly avoidance measures will be taken during intrusive investigations. These anomaly avoidance measures will be addressed in the HASP, which is described in Section 3.5.2 of this POA.
- An ESS is required for the Incinerator Disposal Site because MEC is of concern and emergency removal actions must be addressed.
- The general scope of the MEC-related activities includes geophysics, limited clearing and grubbing, limited surface clearance of MEC, and ER for any MEC that is found.
- The ESS submission will be prepared in accordance with guidelines found in OPNAV 8020.x, Military Munitions Response Program Oversight.
- The content of the ESS will be in accordance with the NOSSAINST 8920.15 Guideline for Preparing an Explosives Safety Submission.
- Interstate Technology & Regulatory Council (ITRC) guidance for conducting geophysical prove-outs will be followed.
- The ESS must be approved by the Naval Ordnance Safety and Security Activity (NOSSA) and Department of Defense Explosive Safety Board (DDESB)
- The ESS will address site characterization and ER activities related to MEC.
- Internal draft, draft, draft final, and final versions will be prepared.
- The internal draft version will be submitted to the Navy for review. The draft version will be submitted to NOSSA for review after Navy comments are addressed. The draft final version will be submitted to DDESB for review after NOSSA comments are addressed.
- ***During negotiations, it was determined that a face-to-face meeting to discuss comments on the draft version of this report was not required. A conference call will be set up for this purpose, if required.***
- Formal written responses will be provided to Navy comments on the internal draft version, NOSSA comments on the draft version, and DDESB comments on the draft final version.

3.5.4 Work Plan and Appendices for Incinerator Disposal Site

Scope

The scope of work includes preparation of the Work Plan, including appendices, for the MEC characterization, including geophysics, emergency removal (ER), and the initial phase of investigation (Phase I) of soils for MC at the Incinerator Disposal Site.

Assumptions

General

- The TRIAD approach will be used as the basis for the development of the Work Plan. Specific elements related to the TRIAD approach will be MEC characterization and ERs, where data will be processed in the field and used to guide MEC clearance activities, the use of anomaly avoidance techniques during MC sampling activities, and field decisions in consultation with subject matter experts regarding modifications of sampling locations / analyses based on field observations. Includes the use of field XRF units for analysis of likely "markers" such as lead.
- Internal draft, draft, draft final, and final versions will be prepared.
- The internal draft version will be submitted to the Navy for review. The draft version will be submitted to NOSSA for review after Navy comments are addressed. The draft final version will be submitted to DDESB and the TCEQ for review after NOSSA comments are addressed. Minimal comments are expected from DDESB or TCEQ.
- Formal written responses will be provided to Navy comments on the internal draft version, NOSSA comments on the draft version, and DDESB and TCEQ comments on the draft final version.

MEC Elements

- The PA has identified MEC as a concern at the Incinerator Disposal Site. Therefore, elements specific to MEC will be included within the Work Plan.
- Chemical warfare materials (CWM) are not of concern at the Incinerator Disposal Site.
- The contents of the Work Plan will be based on information in the initial PA, site-specific information gathered during the Kick-off Meeting, Navy and DDESB requirements for development of Work Plans, and further reviews of archives and photos.
- One review meeting will take place to review / resolve Navy comments on the internal draft version. This meeting will take place over a period of two days including travel at NAS Corpus Christi. The meeting will be attended by the TOM, MRP Scientist, and the Senior UXO supervisor.
- The NOSSA and DDESB-approved ESS will be used as the basis for the development of the Work Plan elements for the MEC characterization including geophysics and ER.
- Work Plan appendices directly related to MEC will include the Conceptual Site Model, Accident Prevention Plan, Project Quality Control Plan (PQCP), Geophysics Prove-Out Plan, and the MEC Management and Contingency Plan.
- An accident hazard analysis (AHA) will be conducted as part of the development of the MEC Accident Prevention Plan.

MC Elements

- The Conceptual Site Model will also address MC.
- Work Plan appendices directly related to MC will include the Field Sampling and Analysis Plan (FSAP) and Quality Assurance Project Plan (QAPP).
- The MC FSAP and MC QAPP will be prepared in accordance with the Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002 and the Uniform Federal Policy for Quality Assurance Project Plans (UFF-QAPP) March 2005.
- The MC FSAP will include a Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP).
- The MC FSAP will identify sample locations and sample collection, documentation and field quality control procedures.
- The MC QAPP will include laboratory QA information and analytical methods.

3.5.5 Work Plan and Appendices for Skeet and Pistol Range

Scope

The scope work includes preparation of the Work Plan, including appendices, for the initial phase of investigation (Phase I) of soils for MC at the Skeet and Pistol Range.

Assumptions

- The PA states that MEC is not a concern at the Skeet and Pistol Range. Therefore, Work Plan elements specific to MEC will not be included within the Work Plan.
- MEC avoidance techniques will be used at the Skeet and Pistol Range. If MEC is encountered, its location will be documented and no intrusive work will take place in the immediate area.
- MEC avoidance techniques will be described in the HASP and the FSAP.
- The TRIAD approach will be used as the basis for the development of the Work Plan. Specific elements related to the TRIAD approach will include the use of XRF techniques for field analysis, establishment of criteria for establishing extent of contamination, and field decisions regarding modifications of sampling locations.
- The Conceptual Site Model will address MC.
- Work Plan contents will include the FSAP and QAPP.
- No onsite review meetings will be required. All Navy comments on the internal draft version will reviewed / resolved via teleconference.
- The MC FSAP and MC QAPP will be prepared in accordance with the Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002 and the Uniform Federal Policy for Quality Assurance Project Plans (UFF-QAPP) March 2005.
- The MC FSAP will include a SAP and QAPP.
- The MC FSAP will identify sample locations and sample collection, documentation and field quality control procedures.
- The MC QAPP will include laboratory QA information and analytical methods.
- Internal draft, draft final, and final versions will be prepared.
- The internal draft and draft versions will be submitted to the Navy for review. ***During negotiations, it was determined that TCEQ would not be reviewing this document.***
- Formal written responses will be provided to Navy comments on the internal draft and draft versions of the report.

3.6 WBS TASK 05 – FIELD INVESTIGATIONS

General Approach

The scope of work is divided into ***two*** events to complete the planned activities.

The first event will include fieldwork necessary for Phase I characterization and ER of MEC at the Incinerator Disposal Site, primarily using geophysical methods.

The second event will include fieldwork necessary for Phase I characterization of MC at the Incinerator Disposal Site ***and the Skeet and Pistol Range Site.***

During negotiations, it was determined that the third field event would be combined with the second event. Therefore, a reduction in labor hours was made to reflect the combined mobilizations.

General Assumptions

- The Navy will provide a staging area on concrete close to the front of the outlying field.

- No storage of hazardous materials or vehicle service will be permitted.
- Open access to NALF Cabaniss will not be permitted. Navy personnel will meet TtNUS staff to open the gate. No escorts will be required to go to the actual site or while field work is being conducted.
- The facility will provide a sufficient supply of potable water for drilling and decontamination.
- Navy operations will not limit fieldwork operations. ***The Air Operations group will be consulted prior to fieldwork and prior to certain site operations (i.e., blasting in place) to ensure that the activities are coordinated with the Base operations.***
- Facility electricity is not available.
- All sites will be identified prior to commencing field activities.
- All work will be conducted in 10-hour days in shifts lasting 10 consecutive days. TtNUS will have access to both sites during weekends and holidays.
- All fieldwork will be conducted during daylight hours.
- Demobilization is included with the proposed field activity (e.g., geophysical investigation, MEC clearance, characterization, drilling, sampling, etc.).
- Mobilization activities include coordination with the site, preparation of the Dig Permit Request, internal coordination, travel arrangements, procurement and shipping of equipment and supplies, travel to and from the site, etc.
- Demobilization activities include return of equipment, site cleanup, providing field documentation to the project manager, etc.
- TtNUS will prepare and submit a Dig Permit Request to NAS Corpus Christi for utility clearance. ***During negotiations, it was determined that a site meeting for the dig permit request was not required.***
- Intrusive sampling locations will be "cleared" via down-hole magnetometers.
- Monitoring wells will not be installed. However, ***groundwater*** samples may be collected, if encountered.
- ***Erosion and sedimentation control measures will be applied, as necessary, to protect Oso Creek.***

3.6.1 Field Coordination and Management

Assumptions

- Field coordination activities include a kickoff meeting among project personnel to review field work requirements, review of work plans by the field team, equipment rental and shipping, travel arrangements, purchase and shipping of consumables, coordination with the Base, coordination with the laboratory for sample bottle shipment, coordination with analytical subcontractors, preparation of sample bottle labels, etc.
- Effort required for field coordination between events is included within this task.

3.6.2 Event 1 – Munitions and Explosives of Concern Characterization and Emergency Response at the Incinerator Disposal Site

Scope

The scope includes fieldwork necessary for Phase I characterization and ER for MEC at the Incinerator Disposal Site.

Assumptions

- Limited surface clearance of MEC will be conducted at the 12.5 acre Incinerator Disposal Site. The surface clearance will take place to the extent necessary to obtain information to delineate boundaries of MEC, collect broad site information, and to assess the risk/hazard posed by any MEC found at the site. Specifically, the MEC characterization and ER will allow the MC investigation to take place and to allow Navy security patrols and ground keeping crews to operate safely along Perimeter Road.

- Limited clearing and grubbing will be required. No tree removal is included.
- Subsurface clearance of MEC will take place only to the extent that it is necessary to allow the MC investigation to take place.
- Any MEC that is encountered will be disposed of by blow-in-place techniques.
- NALF Corpus Christi Quantity-Distance (Q-D) arcs will allow for blow-in-place for MEC including storage of donor explosives.
- All work will be conducted in accordance with the NOSSA / DDESB-approved ESS and MEC Work Plan that is developed based on the approved ESS.
- The Navy will provide a suitable area for the geophysics-prove-out.
- The MEC fieldwork will proceed in a staged manner. The geophysics prove-out will be conducted first, followed by the geophysics investigation and ER.
- The hours for geophysics prove-out includes set-up of the test plot as well as the actual prove-out.
- Geophysical mapping will be included.
- Field data will be recorded electronically.
- The work will be conducted by the Senior Geophysicist, Staff Geophysicist, Senior UXO Supervisor and two UXO Technicians, and one additional Technician (primarily for clearing and grubbing activities).
- For the MEC investigation, field personnel will be onsite from TtNUS offices in Atlanta, GA, Oak Ridge TN, and Houston TX. It is expected that field activities will be completed in three 10-day shifts plus travel.

3.6.3 Event 2 – Munitions Constituent Investigation at the Incinerator Disposal Site

Scope

The scope includes fieldwork necessary for Phase I characterization of MC at the Incinerator Disposal Site ***and the Skeet and Pistol Range.***

Assumptions for the Incinerator Disposal Site

- The fieldwork will take place immediately after completion of the Phase I MEC characterization and ER.
- Fieldwork will be limited to locations that have been cleared for surface MEC.
- No clearing and grubbing will be necessary. Any clearing and grubbing will be accomplished during the MEC characterization and ER described in Section 3.6.2.
- MEC avoidance techniques will be used for intrusive sampling.
- DPT and hand-auguring techniques will be used to collect surface (0 – 2 feet) and near subsurface (4 - 6 feet) samples.
- The TRIAD approach will be used to help guide the number and locations of samples. Field XRF instruments will be used to analyze soil samples for lead, which is one of the primary contaminants that would be expected at locations where incineration of munitions may have taken place.
- A total of 80 soils samples at up to 40 locations will be collected for analysis of TAL metals, explosives, perchlorate, and PAHs.
- A total of 10 sediment samples will be collected from Oso Creek for analysis of TAL metals, explosives, and PAHs.
- A total of 4 surface water samples will be collected from Oso Creek for analysis of TAL metals, explosives, and perchlorate.
- A total of up to ten ***groundwater*** samples will be collected, if encountered, for analysis of TAL metals, perchlorates, and explosives.
- MC investigation fieldwork at the Incinerator Disposal Site will be conducted by the Senior Geologist, Support Technician, and UXO Technician over one ten-day shift, plus travel.
- Hours are included for mobilization and demobilization.

Assumptions for the Skeet and Pistol Range

- Limited clearing and grubbing will be necessary.
- MEC avoidance techniques will be used for intrusive sampling.
- DPT and hand-auguring techniques will be used to collect surface (0 – 2 feet) and near subsurface (4 - 6 feet) for TAL metals, explosives, perchlorate, and PAH analysis.
- The TRIAD approach will be used to help guide the number and locations of samples. Field XRF instruments will be used to analyze soil samples for lead, which is one of the primary contaminants that would be expected at skeet and rifle ranges.
- ***During negotiations, it was determined that explosives analyses were not required at the Skeet and Pistol Range. All laboratory analytical costs associated with these analyses at this site have been removed.***
- A total of 80 soils samples at up to 40 locations will be collected for analysis of TAL metals and PAHs.
- A total of 10 sediment samples will be collected from Oso Creek for analysis of TAL metals and PAHs.
- A total of 4 surface water samples will be collected from Oso Creek for analysis of TAL metals and perchlorate.
- A total of up to ten ***groundwater*** samples will be collected, if encountered, for analysis of TAL metals and perchlorate.
- For the MC investigation at the Skeet and Pistol Range fieldwork will be conducted by the Senior Geologist and Support Technician over one ten-day shift, plus travel.
- Hours are included for mobilization.

3.7 WBS TASK 06 – LABORATORY ANALYSES

Scope

The scope of work includes the fixed-based laboratory analyses of samples collected during the sampling activities described in Task 05.

Assumptions

- It will be necessary to obtain information from the analytical laboratory to develop the Work Plans. Therefore, the laboratory will be procured during development of the Work Plans. Hours for procurement and incorporation of laboratory information into the Work Plans are included respectively in Tasks 01 and 04 and are not included herein.
- The laboratory will be Navy approved and will meet the Navy IR QA Program requirements as presented in the Navy Installation Chemical Data Quality Manual, SP-02056-ENV.
- The samples will be analyzed for constituents outlined in Appendix B. The analytical method and number of environmental samples is also provided in Appendix B.
- ***Two soil samples and one water sample from each site will be analyzed for RCRA waste characterization parameters.***
- The laboratory turnaround time is 30 days.
- Hours are included for coordination with the laboratory throughout the fieldwork and laboratory activities. Coordination includes discussion and resolution of technical analytical issues identified by field and laboratory staff during the course of the fieldwork and laboratory analysis.
- The laboratory must comply with Texas Risk Reduction Program (TRRP) 13, Reporting Requirements.

3.8 WBS TASK 07 – DATA MANAGEMENT

3.8.1 Validation

Scope

The scope includes data validation of all fixed base laboratory data that is generated under Task 06.

Assumptions

- All data will be subjected to full validation as described in the QAPP (to be developed under Task 04).
- The laboratory electronic data deliverable will be modified to include results of data validation.
- ***During negotiations, the explosives analyses associated with the Skeet and Pistol Range were removed from this POA. The labor hours for data validation have been reduced in accordance with the reduction in number of samples.***

3.8.2 Database

Scope

The scope includes placing the data into the TtNUS data management system.

Assumptions

- A sample tracking system will be implemented prior to the field effort. After successful completion of all requested analyses, the laboratory will submit an electronic deliverable to TtNUS. After all electronic deliverables have been received from the laboratory, queries will be run to ensure that the laboratory performed all of the requested analyses. The TOM will be notified as to any discrepancies. All data validation will be conducted in the Pittsburgh office.
- Data (including sample specific data such as sample depths, water levels, etc.) will be loaded into the TtNUS data management system in order to preserve the referential integrity of the data.
- Analytical laboratory chemical data will be received electronically in a format compatible with routine TtNUS electronic data deliverables (EDD). Natural Attenuation data will be received via sample logs for transposition into the electronic database.
- Additionally, laboratory quality control data will be uploaded to the database.
- No historical analytical results will require hand entry.
- Hours for creating report tables are included in the respective report WBS.
- ***During negotiations, the explosives analyses associated with the Skeet and Pistol Range were removed from this POA. The labor hours for database have been reduced in accordance with the reduction in number of samples.***

3.8.3 Environmental Geographic Information System

Scope

The scope includes the update and maintenance of the existing EGIS.

Assumptions

- The Navy will provide all base mapping necessary to establish the project GIS
- Hours for creating report figures are included in the respective report WBS.
- TtNUS will incorporate data from PA and SI activities into the initial project GIS database, including geophysics data.

- TtNUS will update the existing EGIS for Corpus Christi. The EGIS will tie all environmental samples and associated analytical data to their respective sample locations. Through a user-friendly GIS interface, the system's intuitive query tools can be used to obtain specific environmental sampling results, analytical chemistry data, or any other facility information as needed.
- Two incremental updates of the analytical data associated with the current EGIS will be performed on the IR Collaboration Gateway, one each for the Incinerator Disposal Site and for the Skeet and Rifle Range.
- ***During negotiations, the explosives analyses associated with the Skeet and Pistol Range were removed from this POA. The labor hours for EGIS have been reduced in accordance with the reduction in number of samples.***
- TtNUS will produce 4-5 copies of the EGIS on CD-ROM at the close of the project. The CD-ROM will include EGIS project files that can be read using both ArcView and ArcGIS ESRI products.
- Hours for EGIS table generation are included.

3.9 WBS TASK 37 – MISCELLANEOUS

3.9.1 After Action Report

Scope

The scope includes data validation of the After Action Report (AAR) for submission to NOSSA and DDESB upon removal of MEC.

Assumptions

- An AAR will be required only for the Incinerator Disposal Site.
- The AAR will be prepared in accordance with guidelines for submittal of an AAR found in OPNAV Instruction 8020.x, Military Munitions Response Program Oversight Contractor.
- The AAR submission will be coordinated with the Safety Officer at NAS Corpus Christi.
- Draft and final versions will be prepared.
- Formal written responses will be prepared for Navy comments on the draft version of the AAR.

4.0 DELIVERABLES

The following table delineates the deliverables that TtNUS proposes to provide as part of the technical completion of the SOW. The deliverables shown in bold text represent those deliverables that will be tracked in the TFMR for purposes of showing CTO completion. The proposed due dates associated with these deliverables are shown in the project schedule included as Appendix A to this POA.

Project Deliverables
Draft Kickoff Meeting Minutes
Final Kickoff Meeting Minutes
Draft ESS Review Meeting Minutes
Final ESS Review Meeting Minutes
Draft Incinerator PA/SI Review Meeting Minutes
Final Incinerator PA/SI Review Meeting Minutes
Draft Skeet and Pistol Range PA/SI Report
Draft Final Skeet and Pistol Range PA/SI Report
Final Skeet and Pistol Range PA/SI Report
Draft Incinerator Disposal Site PA/SI Report
Draft Final Incinerator Disposal Site PA/SI Report
Final Incinerator Disposal Site PA/SI Report
Draft Abbreviated Health and Safety Plan
Final Abbreviated Health and Safety Plan
Draft Health and Safety Plans
Final Health and Safety Plans
Internal Draft Explosive Safety Submission
Draft Explosive Safety Submission
Draft Final Explosive Safety Submission
Final Explosive Safety Submissions
Internal Draft Incinerator Disposal Site Work Plan
Draft Incinerator Disposal Site Work Plan
Draft Final Incinerator Disposal Site Work Plan
Final Incinerator Disposal Site Work Plan
Internal Draft Skeet and Rifle Range Work Plan
Draft Final Skeet and Rifle Range Work Plan
Final Skeet and Rifle Range Work Plan
Draft After Action Report
Final After Action Report

APPENDIX B

EXPLOSIVE SAFETY SUBMISSION

DEPARTMENT OF THE NAVY
NAVAL ORDNANCE SAFETY & SECURITY ACTIVITY
FARRAGUT HALL BLDG D-323
23 STRAUSS AVENUE
INDIAN HEAD MD 20640-5555

8020
Ser N537/136
12 Feb 08

From: Commanding Officer, Naval Ordnance Safety and Security Activity
To: Commanding Officer, Naval Facilities Engineering Command, Southeast

Subj: INTERIM APPROVAL OF EXPLOSIVES SAFETY SUBMISSION FOR MEC TIME CRITICAL REMOVAL ACTION AT THE INCINERATOR DISPOSAL SITE NAVAL AUXILIARY LANDING FIELD CABANISS CORPUS CHRISTI, TEXAS

Ref: (a) NAVFAC Southeast ltr Code OPG6 of 12 Dec 07 (w/encl)
(b) NAVSEA OP 5, Seventh Revision of 1 Jul 07
(c) NOSSAINST 8020.15A, Explosives Safety Review, Oversight, and Verification of Munitions Responses of 02 Feb 07
(d) DDESB Fragmentation Database
(e) NOSSA ltr 8020 Ser N54-SJ/9130 of 08 Feb 08
(f) US Army Corps of Engineers Engineering and Support Center, Huntsville document HNC-ED-CS-S-98-7

1. The Naval Ordnance Safety and Security Activity (NOSSA) reviewed the Explosives Safety Submission (ESS) forwarded under reference (a) for a munitions response at the Incinerator Disposal Site, Naval Auxiliary Landing Field Cabaniss, Corpus Christi, Texas. NOSSA found the document meets the requirements of references (b), (c), and (d). NOSSA endorsed the ESS to the Department of Defense Explosives Safety Board (DDESB) under reference (e) and requested their review and approval.

2. NOSSA recognizes the need to implement the munitions response as soon as possible. Therefore, and in accordance with the provisions of reference (c), NOSSA authorizes you to take the proposed munitions response action described in reference (a) accepting that the DDESB approval process may impose different or additional requirements.

3. Specifically, you are authorized the following:

a. The munitions with the greatest fragmentation distance (MGFD) will be the 2.75 inch (M229) Rocket Warhead with a net

explosive weight (NEW) of 4.8 pounds. The Exclusion Zone (EZ) for unintentional detonation (hazardous fragment distance,(HFD)) is 302 feet and the EZ for the intentional detonation of a single item (maximum fragment distance, (MFD)) is 1374 feet.

b. Engineering controls may be used to reduce the EZ for an intentional detonation. Engineering controls shall consist of a sandbag enclosure of 24 inches constructed in accordance with reference (f) for the intentional detonation of a single item. The EZ for an intentional detonation when using the sandbag engineering controls will be 200 feet.

c. You are authorized, for the duration of this project, to store non-DoD ammunition and explosives (donor charges) at NAS Corpus Christi in Magazines A5 and/or A6, but you must comply with the quantity-distance and other explosive safety requirements of reference (c), and comply with existing site approvals. Non-DoD ammunition and explosives must be stored in separate storage locations or magazines, or by themselves in separate containers or stacks within a storage area or magazine containing compatible DoD ordnance in order to ensure inventory control.

4. The NOSSA point of contact for this interim approval is Mr. Rick Urbanski, who can be contacted at DSN 354-4450 or commercial (301) 744-4450.

TAMMY K. SCHIRF
By direction

Copy to:
CNO (N411, N453)
COMNAVENGCOM HQ (ENV)
NAVFAC SOUTHEAST (H. Lockard)
NAS CORPUS CHRISTI (Code 14)
NOSSA ESSOPAC (N5P)

Subj: INTERIM APPROVAL OF EXPLOSIVES SAFETY SUBMISSION FOR MEC TIME CRITICAL REMOVAL ACTION AT THE INCINERATOR DISPOSAL SITE NAVAL AUXILIARY LANDING FIELD CABANISS CORPUS CHRISTI, TEXAS

Blind copy to:
NOSSA (N543)

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 3
June 2007

Explosive Safety Submission
for
MEC Time Critical Removal Action
at the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

June 2007

Southeast
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

EXPLOSIVE SAFETY SUBMISSION
for
MEC Time Critical Removal Action
at the
Incinerator Disposal Site
Naval Auxiliary Landing Field Cabaniss, Corpus Christi, Texas

1. PROJECT SUMMARY

1.a Naval Auxiliary Landing Field (NALF) Cabaniss is an outlying field that supports naval air training operations out of Naval Air Station Corpus Christi (NASCC), Texas. A site visit, conducted by Malcolm Pirnie, Inc. to produce a Preliminary Assessment (PA) Report (April 2005), indicated that there is a former Incinerator Disposal Site, and also a former Skeet and Pistol Range, (not part of this Explosive Safety Submission [ESS]), located at NALF Cabaniss. The former Incinerator Disposal Site was located southwest of Runway 31 and west of the former Skeet and Pistol Range, within the boundaries of a former sanitary landfill. Though the exact dimensions are unknown, the former Incinerator Disposal Site may have occupied approximately 17 acres. Figure 1 shows the location of the former Incinerator Disposal Site in relationship to Runway 31 and the NALF Cabaniss boundary.

The former Incinerator Disposal Site was used by the City of Corpus Christi and the Army to incinerate ordnance items, small arms, and confiscated drug material in a boiler. The Army used the boiler for the incineration of ordnance items including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and possibly 80 mm rockets (later preliminary identification is 2.75 inch rocket warheads) None of the 17 acre site was used as a firing range, therefore no unexploded ordnance (UXO) is anticipated. However, discarded military munitions (DMM) and possibly kick outs from the boiler (OB/OD treatment) are anticipated. Incinerator operations began at an unknown date and were terminated in approximately 1980. The area is currently covered in dense vegetation with open sections of wetlands on the south end near Oso Creek. The other three sides of the area are controlled by the installation fencing. No military use is currently designated for this area and ground disturbing activities such as digging, installation of tent stakes, tree planting, etc. are prohibited. Fencing and signage is planned to identify and control the restricted uses of the area. A visual survey conducted by Malcolm Pirnie, Inc. during a site visit to support the PA process indicated the presence of munitions scrap at the site in two discrete locations:

1.) in and around the former boiler
2.) on the ground surface near Perimeter Road approximately 450 feet west of the boiler.

The following thermally-treated munitions scrap was observed during the visual survey performed using a magnetometer to surface sweep the former Incinerator Disposal Area:

- 7.62 mm small arms,
- 20 mm, 30 mm, and 40 mm projectiles,
- 5-pound practice bombs, and
- flares/pyrotechnics.

One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed.

During a site walk conducted on 21 June, 2006, in conjunction with the kick-off meeting for the site inspection phase of this project, Tetra Tech NUS, Inc. (TtNUS), and others, escorted by UXO personnel and NASCC personnel, visually observed the presence of munitions inside the former boiler and on the ground surface near Perimeter Road west of the boiler as noted in the PA.

The visual survey confirmed the presence of Munitions and Explosives of Concern (MEC) at the site. The presence of Munitions Constituents (MC) has not been evaluated up to this point, but sampling for MC will be part of the site inspection phase of this project. No records were found describing maintenance, closure, or remediation performed at the site for incinerated munitions.

1.b A PA Report (April 2005) by Malcolm Pirnie, Inc. concluded that:

- The former Incinerator Disposal Site was located at a sanitary landfill in the southern portion of NALF Cabaniss.
- Incineration operations began at an unknown date and continued until approximately 1980.
- The city of Corpus Christi and the Army used an eight-foot long five-foot diameter boiler for the burning of confiscated drug material and ordnance items.
- There is no documentation describing maintenance, closure, or remediation activities that may have been performed at the site.
- Site reconnaissance indicated the presence of thermally treated munitions scrap inside and around the boiler, as well as on the ground surface in an area near Perimeter Road, 450 feet west of the boiler. One munitions scrap appeared to contain exposed Explosive D compound, confirming the presence of MEC at the site.
- Based on historical operations and visual observations made at the site, MEC and MC are confirmed at these two discrete locations of the site.
- Due to the observation of multiple areas of thermally treated munitions scrap at the site, it is possible similar areas of munitions scrap may be present on the surface or potentially buried in the subsurface, as the site was once a sanitary landfill. Therefore, MEC and MC are suspected to be present at other locations within the site.
- The acreage of known MEC areas is approximately 0.4 acres, and the acreage suspected to contain MEC is approximately three acres.
- The site is not currently used for any military purpose. Future use of the site is not expected to change.

1.c The suspected type of ordnance contamination at the site is incompletely treated MEC, ejected MEC, and munitions scrap containing residual explosives. The following munitions scrap was observed by Malcolm Pirnie, Inc. during a visual survey performed using a magnetometer to surface sweep the former Incinerator Disposal Area:

- 7.62 mm small arms,
- 20 mm, 30 mm, and 40 mm projectiles,
- 5-pound practice bombs, and
- flares/pyrotechnics.

One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed (PA Report, Malcolm Pirnie, 2005).

It is suspected that more munitions of this type will be present at the site. The suspected amount of ordnance at the site is unknown.

1.d The area is currently covered in dense vegetation and has no military use. The use of this area is anticipated to remain unchanged.

1.e A Time Critical Removal Action (TCRA) activity and a UXO avoidance activity to support environmental sampling are planned. The TCRA activity will include a limited surface clearance of MEC to be conducted on portions of the 17 acre former Incinerator Disposal Site.

The TCRA activity will be completed along Perimeter Road to remove MEC hazards on the surface and allow Navy security patrols and ground keeping crews to operate safely in the area. The TCRA activity also includes the removal of hazards from known MEC items in the former boiler, and on the surface around the former boiler and at the known location 450 feet west of the boiler.

The UXO team will also conduct a surface sweep of 10 foot (') wide transects at 75' intervals to collect data on the type and location of MEC at the remainder of the former Incinerator Disposal Site. No MEC will be moved or treated during this phase of the operation. This phase will be performed to the extent necessary to obtain information to delineate boundaries of MEC, collect broad site information, and to assess the risk/hazard posed by any MEC found at the site.

1.f This work falls under the Defense Environmental Restoration Program. The type of munitions response action is a TCRA of limited surface MEC. The surface clearance of MEC shall be performed to the extent necessary to mark safe pathways through the area for mowing crews, security patrols, and others to pass along Perimeter Road. The surface clearance of the two known MEC areas will remove a hazard on the surface around the boiler and near Perimeter Road, 450 feet west of the boiler. The work falls under a Site Inspection and will be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121.

2. MAPS

2.a Regional Map. NALF Cabaniss is an outlying field that supports naval air training operations out of NASCC, Texas. Figure 1 is a regional location map showing the location of the NALF Cabaniss and surrounding area.

2.b Activity Map.

2.b.(1) The former Incinerator Disposal Site was located southwest of Runway 31 and west of the former Skeet and Pistol Range, within the boundaries of a former sanitary landfill. Figure 2 illustrates the location of the former Incinerator Disposal Site.

2.b.(2) There are no other Munitions Response Sites (MRSs) nearby either of these locations.

2.b.(3) The proposed MEC assessment/removal depth at the former Incinerator Disposal Site is a detector-aided surface clearance. The first area to be cleared is from the centerline of the Perimeter Road south in the mown grass area to the tree line. Figure 3 illustrates the location of the Perimeter Road clearance area. The second areas to be cleared are around the boiler and the area 450 feet west of the boiler where known MEC items are located. Figure 3 illustrates the location of the boiler and the area 450 feet west of the boiler.

2.b.(4) The area is currently covered in dense vegetation and has no military use. The use of this area is anticipated to remain unchanged. Figures 2 and 3 illustrate the dense vegetation in the area.

2.b.(5) Demolition explosives will be stored at the NASCC Naval Weapons Complex, an approved explosive storage area. Figure 4 illustrates the Naval Weapons Complex. No demolition explosives or MEC items will be stored at NALF Cabaniss during this operation.

2.b.(6) MEC items discovered during the detector-aided surface clearance of Perimeter Road, the boiler area, and the area 450 feet west of the boiler will be treated in place. Due to the presence of industrial buildings south of the MEC site, engineering controls will be utilized to reduce the exclusion zone to 200 feet. The planned engineering controls will be two feet of sand bags on all four sides of the MEC item and a plywood cover with two feet of sand bags on top. Figure 5 illustrates the Hazardous Fragment Distance (HFD) and the Maximum Fragment Distance (MFD) when treated without engineering controls as well as the reduced exclusion zone using the sand bags.

2.b.(7) There are no non-Navy properties or operations that may affect or be affected by the detector-aided surface sweep operations.

2.b.(8) NALF Cabaniss is an outlying field that supports naval air training operations out of NASCC, Texas. Figure 6 illustrates the over-flight corridors, and air traffic routes at NALF Cabaniss. The Senior Unexploded Ordnance Supervisor (SUXOS) will coordinate any intentional destruction/burning with the Navy Point-of-Contact (POC). The Navy POC will contact the control tower to ensure aircraft are not in the area and that the area remains free of aircraft until the SUXOS has issued an “All Clear”.

2.c Q-D Maps. The Explosive Safety Quantity Distance (ESQD), based on a 2.75 inch rocket warhead without motor can be found in Figure 5. This figure also includes the ESQD arcs for intentional or Blow-in-Place (BIP) operations for the two known MEC areas and the Perimeter Road clearance area. Figure 5 outlines a 302-foot HFD and a 1374-foot MFD ESQD arc for the detector-aided surface sweep operation for a 2.75 inch rocket warhead without motor with respect to both the Perimeter Road clearance

area and the two known MEC areas. In addition, Figure 5 presents a detailed map of the surrounding area and illustrates the reduced 200-foot exclusion zone based on the use of engineering controls during treatment.

2.d Soil Sampling Maps. There are no known explosives soils associated with the operation. MC soil samples will be taken during the Site Inspection and the results from these samples will be used to make recommendations in the Site Inspection Report.

3. AMOUNT AND TYPE OF MEC

3.a The amount and type of MEC in the former Incinerator Disposal Site is unknown. However, the following thermally-treated munitions scrap was observed during the visual survey performed using a magnetometer to surface sweep the former Incinerator Disposal Area: 7.62 mm small arms, 20 mm, 30 mm, and 40 mm projectiles, 5-pound practice bombs, and flares/pyrotechnics. One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed.

Historical research indicated the Army used the boiler for the incineration of ordnance items including .30 and .50 caliber small arms, flares, and explosive cartridges from ejection seats at the former Incinerator Disposal Site. An Initial Assessment Study (IAS) conducted in 1984 also mentioned the possibility of the presence of 80 mm rockets; however, during site visits conducted in 2006, it was determined that the 80 mm rockets were most likely mistakenly identified and were actually 2.75 inch rocket warheads. Therefore, based on historical research, the PA determined that the 2.75 inch rocket warhead is the munitions with the greatest fragmentation distance (MGFD) identified for the TCRA at the former Incinerator Disposal Site. The estimated Net Explosive Weight (NEW) for the 2.75 inch rocket warhead is 4.800 lbs C/D 1.1. Estimates are used because the nomenclature, age, and condition of thermally treated MEC are unknown.

3.b Explosive soils are not anticipated under this operation. MC soil samples will be taken during the Site Inspection and the results from these samples will be used to make recommendations in the SI Report.

3.c There are no explosives contaminated buildings associated with this operation.

3.d There are no known MRSs at NALF Cabaniss which will affect this submission.

4. START DATE

The TCRA along Perimeter Road is scheduled to start in August 2007. This will be followed immediately by the TCRA of the known MEC items around the boiler and near Perimeter Road at the northwest corner of the site. The Site Inspection for additional MEC items at the site will follow.

5. FROST LINE

The operation consists of surface clearance of exposed MEC. The frost line will not impact or affect this operation. Migration of exposed MEC and other munitions scrap may occur naturally through surface soil erosion. Human activities such as grounds maintenance and mowing may also redistribute these items. MC could be carried by surface runoff south for deposition into wetland areas and Oso Creek. MC could also potentially leach through soils to groundwater; however, the rate of infiltration through the soils would be slow due to the low permeability of the clayey soils. Erosion caused by rain or wind may present a potential for the MEC to migrate from the location.

6. RESPONSE TECHNIQUES

6.a(1) The Schonstedt 52 will be used for the detector-aided surface sweep of Perimeter Road, the boiler area, and the area near Perimeter Road, (450 feet west of the boiler area.)

6.a(2) The UXO Technicians will conduct a check of the equipment prior to starting the detector-aided surface sweep. This equipment check will consist of a “Blanket Test” which will be set up by the SUXOS. Inert munitions, or other similar metal items, will be placed on the surface and then covered with a tarp or other material. The UXO Technicians will use the detection equipment to locate all items under the cover. After all equipment has been checked, the SUXOS will remove the cover and compare the results. Any equipment found to be not operating or operating incorrectly, will be repaired, or taken out of operation until repaired and rechecked.

6.a(3) Anomaly discrimination will not be used at this site. MEC items found during the detector-aided surface sweep will be visible on the surface.

6.a(4) Detector-aided surface sweep will be the detection method used during this operation. Each UXO Technician will move in a generally straight line while sweeping a 5’ lane with the Schonstedt and conducting a visual survey of the area. The 5’ lane will be swept for surface MEC. If an anomaly is detected, it will be investigated. If the anomaly can be identified from the surface as MEC and it is located on or near Perimeter Road, the boiler area, or the area near Perimeter Road (450 feet west of the boiler area), it will be treated with a donor charge. If the anomaly is below the surface, or located along a transect during the site investigation, the UXO Technician will determine if the anomaly is a possible MEC. Data such as other MEC items located in the area, number of anomalies, and location near known MEC areas will be collected. If determined to be a possible MEC item, its location will be marked and noted in the field log book. This information will be used by the Project Management Team to identify areas for follow-on geophysical investigation during the Site Inspection phase. After the anomaly is investigated, the UXO Technician will proceed with the detector-aided surface sweep. The Schonstedt detects ferrous metals and will be used by the UXO Technician in conjunction with a visual survey of the area during the detector-aided surface sweep. The Schonstedt is the best technology for this operation.

Follow-on Geophysical Investigations will be conducted using an EM-61 for geophysical mapping escorted by a UXO Technician performing UXO Avoidance. The UXO Technician may be required to remove brush and surface metal debris to support the geophysical mapping effort. MEC items on the surface will be visually marked for avoidance during the geophysical mapping. The location of each MEC item discovered during the detector-aided surface sweep and UXO Avoidance will be added to the data collection for the site.

6.b The target items for this operation are surface MEC and the detection method is detector-aided surface sweep. As a quality assurance/quality control check on the detector-aided surface sweep operation, the SUXOS will initially recheck 25% of the area (25% of each 100 foot of the Perimeter Road, or 25% of the known MEC area around the boiler, or 25% of the known MEC area near Perimeter Road, 450 feet west of the boiler). After 4 rechecks, if no MEC have been found, the rechecks may change to 10%. If MEC is found in any recheck, that portion of the surface sweep will be rejected and the UXO Technicians will complete a re-sweep of the area. The SUXOS will recheck that area again. At this point the rechecks will be increased to 25% until 4 rechecks have been free of MEC.

All detectors used during the detector-aided surface sweep will be checked at the start of each day, or after each battery change, to ensure they are capable of detecting MEC items on the surface. A “blanket test” will be used for this check. The SUXOS will place four inert MEC items, or other similar metal items, on the surface in a previously cleared area. A tarp or other cover will be placed over the items. The UXO Technicians will use the detectors to locate the items under the cover. After all detectors have been checked, the detected locations, and the actual locations will be compared. If any detector is found to not operate correctly, that detector will be removed from operation until repaired and retested.

6.c The UXO Technicians on site conducting the MEC TCRA operations will meet or exceed the minimum qualification standards as stated in Department of Defense Explosives Safety Board (DDESB) TP18, Table 4-1. At least one UXO Technician will be qualified as a SUXOS. The other UXO Technicians will be UXO Technicians II or higher.

6.d During the TCRA operations, all MEC discovered on the surface while completing the detector-aided surface sweep of Perimeter Road, the boiler area, and the area near Perimeter Road (450 feet west of the boiler area) will be treated on site with explosive donor charges. Due to the presence of industrial buildings south of the MEC site, engineering controls will be used to reduce the exclusion zones. The engineering controls will consist of two feet of sand bags placed on all four sides of the MEC item with a plywood cover and two feet of sand bags on top.

MEC discovered during the detector-aided surface sweep of the transects during MEC delineation will not be treated or otherwise disturbed. They will be identified (provided the identification can be accomplished without moving the item) and their location will be determined using Global Positioning System (GPS) technology and added to the field logbook. All information about MEC and MEC-related scrap will be added to the data collected for the site. There is no plan to store MEC on site. There is no plan to collect or store MEC-related scrap during this operation.

The SUXOS will notify the Navy POC prior to the disposal of any MEC items. The Navy POC will coordinate the notification of all required personnel and the control tower and advise the SUXOS when it is clear to proceed with the disposal operation. If, during the detector-aided surface sweep of Perimeter Road, Material Potentially Presenting an Explosive Hazard (MPPEH) is encountered, two UXO Technicians will inspect the MPPEH. Only MPPEH that can be certified as explosive-free, will be relocated off Perimeter Road. If the MPPEH cannot be certified as explosive free it will be treated with explosive donor charges in its location to reduce the hazard to security and maintenance crews operating on Perimeter Road. An attempt will be made to identify all MPPEH items and their original locations will be determined. This information will be added to the data collected for the site.

7. QUANTITY DISTANCE

7.a. MRSs. The location of the detector-aided surface sweep operations is shown on Figure 2, Figure 3, and Figure 5. There are industrial buildings potentially affected by the TCRA approximately 900 to 1000 feet due south of the boiler area. These industrial buildings include a house moving company, (unoccupied), and a self storage company (occupied at irregular intervals). Therefore, engineering controls will be utilized during MEC treatment to reduce the exclusion zone to 200 feet. Figure 5 shows the 302-foot HFD and 1,374-foot MFD ESQD arcs and the 200-foot exclusion zone for the detector-aided surface sweep operation along a portion of the Perimeter Road for a 2.75 inch rocket warhead. Figure 5 also shows the minimum separation distances with engineering controls for the 2.75 inch rocket warhead as stated in the DDESB Fragmentation Data Review Form found in Attachment A. The survey will be conducted using one team operating in one area.

7.b Magazines. Magazines used to store demolition explosive are located at the NASCC Weapons Complex shown in Figure 4. The explosive will be stored in Magazine A6 or alternatively, Magazine A5. The amount of explosive to be stored will be less than 1 pound of 1.1B which is the Blasting Cap, Shock tube assemblies and less than 1 pound of 1.4S which is the primers and Shock tube lead line. Magazine A6 is approved for storage of 143,000 pounds of 1.1 grade explosive and Magazine A5 is approved for storage of 10,000 pounds of 1.1 grade explosive. The items to be stored fall within the ESQD for this established facility. Directions to the Weapons Complex from NALF Cabaniss are shown in Figure 7.

7.c. Planned or established treatment sites. No established treatment areas are planned. Any MEC items found during the investigation along Perimeter Road, the area near the boiler, and the area 450 feet west of the boiler near Perimeter Road, will be blown-in-place (BIP). Exclusion zones for BIP operations will be established in accordance with paragraph 7.d.

7.d "Footprint" Areas. The 200-foot exclusion zone, including engineering controls, is shown on Figure 5. Security for a BIP operation will be set at both ends of Perimeter Road outside the exclusion zone. The storage area across Oso Creek, even though outside the exclusion zone, will be checked for personnel. Oso Creek and the heavy vegetation in the area provide a natural barrier on the south side of the exclusion zone. Figure 5 also shows a 1,374-foot MFD ESQD arc for BIP of a 2.75 inch rocket warhead. This ESQD arc is shown for BIP of a 2.75 inch rocket warhead if found during the detector-aided surface sweep on Perimeter Road, area near boiler, and area 450 west of boiler near Perimeter

Road. If an item is found that has a greater MFD, the ESQD arc will be adjusted for that item and the ESS will be corrected and resubmitted.

8. OFF-SITE DISPOSAL

There is no planned off-site disposal for this TCRA operation.

9. ENVIRONMENTAL CONSIDERATIONS

The proposed investigations are being conducted as part of an environmental investigation for the presence of MC and MEC. The proposed approach has been reviewed with the State of Texas and they concur with the approach. No permits are required as part of this TCRA Operation.

There are no federally listed threatened or endangered plant or animal species at NALF Cabaniss or the former Incinerator Disposal Area. Jurisdictional wetlands are present within the boundaries of the former Incinerator Disposal Site. However, operations are scheduled during the dry season of the year to minimize foot traffic impacts to wetland areas.

A Phase I Archeological Investigation performed in 1994 identified one area for further investigation. The current status of this site, including its location, is not known. The area of archeological interest was identified for further investigation.

There are no environmental considerations which need to be addressed for this munitions response effort.

10. TECHNICAL SUPPORT

UXO Technicians performing the TCRA operations will be provided by Tetra Tech NUS, Inc. under a Contract Task Order (CTO) issued under the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract number N62467-04-D-0055. There is no plan to utilize support from Explosive Ordnance Disposal (EOD) or Technical Escort Unit (TEU) at this time. If support is required from EOD, and/or TEU, that support will be requested through the Navy POC.

11. LAND USE RESTRICTIONS

11.a There are future plans to repair a fence along Perimeter Road to reduce the possibility of personnel coming in contact with remaining MEC items at the former Incinerator Disposal Site after the TCRA has been completed. The Navy plans to maintain control of the area for the time being. No further land use controls are planned at this time. The Incinerator Site is located wholly on Government-owned and operated land.

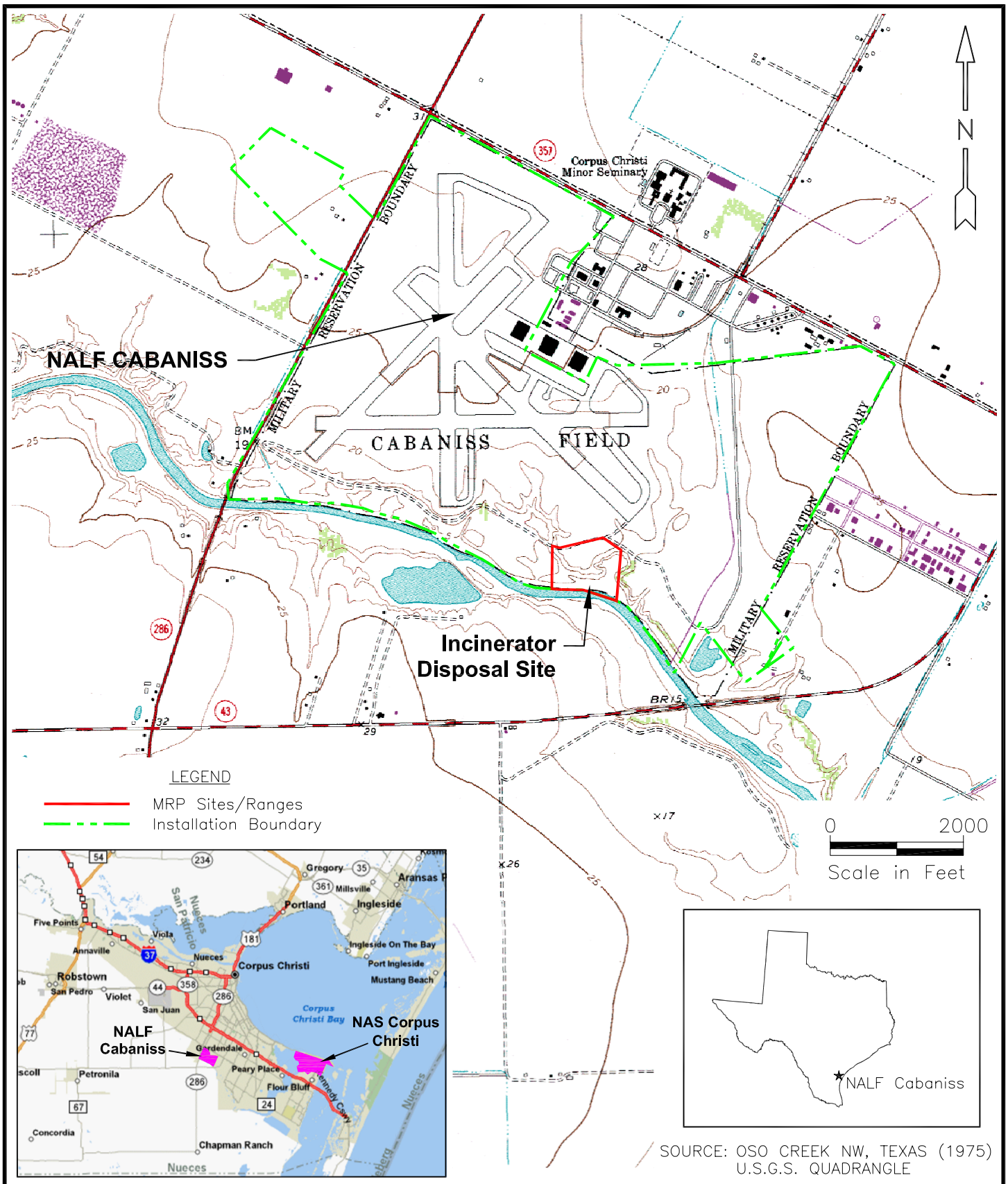
11.b There are no Long-term monitoring requirements at this time. The Site Investigation report may recommend monitoring requirements after the completion of the sampling on site.

11.c There are no plans to conduct a UXO Safety Education Program at this time.

12. PUBLIC INVOLVEMENT

The detector-aided surface sweep operation will be conducted at NALF Cabaniss. NASCC Public Affairs is aware of the operation and will handle all notifications of local officials and the public. All requests for information will be referred to the NASCC Public Affairs office. Any required support from local officials will be requested through the Navy POC who will inform the NASCC Public Affairs office.

00356TOPO.dwg 10-11-06 JFF



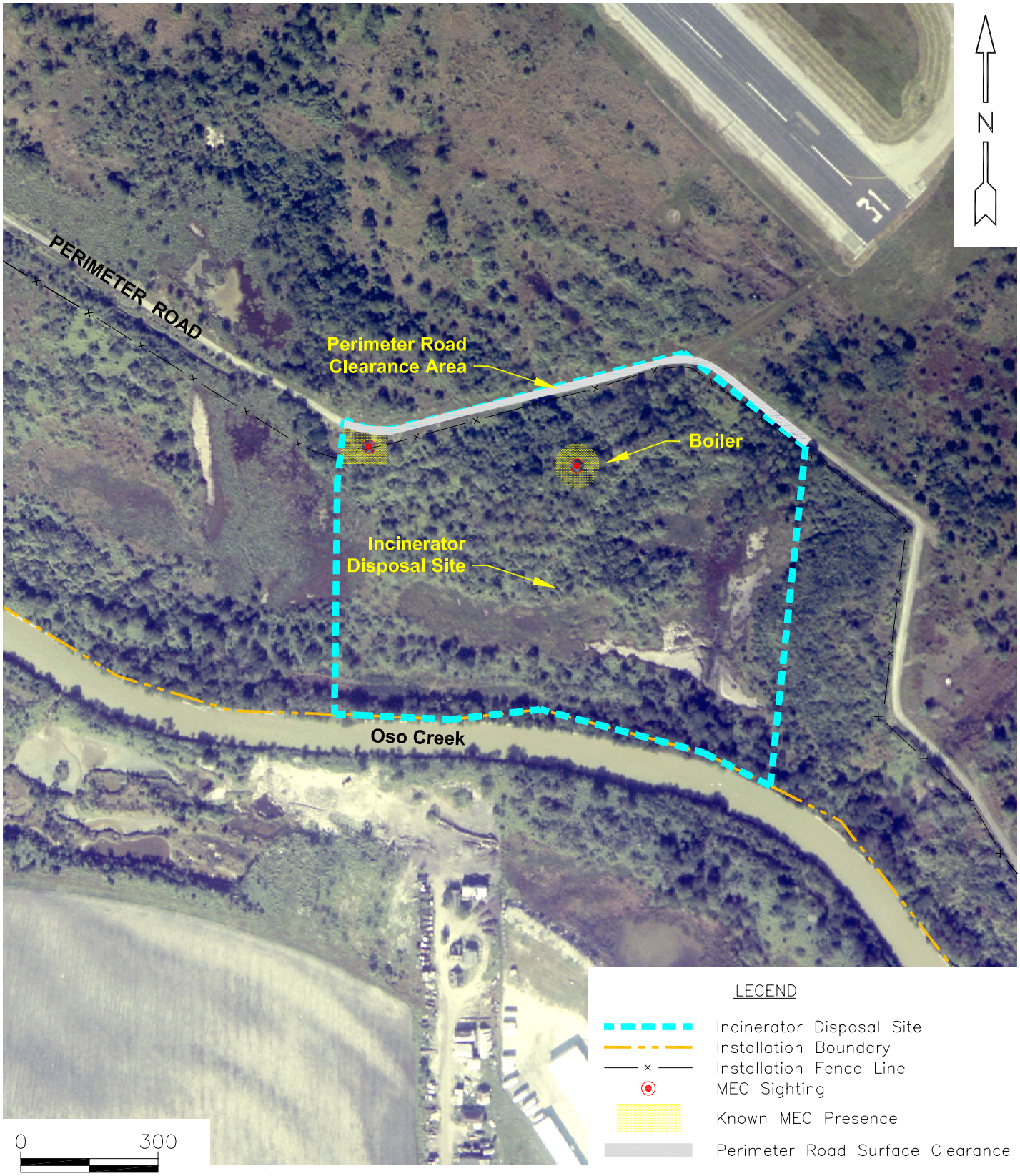
DRAWN BY JF DATE 6/29/06	NAVFAC	AREA LOCATION MAP NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB DATE 6/29/06			OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 REV. 0

00356SM.dwg 10-11-06 JFF

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF	DATE 7/05/06	SITE MAP INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB	DATE 7/05/06		OWNER NO. 0023
REVISED BY --	DATE ------		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 / REV. 0

00356SM2.dwg 10-11-06 JFF



LEGEND

- Incinerator Disposal Site
- Installation Boundary
- Installation Fence Line
- MEC Sighting
- Known MEC Presence
- Perimeter Road Surface Clearance

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF	DATE 7/05/06	MUNITIONS RESPONSE SITES INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB	DATE 7/05/06		OWNER NO. 0023
REVISED BY --	DATE ------		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3 / REV. 0

600 0 600 Feet

Scale in Feet

DRAWN BY J. FLESCH	DATE 09-21-06
CHECKED BY D. LINDSAY	DATE 09-21-06
REVISED BY - - - -	DATE - - - -
SCALE AS NOTED	

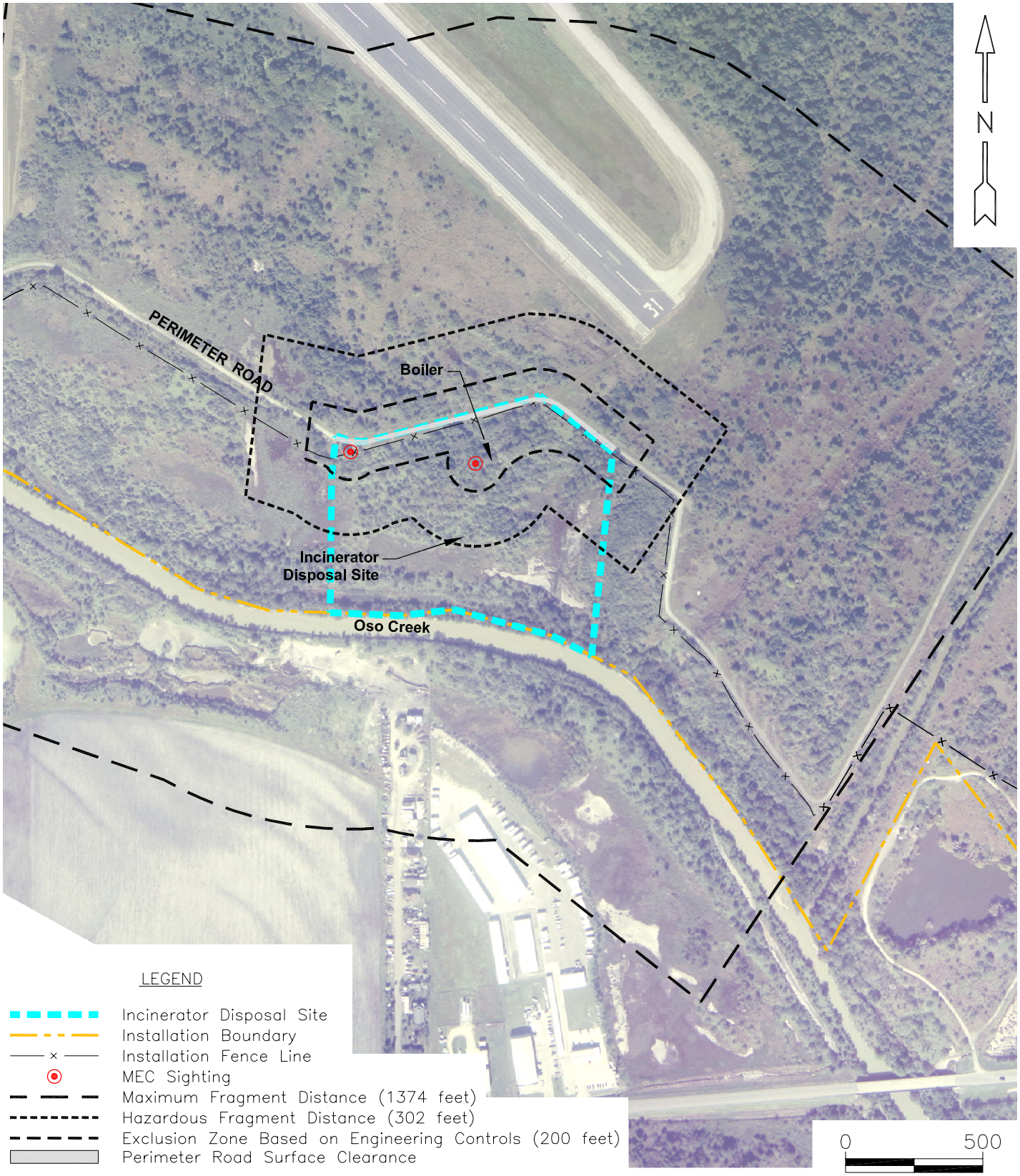
NAVFAC

NASCC WEAPONS COMPLEX

NALF CABANISS, TEXAS

CONTRACT NO. 0356	
OWNER NO. 0023	
APPROVED BY _____	DATE ___
DRAWING NO. FIGURE 4	REV. 0

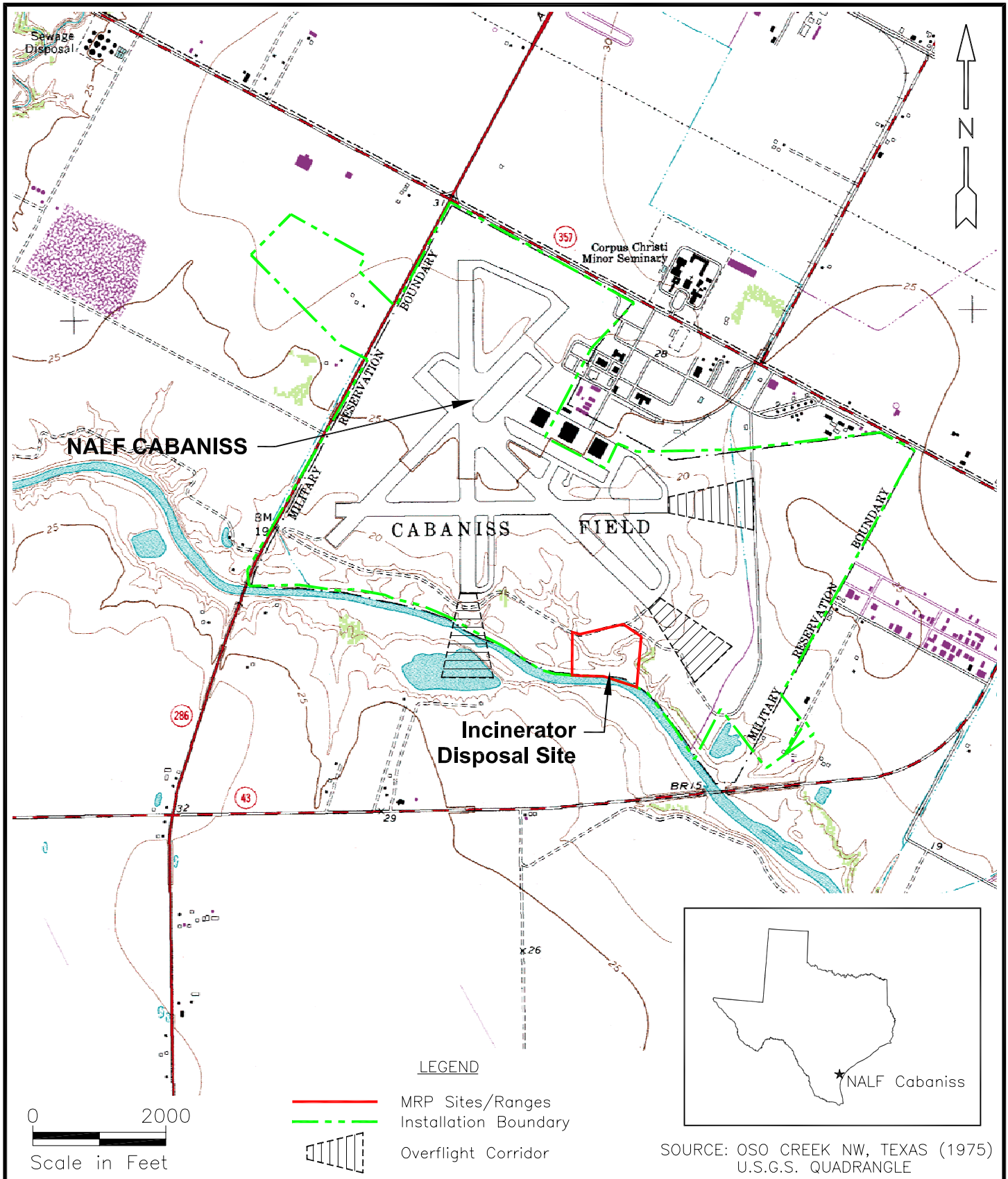
00356SM9.dwg 02-23-07 JFF



NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF DATE 2/23/07	NAVFAC	EXPLOSIVE SAFETY QUANTITY DISTANCE ARCS INCINERATOR DISPOSAL SITE	CONTRACT NO. 0356
CHECKED BY LB DATE 2/23/07		NALF CABANISS, TEXAS	OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 5 / REV. 0

00356TOPO2.dwg 10-11-06 JFF



SOURCE: OSO CREEK NW, TEXAS (1975) U.S.G.S. QUADRANGLE

DRAWN BY JF DATE 7/19/06	NAVFAC	OVERFLIGHT CORRIDORS NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB DATE 7/19/06			OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 6 REV. 0

DRAWN BY	DATE
J. FLESCH	09-21-06
CHECKED BY	DATE
D. LINDSAY	09-21-06
REVISED BY	DATE
- - - -	- - - -
SCALE	
AS NOTED	

NAVFAC

ROUTE FROM NALF CABANISS
TO NASCC WEAPONS COMPLEX

NALF CABANISS, TEXAS

CONTRACT NO.	
0356	
OWNER NO.	
0023	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 7	1

ATTACHMENT A

FRAGMENTATION DATA REVIEW FORM

FRAGMENTATION DATA REVIEW FORM

Category:	HE Rounds	DODIC:	H469
Munition:	2.75" M229 Rocket	Date Record Created:	7/30/2004
		Last Date Record Updated:	6/20/2005
Primary Database Category:	rocket	Individual Last Updated Record:	Crull
Secondary Database Category:	2.75 in	Date Record Retired:	
Tertiary Database Category:	Comp B		

Munition Information and Fragmentation Characteristics

Explosive Type:	Comp B
Explosive Weight (lb):	4.80000
Diameter (in):	2.7500
Max Fragment Weight (lb):	0.050092
Critical Fragment Velocity (fps):	5569

Theoretical Calculated Fragment Range

Range to No More Than 1 Hazardous Fragment/600 Square FeetA (ft):	302
Vertical Range of Maximum Weight Fragment (ft):	1088
Horizontal Range of Maximum Weight Fragment (ft):	1374

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	76
Inhabited Building Distance (09 psi), K50 Distance:	95
Intentional MSD (0065 psi), K328 Distance:	625

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	2.91
Mild Steel:	0.54
Hard Steel:	0.45
Aluminum:	1.18
LEXAN:	3.87
Plexi-glass:	2.44
Bullet Resist Glass:	1.90

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.050092
Critical Fragment Velocity (fps)SB:	5569
Kinetic Energy 106 (lb-ft2/s2)SB:	0.7768
Required Wall Roof Sandbag Thickness (in)SB:	24
Expected Maximum Sandbag Throw Distance (ft)SB:	135
Minimum Separation Distance (ft)SB:	200

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.050092
Critical Fragment Velocity (fps)W:	5569
Kinetic Energy 106 (lb-ft2/s2)W:	0.7768
Water Containment System:	1100 gallon tank
Minimum Separation Distance (ft)W:	200

Print This Form

Close Form

APPENDIX C

PROJECT PERSONNEL AND LOCAL POINTS OF CONTACT

PROJECT PERSONNEL AND LOCAL POINTS OF CONTACT

INCINERATOR DISPOSAL SITE / SKEET & PISTOL RANGE SITE INSPECTION
NALF CABANISS
CORPUS CHRISTI, TEXAS

Attendees		Organization	Email Address	Phone
1.	Helen Lockard	NAVFAC SE	Helen.Lockard@navy.mil	(904)542-3991x4522
2.	Mike Hilger	NRS/NASCC Env.	michael.hilger@navy.mil	(361) 961-5354
3.	Mike Singletary	NAVFAC SE	michael.a.singletary@navy.mil	(843) 820-7357
4.	Nick Bruseño	NASCC - NALF Cabaniss		(361) 961-1999 (361) 961-2080
5.	Asa Taylor	NASCC Air Ops	asa.taylor@navy.mil	(361) 961-2246 (361) 533-1997
6.	Hal Resides	NASCC OSHM	hal.resides@navy.mil	(361) 961-3673
7.	Felix Hernandez	NASCC OSHM	hfelix.hernandez@navy.mil	(361) 961-2828
8.	Caroline Scheible	NASCC Safety	caroline.scheible@navy.mil	(361) 961-4470
9.	Bart Blazer	NASCC Security	bart.blazer@navy.mil	(361) 961-2375
10.	Matt Dillon	NASCC WEPS	matthew.e.dillon@navy.mil	(361) 961-2640 / 2375 / 2282
11.	Raymond Smith	NASCC WEPS	raymond.smith2@navy.mil	(361) 961-2223
12.	James Rominger	NASCC WEPS	james.r.rominger@navy.mil	(361) 961-2223
13.	Mark Weil	NASCCFD	mark.r.weil@navy.mil	(361) 961-3369
14.	Chris Siegel	TCEQ	csiegel@tceq.state.tx.us	(512) 239-2992
15.	Jim Pastorick	TCEQ Consultant UXO Pro Inc.	Jim@uxopro.com	(703) 548-5300
16.	Larry Basilio	Tetra Tech	basiliol@ttnus.com	(832) 251-6018
17.	Ralph Basinski	Tetra Tech	ralph.basinkski@ttnus.com	(412) 921-8308
18.	Ralph Brooks	Tetra Tech	Ralph.brooks@ttnus.com	(770) 413-0965 x231
19.	Chris Pike	Tetra Tech	chris.pike@ttnus.com	(412) 921-8861
20.	Mike Campbell	Tetra Tech	Michael.campbell@ttnus.com	(865) 220-4714

APPENDIX D

NASCC TRANSPORTATION PROCEDURES AND ATF LICENSING REQUIREMENTS

DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 55), you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT ATF CORRESPONDENCE TO	CHIEF, NATIONAL LICENSING CENTER ATF 2600 CENTURY PARKWAY, SUITE 400 Atlanta, GA 30345	LICENSE/ PERMIT NUMBER	1-GA-089-33-7K-00431
		EXPIRATION DATE	October 1, 2007
NAME	TETRA TECH NUS INC	Premises Address	2046 WEST PARK PLACE BLVD SUITE A STONE MOUNTAIN, GA 30087-
TYPE OF LICENSE OR PERMIT	33-USER OF HIGH EXPLOSIVES		
CHIEF, NATIONAL LICENSING CENTER			

PURCHASING CERTIFICATION

I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.

(SIGNATURE OF LICENSEE/PERMITTEE)

LICENSEE OR PERMITTEE MAILING ADDRESS-

TETRA TECH NUS INC
2046 WEST PARK PLACE BLVD SUITE A
STONE MOUNTAIN, GA 30087-

The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR Part 55. The signature on each reproduction must be an ORIGINAL signature.

ATF F 5400.14/5400.15, Part 1 (8/89)

DEPARTMENT OF JUSTICE

Bureau of Alcohol, Tobacco,
Firearms and Explosives

Martinsburg, WV 25401

October 9, 2007

Tetra Tech Nus Inc

2171 West Park Court Suite E
Stone Mountain, GA 30087-

901090:CRR/DJB
5400
File Number: 1-GA-00431

Premises Address: 2171 West Park Court Suite E, Stone Mountain, GA 30087-

Dear Sir/Madam:

This letter acknowledges receipt of your timely application to renew your Federal explosives license/permit (1-GA-00431) as a User Of High Explosives. The Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) is not able to process your application prior to the expiration date of your license/permit. However, Federal law allows you to continue operations under your current license/permit until such time as ATF completes processing your application. See 5 U.S.C. § 558. This letter, or as explained below, a follow-up letter, will serve as your license/permit until we complete action on your renewal. It is referred to as a Letter of Authorization (LOA).

Since we have not completed processing your application, you may supply a copy of this letter to other licensees/permittees, e.g., your distributors, for the next six months (or until we complete action on your renewal, if that occurs in less than six months) as evidence of your licensed/permitted status. If we have not completed processing your application for renewal within six months of the date of this letter, we will send you another letter, which will also be valid for six months (or until we complete action on your renewal, if that occurs in less than six months). This is of course contingent upon your remaining entitled to continue operations under your current license/permit.

Please direct questions or concerns regarding this letter to Lydia Otalora at (877)283-3352.

Sincerely,

Christopher R. Reeves

Christopher R. Reeves
Chief, Federal Explosives Licensing Center

ATF web address: www.atf.gov

U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives
Federal Explosives Licensing Center (FELC)
www.atf.gov

Federal Explosives Licensing Center
244 Needy Road
Martinsburg, West Virginia 25401-9431
telephone: (877)283-3352 fax: (304)260-1141

09/18/2007

NOTICE OF CLEARANCE

for individuals transporting, shipping, receiving, or possessing explosive materials.

ISSUED TO: TETRA TECH NUS INC
NOTICE DATE: 09/18/2007

Federal Explosives license/permit no.: 1-GA-089-33-7K-00431
Expiration Date: October 1, 2007
Explosives License/Permit Type: 33-USER OF HIGH EXPLOSIVES

EXPIRATION DATE: This Notice expires when superseded by a newer Notice which will list all current responsible persons and employee possessors, or when the license or permit expires - whichever comes first.

1. WARNING. Only those individuals listed below as RESPONSIBLE PERSONS and EMPLOYEE POSSESSORS with a background clearance status of "CLEARED" or "PENDING" are authorized to transport, ship, receive, or possess explosive materials in the course of employment with you.
2. "DENIED" STATUS. If an employee possessor has a background clearance status of "DENIED", you MUST take immediate steps to remove the employee from a position requiring the transporting, shipping, receiving, or possessing of explosive materials. Also, if the employee has been listed as a person authorized to accept delivery of explosive materials, you MUST remove the employee from such list and immediately, and in no event later than the second business day after such change, notify distributors of such change, as stated in 27 CFR 555.33(a).
3. CHANGE IN RESPONSIBLE PERSONS. You MUST report any change in responsible persons to the Chief, Federal Explosives Licensing Center, within 30 days of the change and new responsible persons MUST include "appropriate identifying information" as defined in 27 CFR 555.11. Fingerprints and photos are NOT required, however they will be required upon renewal of the license or permit.
4. CHANGE OF EMPLOYEES. You MUST report any change of employee/possessors to the Chief, FELC, within 30 days. Reports relating to newly hired employees must be submitted on ATF Form 5400.28 for EACH employee.

Premises Address: 2171 WEST PARK COURT SUITE E
STONE MOUNTAIN, GA 30087

Mailing Address:
TETRA TECH NUS INC
2171 WEST PARK COURT SUITE E
STONE MOUNTAIN, GA 30087

This 'Notice of Clearance' is provided to you as required by 18 U.S.C. 843(h) and MUST be retained as part of your permanent records and be made available for examination or inspection by ATF officers as required by 27 CFR 555.121. If you receive a Notice subsequent to this Notice, this Notice will no longer be valid.

In accordance with 27 CFR 555.33, Background Checks and Clearances, and 27 CFR 555.57, Change of Control, Change in Responsible Persons, and Change of Employees, ATF's Federal Explosives Licensing Center (FELC) has conducted background checks on the individual(s) you identified as a responsible person(s) and an employee/possessor(s) on your application, or reported after the issuance of your license/permit.

The following is a SUMMARY of the results of the background checks conducted on the individuals you reported as responsible persons and employee/possessors. ATF will be notifying ALL individuals listed on this document of their respective status by separate letter mailed to their residence address.

PLEASE BE ADVISED THAT IT IS UNLAWFUL FOR ANY PERSON REFLECTING A STATUS OF "DENIED" TO TRANSPORT, SHIP, RECEIVE, OR POSSESS EXPLOSIVE MATERIALS.

Please carefully review this Notice to ensure that all the information is accurate. If this Notice is incorrect, please return the Notice to the Chief, FELC, with a statement showing the nature of the error(s). The Chief, FELC, shall correct the error, and return a corrected Notice.

Number of RESPONSIBLE PERSON(S) : 4
Number of EMPLOYEE POSSESSOR(S): 0

LAST NAME, First Name, Middle Name	Clearance Status
RESPONSIBLE PERSONS:	4
0001 BRICKER, TIMOTHY ROBERT	Cleared
0002 BROOKS, RALPH LOUIS	Cleared
0003 FOURNIER, JEFFREY MICHAEL	Cleared
0004 SAMUELS, ERIC MARK	Cleared
EMPLOYEE POSSESSORS:	0

continued

LAST NAME, First Name, Middle Name	Clearance Status

RALPH LOUIS BROOKS

Responsible Person Letter of Clearance for:

U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives
National Licensing Center
2600 Century Parkway NE
Atlanta, GA 30345

901020: LMV/FLS
5400
File Number: 1GA00431

10/04/2005

SUBJECT: **RESPONSIBLE PERSON LETTER OF CLEARANCE for:**

RALPH LOUIS BROOKS 03/14/1956 541686587

UXO MANAGER
(770)632-5754

200 WINDGATE CT
PEACHTREE CITY, GA 30269

and is ONLY valid under the following Federal explosives license/permit:

1-GA-089-33-7K-00431

TETRA TECH NUS INC
2046 W PARK PLACE BLVD STE A
STONE MOUNTAIN, GA 30087-3536

Dear RALPH BROOKS:

You have been approved as a responsible person under the above-listed Federal explosive license or permit. You may lawfully direct the management or policies of the business or operations as they pertain to explosives. You may also lawfully transport, ship, receive or possess explosive materials incident to your duties as a responsible person. **This clearance is only valid under the license or permit referenced above.**

Sincerely,

Lilia M. Vannett
Chief, National Licensing Center

NLC Customer Service. If you believe that information on your "Letter of Clearance" is incorrect, please return a COPY of the letter to the Chief, National Licensing Center, with a statement showing the nature of the error. The Chief, National Licensing Center, shall correct the error, and return an amended letter to you.

Mail: ATF
Chief, National Licensing Center
Attn.: LOC Correction
2600 Century Parkway NE
Atlanta, GA 30345-3100

Fax: 1-866-257-2749 (toll-free)
Chief, National Licensing Center
Attn.: LOC Correction

Call toll-free: 1-866-662-2750

1GA00431-R-10/04/2005-541686587-BROOKS-RALPH-LOUIS-03/14/1956-UXO MANAGER

WWW.ATF.GOV

Brooks, Ralph

From: Barker, Betsy M. [Betsy.M.Teyssier@usdoj.gov]
Sent: Thursday, February 14, 2008 8:16 AM
To: Brooks, Ralph
Subject: RE: Change to Employee Possessors

Ralph,

In the future, please fax these documents to 304-616-4401.

Thanks,
Betsy

From: Brooks, Ralph [mailto:Ralph.Brooks@tetratech.com]
Sent: Tuesday, February 12, 2008 4:00 PM
To: Barker, Betsy M.
Subject: RE: Change to Employee Possessors

Betsy,
Please see attached documents.

Thanks,

PLEASE NOTE NEW CELL NUMBER

Ralph Brooks | Tetra Tech UXO Manager
Direct: 770.413.0965 Ext 231 | **Work Cell: 404.661.4916** | Fax: 770.413.6733
ralph.brooks@ttnus.com

Tetra Tech | Atlanta Office
2171 West Park Court Suite E | Stone Mountain, GA 30087 | www.ttnus.com

PLEASE NOTE: This message, including any attachments, may include privileged, confidential and/or inside information. Any distribution or use of this communication by anyone other than the intended recipient is strictly prohibited and may be unlawful. If you are not the intended recipient, please notify the sender by replying to this message and then delete it from your system.

From: Barker, Betsy M. [mailto:Betsy.M.Teyssier@usdoj.gov]
Sent: Tuesday, November 06, 2007 2:51 PM
To: Brooks, Ralph
Subject: RE: Change to Employee Possessors

Ralph,

We received your email today and the employee possessors will be added to your license once their background clears. We are a little backlogged, but the individuals you have submitted to be added as possessors can work until we would tell them otherwise.

Thanks,
Betsy Barker
Customer Service
877-283-3352

From: Brooks, Ralph [mailto:Ralph.Brooks@tetratech.com]
Sent: Tuesday, November 06, 2007 11:31 AM
To: FELC
Subject: Change to Employee Possessors

<<DOC109.PDF>>
Please see the attached document.

Thanks,

PLEASE NOTE NEW CELL NUMBER

Ralph Brooks | Tetra Tech UXO Manager
Direct: 770.413.0965 Ext 231 | **Work Cell: 404.661.4916** | Fax: 770.413.6733
ralph.brooks@ttnus.com

Tetra Tech | Atlanta Office
2171 West Park Court Suite E | Stone Mountain, GA 30087 | www.ttnus.com

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From: Brooks, Ralph
Sent: Tuesday, September 18, 2007 10:57 AM
To: 'FELC2@atf.gov'
Subject: Change to Employee Possessors

Attention: Lidia O

Please see the attached document. I tried to fax is and was not able to get it through.

If you have any question please give me a call at the number below.

Sincerely << File: DOC071.PDF >> ,

PLEASE NOTE NEW CELL NUMBER

Ralph Brooks | Tetra Tech UXO Manager
Direct: 770.413.0965 Ext 231 | **Work Cell: 404.661.4916** | Fax: 770.413.6733
ralph.brooks@ttnus.com

Tetra Tech | Atlanta Office
2171 West Park Court Suite E | Stone Mountain, GA 30087 | www.ttnus.com

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November 06, 2007

Chief of Federal Explosives Licensing Center
244 Needy Road
Martinsburg, West Virginia 25401

Attention: Sharon Wege

Dear Ms Wege:

Tetra Tech NUS, Inc. would like to formally request a change in Employee Possessor(s) status under our Federal Explosives license/permit number: 1-GA-089-33-7K-00431. We requested the addition of:
Rodgers, Sydney Earl (Social Security Number 006-42-7222)
Dummitt, Peter Raymond (Social Security Number 360-40-6759)
as Employee Possessors as they are in positions with Tetra Tech NUS, Inc. which requires them to possess and handle explosives. Please provide me with and updated Notice of Clearance for my files.

Tetra Tech NUS, Inc. appreciates your assistance with this matter. Should you have any questions or require additional information, please contact me at (770) 413-0965 ext 231.

Sincerely,

Ralph L. Brooks

Ralph L. Brooks
UXO Manager
Tetra Tech NUS, Inc.
2171 West Park Court
Stone Mountain, GA 30087

February 8, 2008

Chief of Federal Explosives Licensing Center
244 Needy Road
Martinsburg, West Virginia 25401

Attention: Sharon Wege

Dear Ms Wege:

Tetra Tech NUS, Inc. would like to formally request a change in Employee Possessor(s) status under our Federal Explosives license/permit number: 1-GA-089-33-7K-00431. We requested the addition of:
Montes, Frank Javier (Social Security Number 508-92-3450)
Yancey, Robert Thomas (Social Security Number 260-76-8787)
Childers, Glen Lee (Social Security Number 573-62-8229)
Alder, Edwin Earle (Social Security Number 266-92-1323)
as an Employee Possessor as they are in a position with Tetra Tech NUS, Inc. which requires them to possess and handle explosives. Please provide me with and updated Notice of Clearance for my files.

Tetra Tech NUS, Inc. appreciates your assistance with this matter. Should you have any questions or require additional information, please contact me at (770) 413-0965 ext 231.

Sincerely,

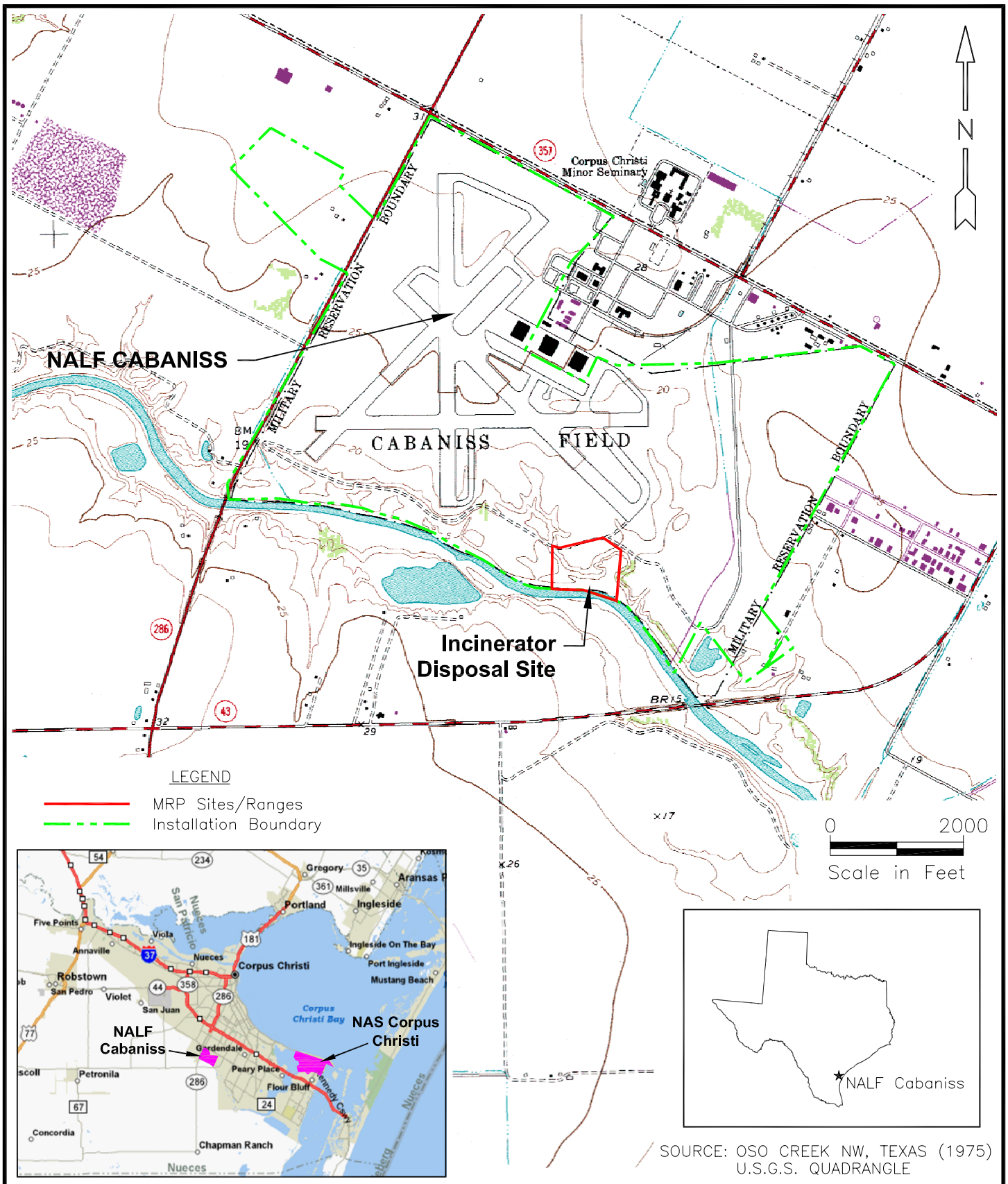
Ralph L. Brooks

Ralph L. Brooks
UXO Manager
Tetra Tech NUS, Inc.
2171 West Park Court
Stone Mountain, GA 30087

APPENDIX E

SITE MAPS

00356TOPO.dwg 10-11-06 JFF



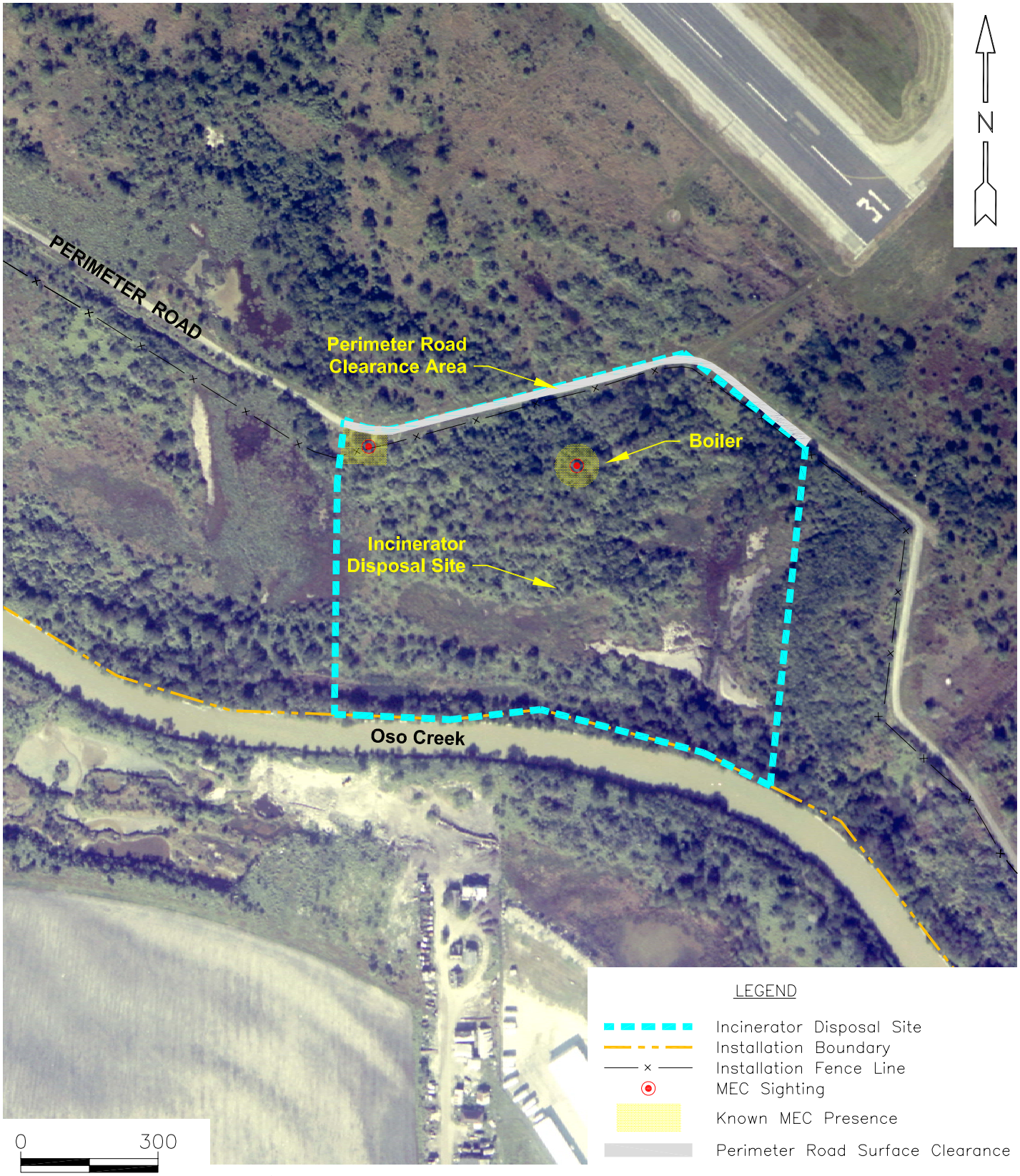
DRAWN BY JF DATE 6/29/06	NAVFAC	AREA LOCATION MAP NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB DATE 6/29/06			OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 REV. 0

00356SM.dwg 10-11-06 JFF

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF	DATE 7/05/06	SITE MAP INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB	DATE 7/05/06		OWNER NO. 0023
REVISED BY --	DATE ------		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 / REV. 0

00356SM2.dwg 10-11-06 JFF



LEGEND

- Incinerator Disposal Site
- Installation Boundary
- Installation Fence Line
- MEC Sighting
- Known MEC Presence
- Perimeter Road Surface Clearance

NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF	DATE 7/05/06	MUNITIONS RESPONSE SITES INCINERATOR DISPOSAL SITE NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB	DATE 7/05/06		OWNER NO. 0023
REVISED BY --	DATE ------		APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3 / REV. 0

600 0 600 Feet

Scale in Feet

DRAWN BY J. FLESCH	DATE 09-21-06
CHECKED BY D. LINDSAY	DATE 09-21-06
REVISED BY - - - -	DATE - - - -
SCALE AS NOTED	

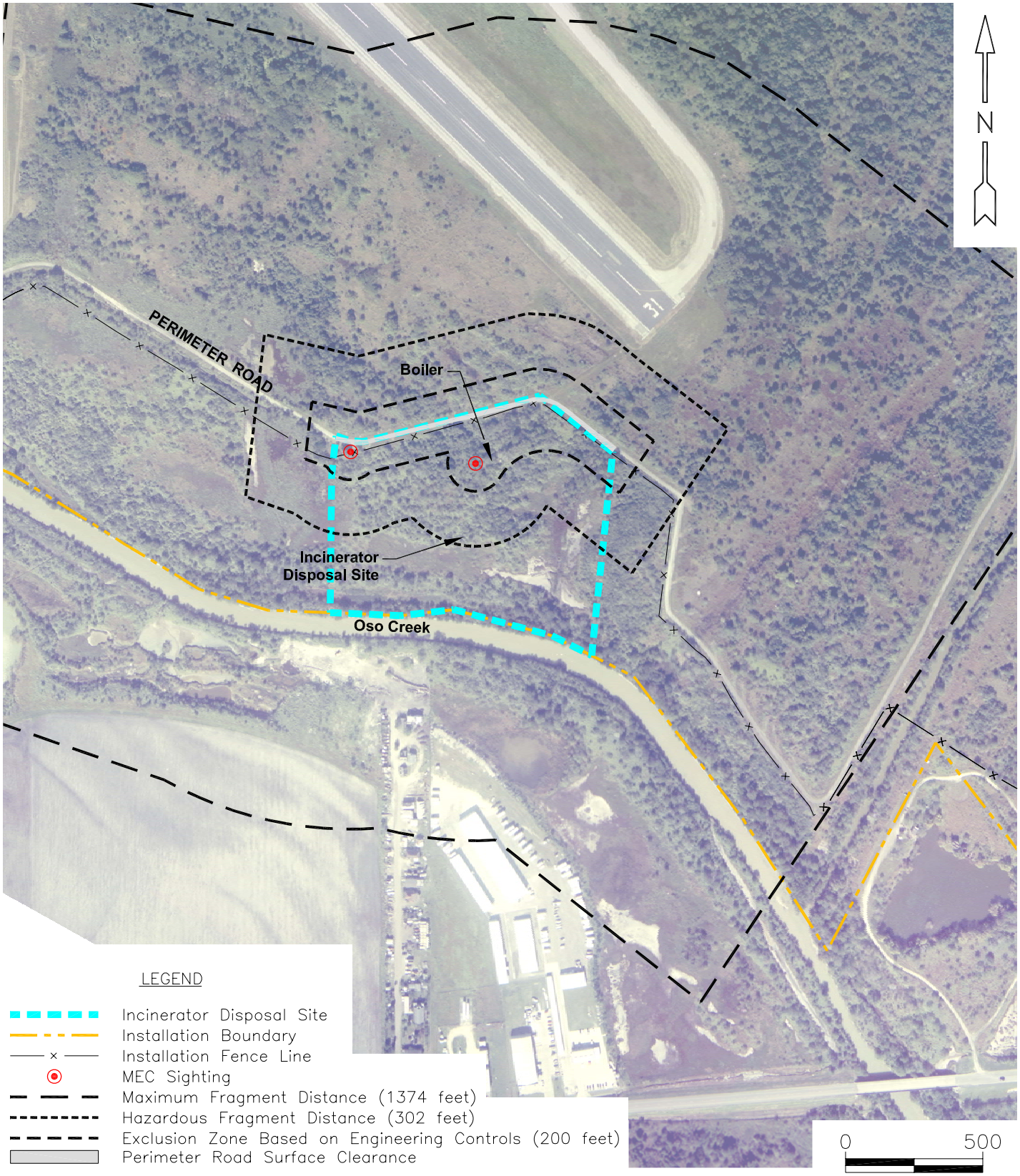
NAVFAC

NASCC WEAPONS COMPLEX

NALF CABANISS, TEXAS

CONTRACT NO. 0356	
OWNER NO. 0023	
APPROVED BY _____	DATE ___
DRAWING NO. FIGURE 4	REV. 0

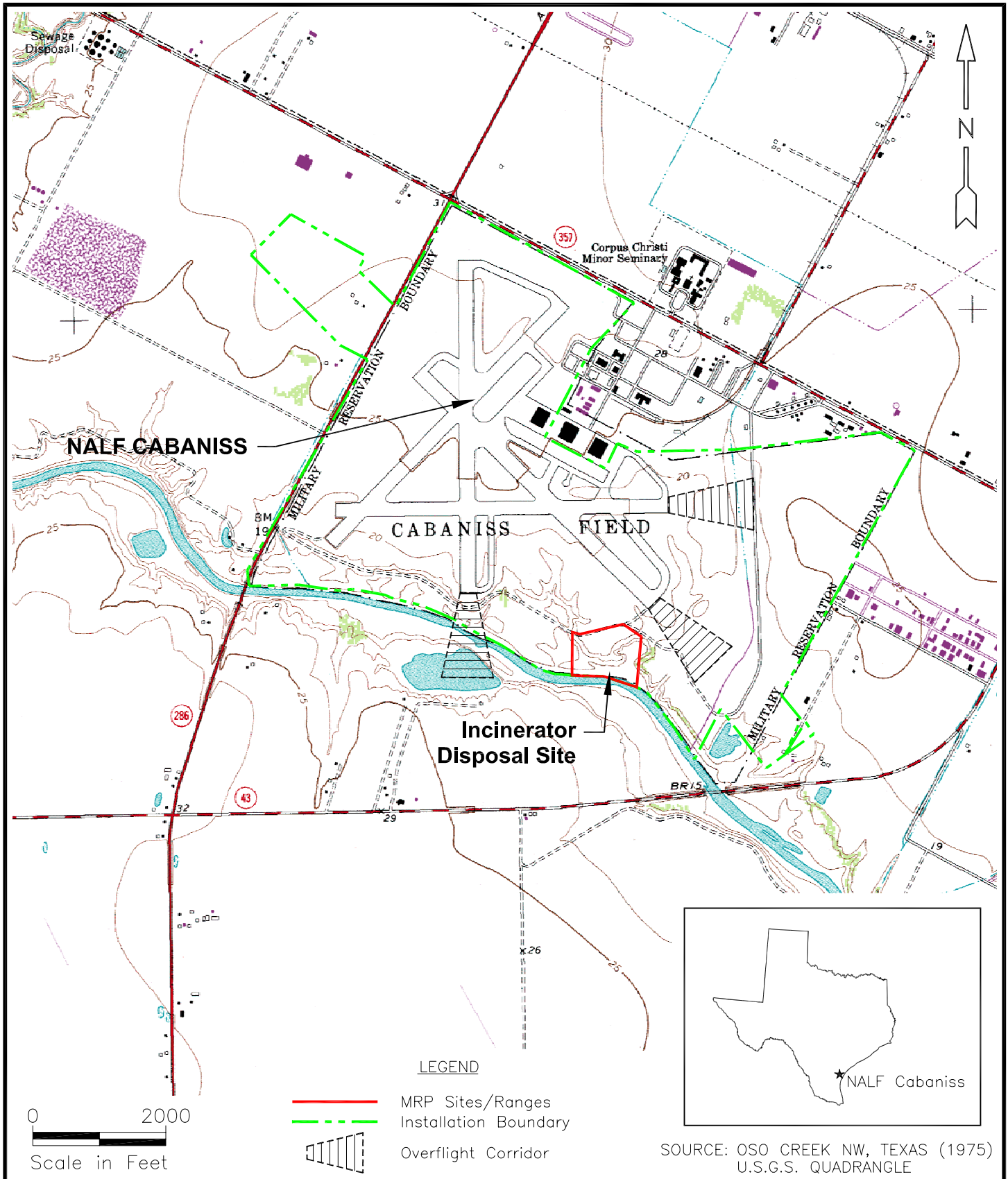
00356SM9.dwg 02-23-07 JFF



NOTE: MEC Presence was determined through review of historical documentation, interviews and visual survey.

DRAWN BY JF DATE 2/23/07	NAVFAC	EXPLOSIVE SAFETY QUANTITY DISTANCE ARCS INCINERATOR DISPOSAL SITE	CONTRACT NO. 0356
CHECKED BY LB DATE 2/23/07		NALF CABANISS, TEXAS	OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 5 / REV. 0

00356TOPO2.dwg 10-11-06 JFF



SOURCE: OSO CREEK NW, TEXAS (1975) U.S.G.S. QUADRANGLE

DRAWN BY JF DATE 7/19/06	NAVFAC	OVERFLIGHT CORRIDORS NALF CABANISS, TEXAS	CONTRACT NO. 0356
CHECKED BY LB DATE 7/19/06			OWNER NO. 0023
REVISED BY -- DATE ------			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 6 REV. 0

DRAWN BY	DATE
J. FLESCH	09-21-06
CHECKED BY	DATE
D. LINDSAY	09-21-06
REVISED BY	DATE
- - - -	- - - -
SCALE	
AS NOTED	

NAVFAC

ROUTE FROM NALF CABANISS
TO NASCC WEAPONS COMPLEX

NALF CABANISS, TEXAS

CONTRACT NO.	
0356	
OWNER NO.	
0023	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 7	1

APPENDIX F

ACCIDENT PREVENTION PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 0
March 2008

Munitions and Explosives of Concern Accident Prevention Plan
for the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

NAVFAC
Naval Facilities Engineering Command
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

TETRA TECH NUS, Inc.

REVISION 1
MARCH 2008

MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) ACCIDENT PREVENTION PLAN

TIME CRITICAL REMOVAL ACTION (TCRA) AND SITE INSPECTION

LOCATED AT THE

INCINERATOR DISPOSAL SITE NAVAL AUXILIARY LANDING FIELD CABANISS, CORPUS CHRISTI, TEXAS

Submitted to:
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

Submitted by:
Tetra Tech NUS, Inc.
661 Anderson Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 0023

MARCH 2008

PREPARED UNDER THE SUPERVISION OF:	APPROVED FOR SUBMITTAL BY:
G. KENNETH GRIM, P.G.	MATTHEW M. SOLTIS, CIH, CSP
PROJECT MANAGER/TASK ORDER MANAGER	CLEAN HEALTH AND SAFETY MANAGER
TETRA TECH NUS, INC.	TETRA TECH NUS, INC.
HOUSTON, TEXAS	PITTSBURGH, PENNSYLVANIA

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ATTACHMENT 1 – ACCIDENT PREVENTION PLAN TRAINING DOCUMENTATION

1.0 BACKGROUND INFORMATION

An Accident Prevention Plan (APP) is, in essence, a safety and health policy and program document. This APP shall interface with the Tetra Tech NUS, Inc. (TtNUS) overall safety and health program and the Site Safety and Health Plan. Employees shall review and be familiar with the TtNUS overall safety and health plan and the Site Safety and Health Plan as well as this APP.

1.1 SITE DESCRIPTION

Naval Auxiliary Landing Field (NALF) Cabaniss is an outlying field that supports naval air training operations out of Naval Air Station Corpus Christi (NASCC), Texas. The NALF Cabaniss installation occupies 923 acres and was originally constructed with four 5,000-foot runways. Only two runways, oriented in north/south and northwest/southeast directions, are presently active and maintained. The primary role of the installation is to support flight training operations originating from NASCC. Training Air Wing FOUR, based at NASCC main installation, performs touch-and-go landing training between the main installation, and NALF Cabaniss. The airfield is lighted, so that night flight training, as well as daylight training, is possible.

A site visit, conducted by Malcolm Pirnie, Inc. to produce a Preliminary Assessment (PA) Report (April 2005), indicated that there is a former Incinerator Disposal Site, and also a former Skeet and Pistol Range, (addressed in a separate Work Plan), located at NALF Cabaniss. The former Incinerator Disposal Site was located southwest of Runway 31 and west of the former Skeet and Pistol Range, within the boundaries of a former sanitary landfill. Though the exact dimensions are unknown, the former Incinerator Disposal Site may have occupied approximately 17 acres.

The former Incinerator Disposal Site was used by the City of Corpus Christi and the Army to incinerate ordnance items, small arms, and confiscated drug material in a boiler. The Army used the eight-foot long by five-foot diameter boiler for the incineration of ordnance items including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and “possibly 80mm rockets.” (likely 2.75-inch rockets) Incinerator operations began at an unknown date and were terminated in approximately 1980. The area is currently covered in dense vegetation and has no military use. A visual survey conducted by Malcolm Pirnie, Inc. during their site visit to support the PA process indicated the presence of munitions scrap at the site in two discrete locations:

1.) in and around the former boiler
2.) on the ground surface near Perimeter Road approximately 450 feet west of the boiler.

Malcolm Pirnie, Inc. observed the following thermally-treated munitions scrap during the visual survey performed on the site using a magnetometer to surface sweep the Incinerator Disposal Area: 7.62 mm small arms, 20 mm, 30 mm, and 40 mm projectiles, 5-pound practice bombs, and flares/pyrotechnics.

One 20 mm projectile was observed to be split in half with what appeared to be residual Explosive D compound exposed.

TtNUS conducted a site walk on 21 June, 2006, in conjunction with the kick-off meeting for the Site Inspection phase of this project. TtNUS employees, and others, escorted by a TtNUS UXO technician and NASCC personnel, visually observed the presence of munitions inside the former boiler and on the ground surface near Perimeter Road west of the boiler as noted in the PA.

The visual survey confirmed the presence of Munitions and Explosives of Concern (MEC) at the site. The presence of Munitions Constituents (MC) has not been evaluated up to this point, but sampling for MC will be part of the Site Inspection phase of this project. No records were found describing maintenance, closure, or remediation performed at the site for incinerated munitions.

2.0 STATEMENT OF SAFETY AND HEALTH POLICY.

See the TtNUS overall safety and health program and the Site Safety and Health Plan for this information.

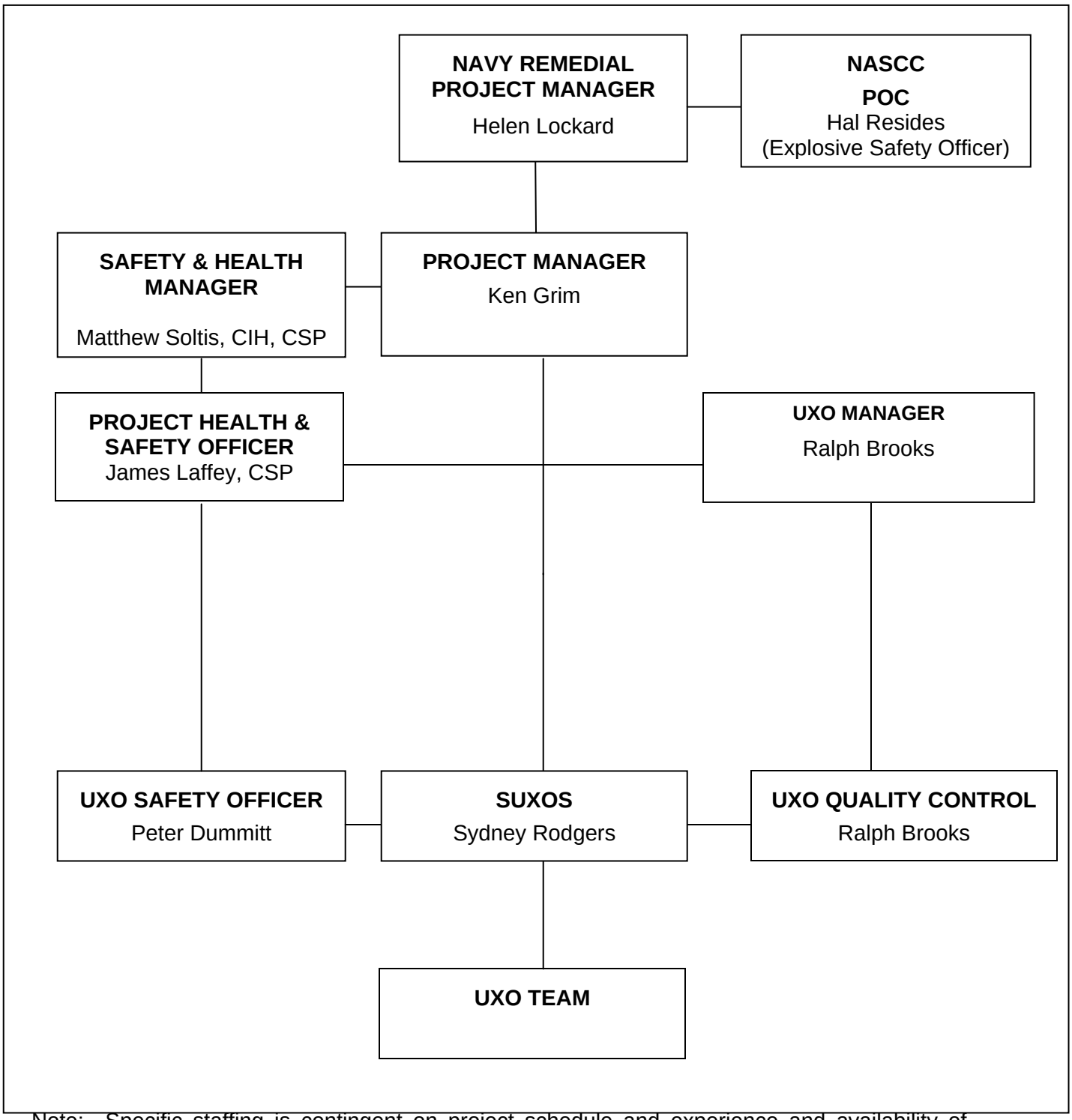
3.0 RESPONSIBILITIES AND LINES OF AUTHORITIES.

See the TtNUS overall safety and health program and the Site Safety and Health Plan for overall corporate and project safety responsibilities.

3.1 For MEC safety the Senior Unexploded Ordnance Supervisor (SUXOS), has over all project responsibility with support from the Unexploded Ordnance Safety Officer (UXOSO). In addition, each UXO Technician on site has the responsibility for MEC safety and the authority to stop work and report MEC safety issues as they arise to the SUXOS and UXOSO.

3.2 Lines of authority.

PROJECT LINES OF AUTHORITY FOR MEC SAFETY CHART



Note: Specific staffing is contingent on project schedule and experience and availability of personnel

3.2.1 Senior Unexploded Ordnance Supervisor (SUXOS)

This individual shall meet the minimum qualification standards listed in table 4-1, DDESB TP 18. This individual shall have at least 10 years UXO experience, which shall include 5 years in supervisory positions. A SUXOS must be able to fully perform all of the functions enumerated for UXO Sweep Personnel and UXO Technicians I, II, and III. In addition, the ability to perform the following functions is a requirement for the SUXOS: Planning, coordinating, and supervising all contractor on-site OE activities; preparing standing operating procedures (SOPs) for OE operations, ensuring compliance with DOD directives as well as local, state, and Federal statues and codes. The SUXOS must also be fully capable of supervising multiple project teams which may be performing OE and OE-related activities: e.g., vegetation removal; land surveying; reconnaissance and classification of OE, pyrotechnic items, and military explosives; locating surface and subsurface OE. The SUXOS is responsible for the following:

- If possible, make identification of any MEC or Munitions Debris without moving or disturbing the item;
- Direct UXO avoidance operations at the work site;
- Direct UXO Surface Sweep Operations at the work site;
- Direct UXO Explosive treatment Operations at the work site;
- Ensure proper notifications in the event that MEC or hazardous Munitions Debris is located which is not part of the approved Explosive Safety Submission. MEC or hazardous Munitions Debris will be identified, recorded in the field log book, and reported as required;
- Ensure that all aspects of the MEC Safety Plan are complied with at all times;
- Ensure proper selection of PPE; enforce proper wear, use and procedures;
- Stop work if unacceptable health and safety conditions exist or unsafe acts are observed;
- Ensure Site Worker MEC Safety Awareness briefings (initial and daily) are conducted and documented prior to work; and
- Ensure visitor MEC safety awareness briefing is conducted and documented prior to allowing visitors on site.

3.2.2. UXO Safety Officer [UXOSO]/UXO Quality Control [UXOQC]

This individual shall meet the minimum qualification standards listed in table 4-1, DDESB TP 18. This individual shall have at least 8 years UXO experience. In addition, this individual shall have the specific training, knowledge, and experience necessary to implement the SSHP and verify compliance with applicable safety and health requirements as well as the site quality control plan. This individual must be able to perform all functions enumerated for UXO Sweep Personnel and UXO Technicians I, II, and III. In addition, the UXOSO must have the ability to implement the approved OE and explosives safety program in compliance with all DOD, Federal, state, and local statutes and codes; analyze OE and explosives operational risks, hazards, and safety requirements; establish and ensure compliance with all site specific safety requirements for OE and explosives operations; enforce personnel limits and safety exclusion

zones for OE clearance operations, UXO and explosives transportation, storage, and destruction; conduct safety inspections to ensure compliance with OE and explosives safety codes; and operate and maintain air monitoring equipment required at a site for airborne contaminants. The UXOSO/UXOQC shall be on-site at all times during UXO related work and has immediate stop work authority. Other responsibilities of the UXOSO/UXOQC include:

- Be present during field activities to implement the SSHP;
- Inspect site activities to identify safety and occupational health deficiencies and correct them;
- Coordinate changes/modifications to the SSHP with the SHM;
- Ensure Site Worker MEC Safety Awareness briefings (initial and daily) are conducted and documented prior to work;
- Ensure visitor MEC safety awareness briefing is conducted and documented prior to allowing visitors on site;
- Ensure proper selection of PPE with SUXOS and enforce proper wear, use and procedures;
- Stop work if unacceptable health and safety conditions exist or unsafe acts are observed;
- Ensure site personnel are trained in accordance with the SSHP;
- Ensure that adequate communication between field personnel and emergency response personnel are available;
- Ensure required exclusion zones are established and maintained;
- Ensure intrusive operations are conducted in accordance to the Work Plan;
- Implement the approved MEC safety program in compliance with all federal, state, and local regulations;
- Analyze MEC and explosives operational risks, hazards, and safety requirements;
- Enforce personnel limits and safety exclusion zones for UXO operations;
- Conduct safety inspections to ensure compliance with MEC safety codes; and
- Conduct quality control inspections to ensure compliance with the work plan.

3.3 TEAM ORGANIZATION AND RESPONSIBILITY

The UXO Team is the TtNUS and subcontract personnel assigned to conduct UXO activities under the oversight of the SUXOS and UXOSO/UXOQC. All team members must give their prior consent to adhere to the provisions in the SSHP and this APP.

3.3.1 UXO Team Leader (UXO Tech III)

The UXO Team Leader (UXO Tech III) will have a minimum of 8 years of EOD/UXO experience including prior military EOD and/or commercial UXO experience in munitions response actions and/or range clearance activities. The UXO Team Leader may supervise up to 6 UXO Technicians. The UXO Team Leader will conduct UXO activities as directed by the SUXOS. The UXO Team Leader will meet the

minimum qualification standards as stated in Table 4-1 DDESB TP 18 dated 20 Dec 2004 and be under the direct supervision of the SUXOS.

3.3.2 UXO Technician (UXO Escort)

The UXO Technician will be assigned UXO Escort/Avoidance activities to ensure areas of intrusive operation, to include the installation of survey stakes, are free of anomalies and MEC concerns. The UXO Technician will conduct UXO Escort for all non-UXO personnel as needed to prevent accidental exposure to potential hazardous ordnance items. The UXO Technicians will meet the qualifications of a UXO Technician II at a minimum, and be under the supervision of the SUXOS/UXO Project Manager.

3.3.3 UXO Technicians (UXO Tech II or I)

The UXO Tech II will have prior military EOD experience, or a minimum of 3 years experience in munitions response actions or range clearance activities. The UXO Tech II will meet the minimum qualification standards stated in Table 4-1 DDESB TP 18. The UXO Tech I will have successfully completed a formal course of instruction as stated in DDESB TP 18. The UXO Technicians will conduct UXO activities as directed by the UXO Team Leader and the SUXOS and be under the direct supervision of the UXO Team Leader/SUXOS. The UXO Technicians will conduct the anomaly investigation effort to clear all non MEC items, and to identify all MEC and MEC related scrap items. In addition, the ability to perform the following functions is a requirement of the UXO Technician II or I: Properly storing OE material in accordance with applicable guidance; identifying fuzes and determining fuze condition; determining a magnetic azimuth using current navigational/locating equipment; performing field expedient identification procedures to identify explosives contaminated soil; preparing an on-site holding area for OE material; and operating modes of transportation for transporting OE material, when appropriate. The responsibilities of UXO team members include the following:

- Complying with all aspects of this Site Safety and Health Plan;
- Obeying the orders of the SUXOS;
- Notifying the SUXOS of hazardous or potentially hazardous incidents or working situations; and
- Stopping work if unacceptable safety conditions exist or unsafe acts are observed.

4.0 SUBCONTRACTORS AND SUPPLIERS.

See the TtNUS overall safety and health program and the Site Safety and Health Plan for this information.

5.0 TRAINING.

Prior to performing field activities at NALF Cabaniss, applicable TtNUS personnel and specified subcontractors must meet health and safety training requirements as outlined in this section.

5.1 HAZWOPER Training

TtNUS and subcontractor personnel engaged in UXO Avoidance, the excavation of anomalies, or activities where exposure to site contaminants could occur will be required to have:

- 40-Hour introductory General Site Worker Training [29 CFR 1910.120 (e)].
- 8-Hour Refresher Training is required annually for all applicable personnel, if it has been greater than a year since they have had their 40-Hour General Site Worker Training.
- Supervisory personnel will have an additional 8-hour training for Site Supervisors [29 CFR 1910.120 (e) (4)].

5.2 Subject Matter Training

In addition, in support of this project, on-site personnel will be provided training in:

- UXO Avoidance and Hazards of UXO expected to be encountered.
- Hazard Communication
- Hearing Conservation (29 CFR 1910.95)
- Blood borne Pathogens (29 CFR 1910.1030)

5.3 First-Aid/CPR

As the nearest emergency medical facility is more than 5 minutes travel time from the intended work areas, at least two members of the field team will hold current training in First Aid and Cardiopulmonary Resuscitation (CPR).

5.4 UXO Technician Training

UXO Personnel will have the required training and experience as listed in DDESB TP18 and described in Section 3.0.

5.5 Documentation

Documentation of introductory training or equivalent work experience, supervisory, and refresher training as well as site-specific training and subject matter training will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement.

5.6 SITE-SPECIFIC SAFETY HEALTH PLAN REVIEW (SITE-SPECIFIC TRAINING)

Prior to beginning field work, the SUXOS/UXOSO shall review this site-specific SSHP and this APP with the TtNUS field team and subcontractor field personnel. All personnel shall sign the acknowledgment to document the SSHP and APP orientation. During the SSHP and APP review, the SUXOS/UXOSO will discuss specific tasks to be performed and the objectives of the project with TtNUS and any subcontractor personnel. This initial review will be supplemented, with daily and, as needed, pre-task reviews which will include the review of pertinent AHAs, MSDSs, and other applicable documents with all intended task participants. Site-specific training will include:

- Names of personnel and their alternates who are responsible for health and safety;
- Safety, health, and other potential hazards present at the site;
- Proper use of assigned personal protective equipment (PPE), including respiratory protection if required;
- Work practices and restrictions to minimize hazard potentials on the site;
- Safe use of any implemented engineering controls and equipment on the site;
- Medical surveillance requirements, including the recognition of symptoms of overexposure to substances known or suspected to be on the site;
- Monitoring instrumentation to be used on the site;
- The contents of this AAP;
- Personnel decontamination procedures;
- Emergency procedures;
- Field communications;
- Fire precautions;
- Spill containment; and
- Other topics as specified in the SSHP and APP.

5.6.1 Tailgate Training Sessions

The tailgate sessions will be conducted periodically to:

- Review hazards and control measures of upcoming tasks
- To review lessons learned
- To review SUXOS/UXOSO Site Surveys findings/observations.

The training session will consist of a review of the applicable AHA(s) as they relate to the task assignment(s) in question. These sessions are intended to provide the communication line for reviewing protective measures and hazards associated with each operation. This SSHP, AHA, and APP will be used as the primary references for selecting levels of protection and control measures. However, this direction may be modified based on site-specific conditions/situations. Tailgate training sessions will be documented.

5.6.2 Pre-Work Nuts and Bolts Meeting

Prior to the commencement of work, site management personnel will attend a Nuts and Bolts Meeting with the NASCC Point of Contact, or designee, and NASCC safety staff.

6.0 SAFETY AND HEALTH INSPECTIONS.

The UXOSO will conduct an initial safety and health inspection prior to the start of field work, and/or prior to the start of a new type of field work not covered under a previous safety and health inspection. This initial inspection will be documented on a Safe Work Permit.

Each week during field work, a selected employee will conduct a re-inspection using the Safe Work Permit as a guide. This UXOSO will compare the re-inspection to the initial Safe Work Permit for that task. Any deficiency noted will be reviewed and corrected immediately or during the next daily safety meeting, as appropriate.

All inspections recorded on Safe Work Permits will be available on site for PM and Navy POC review.

7.0 SAFETY AND HEALTH EXPECTATIONS, INCENTIVE PROGRAMS, AND COMPLIANCE.

See the TtNUS overall safety and health program and the Site Safety and Health Plan for this information.

8.0 ACCIDENT/INCIDENT REPORTING.

In order to address potential emergency situations, the field crew will utilize public support services (911), or NASCC Security, if required. In order to accomplish this, Local Emergency Services have been identified and are listed in Section 9 of this APP. This includes phone numbers and a map to the closest emergency medical services provider. In addition the appropriate contacts will be notified as listed in the table below:

EMERGENCY CONTACT REFERENCE
NAS, CORPUS CRISTI, TEXAS

CONTACT	PHONE NUMBER
EMERGENCY NAS Corpus Christi Base Security (Dispatch) (Operations) (Operations Patrol)	**911** (361) 961-2375 (361) 961 3491 (361) 961-2282
Christi Spohn Hospital South (Primary Hospital)	(361) 985-5000
Navy Onsite Representative at NAS Corpus Christi Michael Hilger	(361) 961-5354
NAS Corpus Christi Explosive Safety Officer Hal Resides	(361) 961-3673
NAS Corpus Christi Explosive Ordnance Support This contact will be employed for imminent hazardous situations dealing with UXO/MEC. All will go through Hal Resides.	(361) 961-3673
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
Poison Control Center	(800) 222-1222
WorkCare	(800) 455-6155 ext. 109
Project Manager/Task Order Manager G. Kennith Grim, P.G.	(832) 251-6023
Health and Safety Manager Matthew M. Soltis, CIH, CSP	(412) 921-8912
Project Health and Safety Officer Thomas M. Dickson, CSP	(412) 921-8457

8.1 Recognition and Prevention

Control measures listed in Section 13.0 will be the primary methods employed for controlling potential emergencies. Any hazards listed in Section 13.0 that come to full realization will be considered emergencies.

Should an emergency occur the following will be conducted:

- Care for any injured persons.
- Call NAS Corpus Christi Security Dispatch – They will notify appropriate responding agency (Fire, ambulance, etc.).
- For UXO/MEC - The Team will provide security of the area until responding agencies arrive.

8.2 POTENTIAL EXPOSURE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management of injury situations. In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this APP by suitable and appropriate conveyance (i.e. ambulance for serious events).
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a Tetra Tech NUS, Inc. (TtNUS) employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, or follow the voice prompt after hours and on weekends and be prepared to provide:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved TtNUS employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact TtNUS Corporate Health and Safety Department (Matt Soltis) at 1-800-245-2730.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare. WorkCare will compile the results of all data and provide a summary report of the incident. A copy of this report will be placed in each victim's medical file in addition to being distributed to appropriately designated company officials.

Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known):_____

_____

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing?_____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was there skin contact?_____

Was the exposing agent inhaled?_____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)
Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)
None: _____ Self-Medicated: _____Physician Treated: _____

9.0 MEDICAL SUPPORT.

9.1 Emergency Medical Treatment

Tetra Tech NUS, Inc. personnel are only permitted to provide treatment to the level of their First-Aid Training. It should also be noted that all first aid shall be administered voluntarily. Tetra Tech NUS, Inc. personnel will employ the following in an emergency situation:

- Engage emergency notification.
- If it will not endanger the injured individual (i.e., spinal cord injury, etc.) transport to the identified medical facility.
- Begin life saving techniques as appropriate (CPR, cooling or warming regimens, etc.)

9.2 Route to the Hospital:

Christus Spohn Hospital South
5950 Saratoga Blvd
Corpus Christi, TX 78414
(361) 985-5000

Directions to Christus Spohn Hospital South:

Exit base going SOUTHWEST on KOSTORYZ RD toward SARATOGA BLVD / TX-357 E. <0.1 miles

Turn LEFT onto SARATOGA BLVD / TX-357 E. 3.5 miles

End at **Christus Spohn Hospital South:**

5950 Saratoga Blvd, Corpus Christi, TX 78414, US

Total Est. Time: 6 minutes

Total Est. Distance: 3.54 miles

9.3 Medical Data Sheet

Each person on site will complete a medical data sheet prior to starting field work. This information will be maintained on site and provided to medical personnel when needed.

MEDICAL DATA SHEET

This attachment must be completed for each field crew member (Tetra Tech NUS, Inc. and subcontractor personnel) and approved visitors who wish to enter active operational zones. Information provided in this document should contain information you would want medical personnel to know concerning your medical profile in the event you would be incapacitated. This Medical Data Sheet should be kept in a central location during site operations. This data sheet will accompany any personnel when medical assistance is needed.

Project: NALF Cabaniss
Name: _____
Home Telephone:_____Work Telephone:_____Cell Phone:_____
Address :_____
_____
Age: _____ Height: _____ Weight:_____
Occupation:_____
Name of Next of Kin: _____
Address:_____
_____
Home Phone:_____Work Phone:_____Cell Phone:_____
Drug or other Allergies: _____
_____
Particular Sensitivities: _____
_____
Do You Wear Contacts?_____
What medications are you presently using? _____
_____
_____

Past Medical History/Review of Systems (Check if you have had positive history and would like this information passed on to an attending physician in the event of an emergency)

- ☐ Heart Conditions (Chest pains, angina, heart attacks)
- ☐ Gastrointestinal Conditions (Ulcers, liver, GI Bleeding)
- ☐ Pulmonary (Difficulty in breathing, coughing, asthma, pneumonia)
- ☐ Muscular/Skeleton (Arthritis, Fractures, etc.)
- ☐ Kidney/Urological Disorder (kidney stones, renal failure)
- ☐ Other (Recent Illnesses, weight loss, fever, etc.)
- ☐ Endocrine (Thyroid, diabetes)
- ☐ Hematological (Clotting, anemia)
- ☐ Cancer
- ☐ Neurological [Headaches, dizziness, strokes (CVA, TIA)]

Comments: (Please explain positive indications)_____
_____
_____

Do you have any medical restrictions?_____
_____

Immunization History: Last Tetanus Shot or Booster (Date):_____
Pneumonia Vaccination (Date):_____Flu Vaccination (Date):_____
Other:_____

Name, Address, and Phone Number of personal physician: _____
_____
_____
_____

I am the individual described above. I have read and understand this APP.

_____ _____

Signature Date

9.4 Near Miss, Incident, and First Aid Reporting

Any and all near miss and incidents will be reported to the CLEAN Health and Safety Manager (HSM) for additional direction. All TtNUS personnel who administer first aid will immediately notify the HSM. General first aid direction is provided as follows:

American Red Cross

First Aid

EMERGENCY TELEPHONE NUMBERS

Police _____
Fire Department _____
Doctor _____
Ambulance _____
Hospital _____
Poison Control Center _____

BITES Animal Bites - Thoroughly wash the wound with soap and water. Flush the area with running water and apply a sterile dressing. Immobilize affected part until the victim has been attended by a physician. See that the animal is kept alive and in quarantine. Obtain name and address of the owner of the animal.

Insect Bites - Remove "stinger" if present. Keep affected part down below the level of the heart. Apply ice bag. For minor bites and stings apply soothing lotions, such as calamine.

BURNS AND SCALDS Minor Burns - DO NOT APPLY VASELINE OR GREASE OF ANY KIND. Apply cold water applications until pain subsides. Cover with a dry, sterile gauze dressing. Do not break blisters or remove tissue. Seek medical attention.

Severe Burns - Do not remove adhered particles of clothing. Do not apply ice or immerse in cold water. Do not apply ointment, grease or vaseline. Cover burns with thick sterile dressings. Keep burned feet or legs elevated. Seek medical attention immediately.

Chemical Burns - Wash away the chemical soaked clothing with large amounts of water. Remove victim's chemical soaked clothing. If dry lime, brush away before flushing. Apply sterile dressing and seek medical attention.

CRAMPS Symptoms - Cramps in muscles of abdomen and extremities. Heat exhaustion may also be present.

Treatment - Same as for heat exhaustion.

CUTS Apply pressure with sterile gauze dressing, and elevate the area until bleeding stops. Apply a bandage and seek medical attention.

EYES Foreign Objects - Keep the victim from rubbing his his eye. Flush the eye with water. If flushing fails to remove the object, apply a dry, protective dressing and consult a physician.

Chemicals - Flood the eye thoroughly with water for 15 minutes. Cover the eye with a dry pad and seek medical attention.

FAINTING Keep the victim lying down. Loosen tight clothing. If victim vomits, roll him onto his side or turn his head to the side. If necessary wipe out his mouth. Maintain an open airway. Bathe his face gently with cool water. Unless recovery is prompt, seek medical attention.

FRACTURES Deformity of an injured part usually means a fracture. If fracture is suspected, splint the part, DO NOT ATTEMPT TO MOVE INJURED PERSON; seek medical attention immediately.

FROSTBITE Symptoms - Just before frostbite occurs skin may be flushed, then change to white or grayish-yellow. Pain may be felt early then subsides. Blisters may appear, affected part feels very cold and numb.

Treatment - Bring victim indoors, cover the frozen area, provide extra clothing and blankets. Rewarm frozen area quickly by immersion in warm water---NOT HOT WATER. DO NOT RUB THE PART. Seek medical attention immediately.

HEAT EXHAUSTION Caused by exposure to heat - either sun or indoors. Symptoms - Near normal body temperature. Skin is pale and clammy. Profuse sweating, tiredness, weakness, headache, perhaps cramps, nausea, dizziness, and possible fainting.

Treatment - Keep in lying position and raise victim's feet. Loosen clothing, apply cool wet cloths. If conscious, give sips of salt water (1 teaspoon of salt per glass) over a period of one hour If vomiting occurs, discontinue the salt water. Seek medical attention immediately.

SUNSTROKE Symptoms - Body temperature is high (106 degrees F or higher). Skin is hot, red, and dry. Pulse is rapid and strong. Victim may be unconscious.

Treatment - Keep victim in lying position with head elevated. Remove clothing and repeatedly sponge the bare skin with cool water or rubbing alcohol. Seek medical attention immediately.

POISONING Call the poison control center for instruction on immediate care. If victim becomes unconscious, keep the airway open. If breathing stops give artificial respiration, by mouth to mouth breathing. Call an emergency squad as soon as possible.

POISON IVY Remove contaminated clothing; wash all exposed areas thoroughly with soap and water followed by rubbing alcohol. If rash is mild, apply calamine or other soothing skin lotion. If a severe reaction occurs, seek medical attention.

PUNCTURE WOUNDS If puncture wound is deeper than skin surface, seek medical attention. Serious infection can arise unless proper treatment is received.

SPRAINS Elevate injured part and apply ice bag or cold packs. DO NOT SOAK IN HOT WATER. If pain and swelling persist, seek medical attention.

UNCONSCIOUSNESS Never attempt to give anything by mouth. Keep victim lying flat, maintain open airway. If victim is not breathing provide artificial respiration by mouth to mouth breathing and call an emergency squad as soon as possible.

10.0 PERSONAL PROTECTIVE EQUIPMENT.

Personal protective equipment (PPE) will be one of the control measures used to minimize personnel exposure to chemical and physical hazards at the job site. Through the AHA process, PPE requirements have been identified for each planned site task. These requirements will be communicated to all site personnel through the review of this APP, the SSHP and the AHAs as part of site-specific safety and health training and daily briefings. PPE will be:

- Individually assigned and used;
- Will not be shared between multiple personnel;
- Used, maintained, and stored by the workers assigned the PPE items; and
- Used, maintained, and stored in accordance with their training and with manufacturers' recommendations and intentions.

10.1 PPE Training

This training will, at a minimum, cover the following:

- When and what types of PPE are necessary;
- How to properly don, doff, adjust and wear PPE;
- PPE limitations, proper care, inspection, testing, maintenance, useful life, storage and disposal requirements; and
- Prohibitions against using any PPE that is found to be defective or inoperable.

Worker familiarity with these matters will be judged by the SUXOS/UXOSO through collection and review of training certificates and records, and through direct observation of worker's initial usage of PPE on site, as well as ongoing observations of ongoing usage throughout site activities. Employees working at this site will possess medical clearance to perform work duties while wearing prescribed PPE. This is accomplished through their participation in a suitable HTRW medical surveillance program.

10.2 ANTICIPATED PPE USAGE

Specific PPE requirements have been established for each planned field activity, and are prescribed in the AHAs of this APP and the SSHP. TtNUS personnel and any subcontractors will be required to wear, as a minimum, Level D personnel protective equipment, which shall include (at a minimum):

- Over the ankle boots with an aggressive tread for traction is preferred. Steel-toe work shoes or boots (not required for UXO Geophysical activities) when working around potential foot hazards;
- Work Gloves;
- Rubber Gloves and Boots (when needed for working in wet areas);
- Hearing Protection (if necessary as directed);
- Communication (i.e. cell phone, radio, etc.)*

- Standard work clothing [short/long sleeved shirts (no cut offs), loose fitting long pants]. A rugged material such as denim will offer protection when moving through the brush as well as offer limited protection in some snake bite instances. Tape up and use insect repellants.
- Hardhat when working with over head hazards (not required for enclosed cabs);
- Safety Glasses (not required for enclosed cabs); and
- Reflective High Visibility Vest (when working around heavy equipment).

Additional protective measures such as Tyvek are not recommended at this time. This determination is based on the initial hazard assessment. If it is later determined to be needed, use the following guidance and the SSHP:

- Basic PPE used for dermal protection from chemical hazards typically will include:
- Nitrile or latex surgeons style gloves, and
- Tyvek Coveralls when handling potentially contaminated soils and there is potential for soiling work clothes.
- Impervious coveralls (Saranex and/or PVC coated Tyvek or Rain suits) will be required when there is a potential for saturation of work clothes.

*All electronic devices will be approved by the SUXOS prior to use. All electronic devices, spark and/or heat producing devices/materials will be prohibited during UXO transport, storage, handling, and intrusive activities. Any unnecessary contact with potentially contaminated substances must be avoided. This includes contact with potentially contaminated surfaces and/or equipment. Magnetic detection instruments and other hand-held items are not to be placed on potentially contaminated surfaces.

10.3 REASSESSMENT OF PROTECTION LEVEL

Throughout the course of the fieldwork, PPE requirements may be modified (upgraded or downgraded) due to environmental concerns (e.g., dusty conditions, etc.). However, quantitative monitoring will not be required in all cases (i.e., dust and noise). For these situations, engineering controls such as area wetting with water will be employed as necessary to control windblown dust in the work area. In addition, hearing protection should be used to protect against excessive noise.

10.3.1 Excessive Noise

In situation where excessive noise is an anticipated hazard of a task, hearing protection has been selected and identified within the AHA. During activities where it is unknown whether excessive noise will be a hazard the following general rule of thumb will apply:

If workers standing within 2 feet of each other need to raise their voices to communicate, then excessive noise levels (>85dBA) are being approached and hearing protection should be employed until noise levels can be qualified/quantified.

The SUXOS/UXOSO in consultation with the Safety and Health Manager (SHM), will determine if exposure monitoring or PPE upgrades are required. No alteration of PPE requirements or application of engineering controls shall occur without the approval of the SUXOS/UXOSO and/or the SHM.

10.4 RESPIRATORY PROTECTION

The use of respiratory protection is not anticipated. This assertion is based the tasks to be conducted and the type and physical properties of contaminants (metals, residual levels of energetics, etc.) that could be encountered. Because the contaminants in question will present themselves as particulates or bound to particulates, efforts will be directed at control dust generation. Airborne dust is visible at concentrations reaching approximately 2.0 mg/m^3. Visible dust suppression will be accomplished as necessary using water spray.

Should it be determined that respirators become necessary at any time during the field activities, the SUXOS/UXOSO will cease field activities until an appropriate site-specific respiratory protection plan can be fully developed and implemented. The SUXOS/UXOSO together with the SHM will coordinate the development and implementation of an appropriate site-specific written Respiratory Protection Program for this project.

11.0 PLANS (PROGRAMS, PROCEDURES) REQUIRED BY THE SAFETY MANUAL

11.1. Emergency response plans:
See the TtNUS Safety and Health Plan and the SSHP under separate cover,

11.2. Health hazard control program
See the TtNUS Safety and Health Plan and the SSHP under separate cover.

11.3. Contingency plan for severe weather
See the TtNUS Safety and Health Plan and the SSHP under separate cover.

11.4. Safety and health plan and SSHP
See the TtNUS Safety and Health Plan and the SSHP under separate cover.

11.5. Blasting plan
See the Section 3 and 4 of the Work Plan.

11.6. Fall protection plan
See the SSHP for slips, trips, and falls information.

12.0 TETRA TECH NUS, INC. INFORMATION.

The SUXOS and the UXOSO will provide an initial review of the requirements of this APP to all personnel working on site. This review will include a summary of the TtNUS Safety and Health Plan requirements and an initial review of the SSHP. The SUXOS and the UXOSO will follow this up with periodic reviews as necessary to maintain the safety requirements and focus of the field personnel on site.

13.0 SITE-SPECIFIC HAZARDS AND CONTROLS.

ACTIVITY: Mobilization/Demobilization **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
Mobilization/Demobilization: • Assembling, packing, unpacking equipment and supplies	1. Minor cuts, abrasions or contusions handling equipment and tools	1. Wear cut-resistant gloves when handling items with sharp or rough edges.
This activity includes receipt, storage and transfer of explosives and explosive components. Explosive materials to be handled as a part of this activity include: Helix 1.1 lb. containers Non-El cord with blasting caps	1.1 Explosive handling	1.1 Only MEC/UXO or personnel under their direction will be permitted to handle and/or transport explosives and detonators. Only MEC/UXO personnel will be permitted to load and detonate explosive materials. See AHS for intrusive operations for more information.
	1.2 Initiating explosives	1.2 Segregation – Strict adherence will be practiced with regard to the segregation of initiating devices (cord and detonators) from the explosives during storage and transport. Non-essential personnel will be restricted from operating area.
	1.3 Storage Precautions	1.3 The following requirements shall be adhered to when storing explosives: • Store explosives and explosive devices in an authorized storage facility (e.g., secured magazine repository, vault, cubicle, room, or separate facility). • Assure that each container of explosive =s is properly labeled. • Segregate explosives from detonating devices, incompatible materials. • Environmental conditions within the storage facility shall be maintained as not to subject the explosives to excessive heat and/or cold. Humidity level maintained above 60% will prevent static electrical accumulation and discharge. • Stacks of explosives shall be arranged so that air freely circulates to all parts of the stack. • Pallets or appropriate cribbing shall be used to ensure that containers are not stacked directly on the magazine floor. • Maintain a running inventory. • Inspect storage locations and explosives containers at least once a week or ensure continued safe storage. • Storage buildings should be kept clear of combustible or flammable storage/debris at least 25 feet surrounding the perimeter. • I flights are used within the building they shall be intrinsically safe configuration. • All temporary storage facilities will be properly grounded to provide protection against electrical hazards. • Appropriate signage indicating storage content as well as safety signs (NO SMOKING, NO OPPEN FLAMES OR SPARK PRODUCING DEVISES) will be surrounding the storage.

ACTIVITY: Mobilization/Demobilization **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

	1.4 Hazard communication/ Emergency action procedures	1.4 Hazard Communication/Emergency Action Procedures – Hazard communication will be an integral part of explosives handling to alert transport workers and emergency response personnel of the presence of explosive hazard communication requirements apply to explosives. Those include identifying materials on transport documents, providing specific emergency response information with the transport document and 24-hour telephone number where more detailed information may be obtained, marking and labels on packaging as well as placarding and transport units. Each employee is required to be trained on the hazards of the materials they handle and their specific responsibilities. • Toxicity – Explosives material, explosives components (additives or adhesives), and materials such as organic solvents sued in the explosives processing procedure that can be toxic when inhaled, ingested, or absorbed through the skin. The most frequently reported effect from working with explosives is a skin rash resulting from skin contact with explosive materials, or with solvents and adhesives used with explosives operations. The following general precautions should be used: 1) Know the health hazards and controls before beginning operations, Read your MSDS. If you have questions ask the SUXOS and/or the UXOSO for clarification. 2) Handle materials in a well-ventilated area; where this is not possible local exhaust ventilation is preferred. 3) Avoid skin contact; use surgeon's gloves when necessary to avoid direct skin contact and absorption. Cotton coveralls are also recommended. The UXOSO may recommend additional PPE based on site specific conditions. 4) Practice good work/personal hygiene. Wash before eating, drinking, or smoking (hand to mouth activities), or using toilet facilities; end of shift showers
	1.5 Transportation	1.5 The motor carrier requirements in 49 CFR 397 include requirements for routing of Explosion Hazard Class Division 1.1, 1.2, and 1.3 explosives away from population centers as will as when these material should me moved(when traffic is at its lowest point). These standards require that vehicles be operated in accordance with a route plan prepared by the carrier with the intention of avoiding populated areas and critical infrastructure. The regulation also acknowledges that these areas cannot always be avoided and permits reasonable exceptions at the discretion of the carrier or driver. Drivers operating explosives transport vehicles are required to have a Drivers License within their State of Origin with CDL Qualifications.
• Perform a Jobsite Hazard Evaluation and initial/exit inspections of the intended work areas.	2. Heavy lifting (muscle strains and pulls)	2. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, lift with legs not back, obtain help when needed to lift large, bulky, or heavy items).

ACTIVITY: Mobilization/Demobilization **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
• Perform initial clearance of travel pathways (foot/vehicular). These activities will involve the performance of walkthrough visual inspections	3. Vehicular traffic at the work site	3. Locate vehicle and equipment staging areas. Inform TtNUS personnel of equipment areas and of their responsibility to stay clear of moving vehicles. Observe designated and marked travel pathways.
	4. Intermittent high noise levels	4. Based on the anticipated activities the use of hearing protection has been specified where applicable. However, as every scenario cannot be anticipated, personnel are directed to follow the General Rule of thumb: *If noise levels are such that they must raise their voice in order to communicate with someone who is within arm's reach (approx. 2') of them then excessive noise levels are being approached and hearing protection is required.* Hearing protection will be required until which time noise monitoring indicates the need for hearing protection or not. Hearing protection may be required at the discretion of the UXO Team Leader. Hearing protection is to consist of either ear muffs or ear plugs that have an NRR of at least 25 dB.
	5. Slip/trip/fall hazards	5. Implement and maintain good housekeeping practices throughout work areas. Preview walking/working areas and maintain them identify and avoid when possible slipping/tripping hazards. Preview work locations for unstable/uneven terrain.
	6. Water	6. While working near water, personnel shall wear U.S. Coast Guard-approved personal flotation devices (PFD). When working on the shore, within 4 ft. of the water edge, lifelines, safety harnesses, and other personal safety devices may be used instead of a PFD.
• Arranging for utilities, site access, notifying appropriate client contacts	7. Energized Systems	7. Pre-inspect work sites noting overhead utilities within the work area as will as surface monuments (manhole covers, valve boxes, associated utility markers).

ACTIVITY: Mobilization/Demobilization

ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Hand tools (dollies, hand carts, hand knives, shovels, etc.)	Visual inspection of hand tools prior to use by user. UXO Team Leader to perform regular inspections for housekeeping issues and surveys of operational areas to insure compliance with this HASP.	None required.
Personal Protective Equipment: **Minimum**: • Steel toe safety shoes/boots when working around crush hazards • Coveralls or durable work clothes • Surgeons glove for handling liquids • Work gloves for handling sand bags/sharp objects **Optional items**: Hearing protection, high visibility vests **HTRW**: None anticipated for this task. For UXO Technicians - Steel toe/shank boots are required when working in areas where there is a danger of foot injuries due to failing or rolling objects, or objects piercing the sole.	Initial PPE inspection performed by UXO Team Leader. Ongoing (prior to each use) inspections of PPE is the responsibilities of the users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the Senior UXO Technician through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities.

TABLE 13-2
ACTIVITY HAZARD ANALYSIS

ACTIVITY: UXO Avoidance During set-up of Geophysical Demonstration Area,

ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Avoidance During set-up of Geophysical Demonstration Area. .	1. Heavy equipment such as an excavator, backhoe or other similar type equipment.	1. Be aware of safe work zones and use the designated routes of approach. Personnel not directly supporting this operation will remain at least the length of a fully extended boom + 5-feet with a minimum distance of 25-feet from the point of operation. This will be the area identified as the exclusion zone. - Only authorized personnel should be in the area. - Self-propelled equipment should be equipped with movement warning systems.
	2. UXO	2. Prior to any intrusive activities, the proposed Geophysical Demonstration Area will be mapped to identify anomalies in the area. UXO Techs will conduct UXO avoidance during stake installation, and inert UXO/surrogate target installation. All operations will be conducted with a UXO escort on site. If UXO is observed, the UXO Technician making the observation will stop operations, report the finding to the Navy POC and a new location for the test plot will be identified.
	3. Water	3. While working near water, personnel shall wear U.S. Coast Guard-approved personal flotation devices (PFD). When working on the shore, within 4 ft. of the water edge, lifelines, safety harnesses, and other personal safety devices may be used instead of a PFD.
	4. Strains/sprains from heavy or improper lifting	4. Maintain clear walking working areas and good housekeeping to the extent possible. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, lift with legs not back, obtain help when needed to lift large, bulky, or heavy items).
	5. Electrical storms/ Inclement weather (high winds, heavy rains, etc.)	5. If electrical storms or inclement weather are within the area as determined through local forecasting or weather alerts issued, the UXO Team Leader will suspend outside activities. The 30-30 rule shall be applied which is - If a time interval of 30 seconds or less is between lightning and its thunder go inside and stay inside for at least 30-minutes. If no additional lightning and/or thunder is noted within this 30-minutes work may resume at the UXO Team Leader's direction. Personnel will be directed to seek suitable shelter. Lightning threat detection will be coordinated within NWS Charleston existing systems.

ACTIVITY: UXO Avoidance During set-up of Geophysical Demonstration Area,

ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Personal Protective Equipment: **Minimum**: • Steel toe safety shoes/boots when working around crush hazards • Coveralls or durable work clothes • Surgeons glove for handling liquids • Work gloves for handling sand bags/sharp objects **Optional items**: High visibility vests **HTRW**: none	Initial PPE inspection performed by the UXO Team Leader. Ongoing (prior to each use) inspections responsibilities of PPE users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the Senior UXO Technician through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities. Explosive handling and transportation is not anticipated. If required to be performed, this task will be conducted by qualified UXO Technicians. Therefore, this training and background is considered sufficient for this task.

ACTIVITY: UXO Surface Sweep **ANALYZED BY/DATE: R. Brooks/J. Laffey 03**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Surface Sweep – Identifying MEC/UXO materials on the surface/near surface. As part of this activity travel (foot and vehicular) paths will be established within the area of concern as well as within the grids/transects.	1. MEC/UXO Hazards	1. MEC/UXO operations will be conducted by trained UXO Technicians. All Non-UXO personnel will be clear of the area during initial sweeps and anomaly investigation operations. Magnetometers will be tested using inert UXO/surrogates similar in size to the suspected target munitions. UXO Technicians will clear vehicle and foot travel paths within the area in order to move up support personnel and equipment. Once this is completed grid/transect clearance of the area of concern will be conducted. If suspect MEC/UXO is observed, the UXO Technician making the observation will signal the UXO Team Leader who will supervise all investigation operations. • Any MEC/UXO item discovered during the UXO Surface Sweep operations will be investigated and treated as indicated in the Work Plan. No MEC/UXO items will be moved without approval from the UXO Team Leader and then only if authorized by the Work Plan. All MEC/UXO items discovered will be reported to the Navy POC. • The MEC/UXO will be inspected by two UXO Technicians and if determined to be scrap or munitions debris free from explosive by two UXO Technicians, the scrap or munitions debris may be removed/consolidated out of the area of concern. • An inventory will be maintained by the SUXOS with location, and description (provide that information can be obtained without moving the item) for all MEC/UXO discovered during this operation and the Navy POC will be provide an update about the inventory on a daily basis.
	2. Slips/Tips/Fall Hazards	2. Maintain clear walking working areas and good housekeeping to the extent possible. • Debris and rutted areas create tripping hazards. As part of the initial site preparation these hazards will be eliminated if possible, and pointed out to the UXO Technicians if not possible. • Personnel will return the site to a neat and orderly condition prior to leaving the site. • All exit and access pathways will be maintained free of obstructions. • If excavation holes are to be left open overnight, they will be barricaded.

ACTIVITY: UXO Surface Sweep **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Surface Sweep (continued)	3 Strains/sprains from heavy or improper lifting	3. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, lift with legs not back, obtain help when needed to lift large, bulky, or heavy items).
	4. Lightning - Inclement weather (high winds, heavy rains, etc.)	4. If electrical storms or inclement weather are within the area as determined through local forecasting or weather alerts issued, the UXO Team Leader will suspend activities. The 30-30 rule shall be applied: If 30 seconds or less is between lightning and its thunder go inside (Vehicle) and stay inside for at least 30-minutes. Personnel will be directed to seek suitable shelter. All lightning threat detection will be coordinated within NAS Corpus Christi existing systems.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Personal Protective Equipment: **Minimum**: • Steel toe safety shoes/boots when working around crush hazards • Coveralls or durable work clothes • Surgeons glove for handling explosives • Work gloves for handling sand bags/sharp objects **Optional items**: high visibility vests **HTRW**:	Initial PPE inspection performed by UXO Team Leader. Ongoing (prior to each use) inspections will be the responsibility of PPE users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the Senior UXO Technician through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities. See Section 3.0 for the following training/experience requirements • UXO Technician Qualification Requirements

ACTIVITY: UXO Avoidance During Geophysical Survey **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Avoidance During Geophysical Survey – Identifying MEC/UXO materials on the surface/near surface. As part of this activity travel (foot and vehicular) paths will be established within the area of concern as well as within the grids/transects.	1. MEC/UXO Hazards	1. MEC/UXO avoidance operations will be conducted by trained UXO Technicians. All Non-UXO personnel will be escorted while in the area of concern. Magnetometers will be tested using inert UXO/surrogates similar in size to the suspected target anomalies. Any MEC/UXO items on the surface and near surface will be flagged for UXO avoidance. UXO Technicians will clear vehicle and foot travel paths within the area in order to move up support personnel and equipment. Once this is completed grid/transect clearance of the area of concern will be conducted. If MEC/UXO is observed, the UXO Technician making the observation will signal to stop operations. • Any MEC/UXO item discovered during the UXO Avoidance operations will be flagged for UXO avoidance and left in place. No MEC/UXO items will be moved during this operation. All MEC/UXO items discovered will be reported to the Navy POC. • An inventory will be maintained by the SUXOS with location, and description (provide that information can be obtained without moving the item) for all MEC/UXO discovered during this operation and the Navy POC will be provide an update about the inventory on a daily basis.
	2. Slips/Tips/Fall Hazards	2. Maintain clear walking/working areas and good housekeeping to the extent possible. • Debris and rutted areas create tripping hazards. As part of the initial site preparation these hazards will be eliminated if possible, and pointed out to the UXO Technicians if not possible. • Personnel will return the site to a neat and orderly condition prior to leaving the site. • All exit and access pathways will be maintained free of obstructions. • If excavation holes are to be left open overnight, they will be barricades.

ACTIVITY: UXO Avoidance During Geophysical Survey **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Avoidance During Geophysical Survey (continued)	3 Strains/sprains from heavy or improper lifting	3. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, lift with legs not back, obtain help when needed to lift large, bulky, or heavy items).
	4. Lightning - Inclement weather (high winds, heavy rains, etc.)	4. If electrical storms or inclement weather are within the area as determined through local forecasting or weather alerts issued, the UXO Team Leader will suspend activities. The 30-30 rule shall be applied: If 30 seconds or less is between lightning and its thunder go inside and stay inside for at least 30-minutes. Personnel will be directed to seek suitable shelter. All lightning threat detection will be coordinated within NWS Charleston existing systems.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Personal Protective Equipment: **Minimum**: • Steel toe safety shoes/boots when working around crush hazards • Coveralls or durable work clothes • Surgeons glove for handling explosives • Work gloves for handling sand bags/sharp objects **Optional items**: high visibility vests **HTRW**:	Initial PPE inspection performed by UXO Team Leader. Ongoing (prior to each use) inspections will be the responsibility of PPE users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the Senior UXO Technician through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities. See Section 3.0 for the following training/experience requirements • UXO Technician Qualification Requirements

ACTIVITY: UXO Anomaly Investigation **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Anomaly Investigation – Identifying anomaly as MEC/UXO materials or non MEC/UXO. As part of this activity travel (foot and vehicular) paths will be established within the area of concern as well as within the grids/transects.	1. MEC/UXO Hazards	1. MEC/UXO operations will be conducted by trained UXO Technicians. All Non-UXO personnel will be clear of the area during anomaly investigation operations. Magnetometers will be tested using inert UXO/surrogates similar in size to the suspected target anomalies. Any MEC/UXO items discovered will be flagged and treated IAW the work plan and reported to the Navy POC. UXO Technicians will clear vehicle and foot travel paths within the area in order to move up support personnel and equipment. Once this is completed grid/transect clearance of the area of concern will be conducted. If suspect MEC/UXO is discovered, the UXO Technician making the discovery will signal to stop operations. • Any MEC/UXO item discovered during the UXO Anomaly Investigation operations will be flagged and treated IAW the work plan. No MEC/UXO items will be moved during this operation. All MEC/UXO items discovered will be reported to the Navy POC. • The MEC/UXO will be inspected by two UXO Technicians and if determined to be scrap or munitions debris free from explosive by two UXO Technicians the scrap or munitions debris may be removed/consolidated out of the area of concern. • An inventory will be maintained by the SUXOS with location, and description (provide that information can be obtained without moving the item) for all MEC/UXO discovered during this operation and the Navy POC will be provide an update about the inventory on a daily basis.
	2. Slips/Tips/Fall Hazards	2. Maintain clear walking/working areas and good housekeeping to the extent possible. • Debris and rutted areas create tripping hazards. As part of the initial site preparation these hazards will be eliminated if possible, and pointed out to the UXO Technicians if not possible. • Personnel will return the site to a neat and orderly condition prior to leaving the site. • All exit and access pathways will be maintained free of obstructions. • If excavation holes are to be left open overnight, they will be barricades.

ACTIVITY: UXO Anomaly Investigation **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY / PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
UXO Anomaly Investigation (continued)	3 Strains/sprains from heavy or improper lifting	3. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, lift with legs not back, obtain help when needed to lift large, bulky, or heavy items).
	4. Lightning - Inclement weather (high winds, heavy rains, etc.)	4. If electrical storms or inclement weather are within the area as determined through local forecasting or weather alerts issued, the UXO Team Leader will suspend activities. The 30-30 rule shall be applied: If 30 seconds or less is between lightning and its thunder go inside and stay inside for at least 30-minutes. Personnel will be directed to seek suitable shelter. All lightning threat detection will be coordinated within NAS Corpus Christi existing systems.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
Personal Protective Equipment: **Minimum**: • Steel toe safety shoes/boots when working around crush hazards • Coveralls or durable work clothes • Surgeons glove for handling explosives • Work gloves for handling sand bags/sharp objects **Optional items**: high visibility vests **HTRW**:	Initial PPE inspection performed by UXO Team Leader. Ongoing (prior to each use) inspections will be the responsibility of PPE users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the Senior UXO Technician through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities. See Section 3.0 for the following training/experience requirements • UXO Technician Qualification Requirements

ACTIVITY: Transfer of MPPEH and Debris **ANALYZED BY/DATE: R. Brooks/J. Laffey 03/07**

ACTIVITY/PHASE	POTENTIAL HAZARDS	RECOMMENDED ACTIONS / CONTROLS
Transfer MPPEH and debris	1. UXO/MEC	1. Each MPPEH and debris item identified for transfer will be inspected by two UXO Technicians. If the item is determined to be explosive free, the item will be certified as such and released to the Navy POC for handling/processing. If the item cannot be determined to be explosive free, the item will be reported to the Navy POC as possibly containing explosives and will be segregated for later treatment.
	2. Minor cuts, abrasions or contusions handling equipment and tools	2. Wear cut-resistant gloves when handling items with sharp or rough edges.
	3. Heavy lifting (muscle strains and pulls)	3. Practice safe lifting techniques (use mechanical lifting devices such as a dolly whenever possible, ensure clear path of travel, good grasp on object, lift with legs not back, obtain help when needed to lift large, bulky, or heavy items).
	4. Vehicular traffic when moving equipment to the work site	4. Designate/demarcate vehicle and satellite storage locations, equipment staging areas.
EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Personal Protective Equipment: **Minimum**: • Steel toe safety shoes/boots when working around crush hazards • Coveralls or durable work clothes • Surgeons glove for handling explosives • Work gloves for handling sand bags/sharp objects **Optional items**: high visibility vests **HTRW**	Initial PPE inspection performed by UXO Team Leader. Ongoing (prior to each use) inspections will be the responsibility of PPE users.	PPE training in proper use, care, storage, and limitations. It is anticipated that this has been covered in employees 40 hour HAZWOPER training, which is to be verified by the UXO Team Leader through initial training documentation and review prior to permitting personnel to participate in site activities, and will be confirmed by visual observations of worker activities. See Section 3.0 for the following training/experience requirements • UXO Technician Qualification Requirements

ATTACHMENT 1

ACCIDENT PREVENTION PLAN
TRAINING DOCUMENTATION

ACCIDENT PREVENTION PLAN TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing the Time Critical Removal Action and Site Inspection activities at the Incinerator Disposal Site, at NALF Cabaniss located in Corpus Christi, Texas, and that I have received a briefing concerning potential hazards and selected control measures presented below:

- Names of designated personnel and alternates responsible for site safety and health
- Safety, health, and other hazards present on site (UXO/MEC/Natural Hazards)
- Use of personal protective equipment and control measures to minimize potential hazards
- Contents of the Accident Prevention Plan
- Emergency action procedures

I further state that I have been given the opportunity to ask questions, that my questions have been answered to my satisfaction, and that I agree to abide by the procedures and policies addressed in this plan.

Name (Printed)	**Signature**	**Date**

Instructor(s): _____

_____

APPENDIX G

PROJECT FORMS

TETRA TECH NUS, INC.

NALF CABANISS, CORPUS CHRISTI, TEXAS			
Tailgate Safety Briefing			
Date: _____/_____/_____		**Location:_____**	
Time: _____ AM PM		**Team #: _____**	
1. Reason for Briefing:			
	Daily Safety Briefing		New Site Procedure
	Initial Safety Briefing		New Site Information
	New Task Briefing		Review of Site Information
	Periodic Safety Meeting		Other: (Specify)

2. Personnel Attending:

Name	Signature	Position

Briefing Given By:

Name	Signature	Position

3. Topics: (Check All That Apply)			
	Site Safety Personnel		Decontamination Procedures
	Site/Work Area Description		Emergency Response/Equipment
	Physical Hazards		On-Site Injuries/Illnesses
	Chemical/Biological Hazards		Reporting Procedures
	Heat/Cold Stress		Directions to Medical Facility
	Work/Support Zones		Drug and Alcohol Policies
	PPE		Medical Monitoring
	Safe Work Practices		Evacuation/Egress Procedures
	Air Monitoring		Communications
	Task Training		Confined Spaces
	OE Precautions		Other:
4. Remarks:			

TETRA TECH NUS, INC.

SAFETY MEETING/TRAINING RECORD

DATE: _____/_____/_____ **TIME: _____**

AM PM

1. Reason for Meeting/Training: (Check all that apply)	
	Daily Safety Meeting/Training
	Initial Site Safety Meeting/Training
	New Task Briefing
	Periodic Safety Meeting/Training
	New Site Procedures
	New Site Information
	Periodic Review of Site Information
	Other (Explain):

2. Personnel Attending Meeting/Training:

Name	**Signature**	**Company**

TETRA TECH NUS, INC.

LOCATION/SITE: _____

Safety Meeting/Training Record Con't:

3. Topics Covered (Check all that apply)

	Site Safety Personnel		**Decontamination Procedures**
	Site/Work Area Description		**Emergency Response Plan**
	Site Characterization		**Hazard Communication**
	Biological Hazard(s)		**On-Site Emergency**
	Chemical Hazard(s)		**On-Site Injuries/Illnesses**
	Physical Hazard(s)		**Evacuation Procedures**
	Heat Stress		**Rally Point(s)**
	Cold Stress		**Emergency Communication**
	Site Control		**Directions to Medical Facility**
	Work and Support Zones		**Drug and Alcohol Policies**
	PPE		**Medical Monitoring Program**
	Air Monitoring		**Specific Task Training**
	Safe Work Practices		**Confined Spaces**
	Engineering Controls and Equipment		**Heavy Equipment**
	Spill Containment Procedures		**Other: (Specify)**

4. Remarks:

TETRA TECH NUS, INC.

DATE	
NO.	
SHEET 1 OF 1	

FIELD ACTIVITY WEEKLY LOG

PROJECT NAME:	PROJECT NO:
FIELD ACTIVITY SUBJECT:	
DESCRIPTION OF WEEKLY ACTIVITIES AND EVENTS:	
VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
PERSONNEL ON SITE:	
SIGNATURE:	DATE:

TETRA TECH NUS, INC.

FIELD ACTIVITY DAILY LOG

DATE	
NO.	
SHEET 1 OF 1	

PROJECT NAME:	PROJECT NO:
FIELD ACTIVITY SUBJECT:	
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:	
VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
PERSONNEL ON SITE:	
SIGNATURE:	DATE:

Tetra Tech NUS, Inc.

PROJECT: _____ **JOB #:** _____
LOCATION: _____ **DATE:** _____
PROJECT MANAGER: _____ **FOL:** _____

DAILY ACTIVITIES CHECKLIST

Startup Checklist

Activity	Yes	No	N/A
Pertinent site activities/information entered into site logbook			
All onsite personnel listed in logbook			
Required medical information onsite for all workers (TtNUS and Subcontractors)			
Required MSDS's onsite			
Proper equipment calibrations performed (list equipment)			
1 _____			
2 _____			
3 _____			
4 _____			
Calibration logs filled out			
Tailgate H&S meeting held prior to beginning field activities			
Required work permits filled out/signed			
Required utility clearances obtained			
Required PPE onsite and in use			
Information required to be posted is in place			
(OSHA poster, hospital route, key phone numbers, etc.)			

Exit Checklist

Activity	Yes	No	N/A
Logbooks completely and comprehensively filled out			
Field forms complete and accounted for/properly filed			
Samples properly packaged/shipped			
COCs faxed to appropriate in-house personnel			
All equipment accounted for, on charge if needed, and properly secured			
All personnel accounted for			
Arrangements made for upcoming work (permits, clearances, equipment, etc.)			
Site properly secured			

Note - not all items listed apply to every job, and some additional requirements may apply on a job-specific basis.

DAILY QUALITY CONTROL REPORT

CONTRACT NUMBER:	PROJECT:	
REPORT NUMBER:	LOCATION:	DATE:

PHASE	LIST DEFINABLE FEATURES OF WORK, LOCATION, AND LIST PERSONNEL PRESENT	
PREPARATORY		
INITIAL		INSPECTIONS PERFORMED
FOLLOW-UP		INSPECTIONS PERFORMED

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)	REWORK ITEMS CORRECTED TODAY

REMARKS

9.7 Checklist for Field Editing

Project Name: _____

Project Location: _____

CEHNC POC: _____

Reviewer's Name and Title: _____

Date of Review: _____

	Y	N	N/A
a. Have the following items been evaluated for correctness and edited if necessary:			
• Line numbers?	___	___	___
• Start and end points?	___	___	___
• Line direction?	___	___	___
• Fiducial locations?	___	___	___
b. Has the data been examined in profile and evaluated for geophysical noise?	___	___	___
c. Has the data been examined for the presence of drop-outs and spikes?	___	___	___
d. Has the presence of metal on the operator been eliminated as a possible source of geophysical noise?	___	___	___
e. Has the edited data been converted to the appropriate .xyz format?	___	___	___
f. If using magnetics, have the following steps been taken:			
• Examined base station data for any problems?	___	___	___
• Performed diurnal correction to field magnetometer data?	___	___	___
g. Has the positional data been evaluated for accuracy and completeness?	___	___	___

9.8 Checklist for Data Processing

		FILENAMES:	
Site:	_____	Raw:	_____
Location:	_____	Edited:	_____
Contractor:	_____	Processed:	_____
Sector:	_____	Contour Map:	_____
Grid:	_____	Target List:	_____
Processor(s):	_____	Target Map:	_____

	Y	N	N/A
Preprocessing			
a. Coordinate Conversion			
Projected Coordinate System _____	___	___	___
h. Removal of Drift and Leveling	___	___	___
i. Removal of Heading	___	___	___
j. Latency and Offset	___	___	___
Processing			
a. Initial Gridding	___	___	___
k. Calculation of 3D Analytic Signal	___	___	___
l. Digital Filtering and Enhancement			
❑ Filter 1: _____			
❑ Filter 2: _____			
❑ Filter 3: _____	___	___	___
❑ Filter 4: _____			
❑			
❑			
m. Threshold Selection			
Threshold value _____	___	___	___
n. Anomaly Selection			
Number of targets _____	___	___	___

APPENDIX H

MSD CALCULATION FORMS

FRAGMENTATION DATA REVIEW FORM

Category:	HE Rounds	DODIC:	H469
Munition:	2.75" M229 Rocket	Date Record Created:	7/30/2004
		Last Date Record Updated:	6/20/2005
Primary Database Category:	rocket	Individual Last Updated Record:	Crull
Secondary Database Category:	2.75 in	Date Record Retired:	
Tertiary Database Category:	Comp B		

Munition Information and Fragmentation Characteristics

Explosive Type:	Comp B
Explosive Weight (lb):	4.80000
Diameter (in):	2.7500
Max Fragment Weight (lb):	0.050092
Critical Fragment Velocity (fps):	5569

Theoretical Calculated Fragment Range

Range to No More Than 1 Hazardous Fragment/600 Square FeetA (ft):	302
Vertical Range of Maximum Weight Fragment (ft):	1088
Horizontal Range of Maximum Weight Fragment (ft):	1374

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	76
Inhabited Building Distance (09 psi), K50 Distance:	95
Intentional MSD (0065 psi), K328 Distance:	625

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	2.91
Mild Steel:	0.54
Hard Steel:	0.45
Aluminum:	1.18
LEXAN:	3.87
Plexi-glass:	2.44
Bullet Resist Glass:	1.90

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.050092
Critical Fragment Velocity (fps)SB:	5569
Kinetic Energy 106 (lb-ft2/s2)SB:	0.7768
Required Wall Roof Sandbag Thickness (in)SB:	24
Expected Maximum Sandbag Throw Distance (ft)SB:	135
Minimum Separation Distance (ft)SB:	200

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.050092
Critical Fragment Velocity (fps)W:	5569
Kinetic Energy 106 (lb-ft2/s2)W:	0.7768
Water Containment System:	1100 gallon tank
Minimum Separation Distance (ft)W:	200

Print This Form

Close Form

APPENDIX I

UXO PERSONNEL RESUMES/CERTIFICATIONS

Ralph Brooks
UXO MANAGER
STONE MOUNTAIN, GEORGIA

EDUCATION: Bachelor of Science; General Studies; Excelsior College; 2001
Associate in Applied Science; Military Technology; Pierce College; 1997

CERTIFICATIONS/ REGISTRATIONS: EPA/AHERA Nebraska Supervisor Initial Course; 7ME05167502NS006; 2003
Asbestos Supervisor Nebraska; 6157; 2003

TRAINING: OSHA 1910.120 40-Hour HAZWOPER Training; Jan/2002
OSHA 1910.120 8-Hour Annual Refresher Training; Dec/2007
Evaluation of Hazwoper Supervisor Qualification; May/2004
Explosive Ordnance Disposal Course; Mar/1978
Field Artillery Surveyor Course; May/1976

EXPERIENCE SUMMARY:

Mr. Brooks has 30 total years of Explosive Ordnance Disposal/Unexploded Ordnance (EOD/UXO) experience.

PROJECT EXPERIENCE:

UXO Manager; Site Inspection for Naval Air Landing Field Cabaniss, Texas; February 2006 to Present. Provide cost estimate, Abbreviated Health and Safety Plan, Explosive Safety Submission, and Work Plan to the Project Manager for UXO Support. Support includes a Time Critical Removal of munitions and explosives of concern and UXO support to complete a Site Inspection for the Navy. UXO support total estimate at $500,000.

UXO Manager; Site Inspection for Naval Weapons Station Concord, California; August 2006 to Present. Provide cost estimate, Abbreviated Health and Safety Plan, Explosive Safety Submission, and Work Plan to the Project Manager for UXO Support. Support includes UXO escort/avoidance support to complete a Site Inspection for the Navy. UXO support total estimate at $200,000.

UXO Manager; Site Inspection for Naval Weapons Station Charleston, South Carolina; July 2006 to Present. Provide cost estimate, Abbreviated Health and Safety Plan, and Work Plan to the Project Manager for UXO Support. Support includes UXO escort/avoidance support to complete a Site Inspection for the Navy. UXO support total estimate at $100,000.

UXO Manager; Site Inspection for Naval District Washington, Solomon's Complex, Maryland; December 2005 to Present. Provide cost estimate, Abbreviated Health and Safety Plan, and Work Plan review to the Project Manager for UXO Support. Support includes UXO escort/avoidance support to complete a Site Inspection for the Navy. UXO support total estimate at $50,000.

UXO Manager; Site Inspection for Marine Corps Base Quantico, Virginia; August 2006 to Present. Provide cost estimate, Abbreviated Health and Safety Plan, and Work Plan to the

Project Manager for UXO Support. Support includes UXO escort/avoidance support to complete a Site Inspection for the Marine Corps/Navy. UXO support total estimate at $100,000.

UXO Manager; Site Inspection for Naval Air Station, Brunswick, Maine; September 2006 to Present. Provide cost estimate, Abbreviated Health and Safety Plan, and Work Plan to the Project Manager for UXO Support. Support includes UXO support to complete a Site Inspection for the Navy. UXO support total estimate at $500,000.

UXO Manager; US Army COE/Tetra Tech Div, Iowa Army Ammunition Plant UXO Support; Middletown, Iowa; June 2006 to Present. Provide cost estimate, review Health and Safety Plan and Work Plan, and provide comments to the Project Manager for UXO support to complete Geophysical survey, and anomaly avoidance at several project sites. Provided support multiple times and provided management support until project completion. UXO support equals 50 man-days.

UXO Manager; Draft Closure Plan for OB/OD Unit, Sierra Army Depot, California: July 2005 to Present. Provide document review and UXO input to a Draft Closure Plan for the Open Burn/Open Detonation Unit at Sierra Army Depot, California. Provide all data to the Project Manager. Final input covered fourteen pits on Sierra Army Depot with ejection of munitions over several thousand feet with UXO support total estimate at $1,500,000.

UXO Manager; Tetra Tech NUS, Inc. Internal Growth Initiative Program; October 2005 to Present. Provide UXO input to the Internal Growth Initiative Program to support the three Regional Managers of Tetra Tech NUS, Inc. Updated the Tetra Tech NUS, Inc. UXO pamphlet and provided UXO input to the Military Munitions Response Program pamphlet. Part of a team to provided a presentation on the Military Munitions Response Program to Tetra Tech NUS, Inc.

UXO Manager; UXO Support; NASA Wallops Flight Facility; Wallops Island, Virginia; July 2005 to February 2008. Provide cost estimates, Site Health and Safety Plans, and Work Plans to the Project Manager for UXO support to complete a UXO surface seep, Geophysical survey, Anomaly investigation, and MEC treatment at the Visitor Center and Fire Station, Wallops Island Virginia. Mobilized 5 UXO Technicians to the Visitors Center and 6 UXO Technicians to the Fire Station and provided management support until projects completion. UXO support equals $60,000.

UXO Manager; Visual Inspection UXO Support; Shirley Plantation; Charles City, Virginia and Naval Weapons Station Earle, New Jersey; November 2005 to October 2007. Provide Site Health and Safety Plans, and Work Plans to the Project Manager for UXO support to complete a UXO visual inspection of debris contained in barges after pumping operations, Charles City, Virginia with follow-on support to remove discarded military munitions from the dredge material at NWS Earle, New Jersey. Mobilized 2 UXO Technicians to the Charles City, VA site and mobilized 9 UXO Technicians to the NWS Earle, NJ site and provided management support until project completion. UXO support equals 1050 man-days.

UXO Manager; Drainage Improvements for Gorge Test Area Facility UXO Support; Picatinny Arsenal, New Jersey; July 2005 to December 2005. Provide cost estimate, Site Health and Safety Plan, and Work Plan to the Project Manager for UXO support to construction work to improve drainage for the Gorge Test Area Facility. Mobilized 4 UXO Technicians to the site and provided management support until project completion. UXO support equals $63,798.

UXO Manager; Gun Boat Point UXO Support; NASA Wallops Flight Facility; Wallops Island, Virginia; July 2005 to December 2005. Provide cost estimate, Abbreviated Health and Safety Plan, Site Health and Safety Plan, and Work Plan to the Project Manager for UXO support to install military warning signs at Gun Boat Point, Wallops Island Virginia. Mobilized 2 UXO Technicians to the site and provided management support until project completion. UXO support equals $9,130.

UXO Manager; Sampling at OB/OD Site UXO Support; Naval Weapons Station Earle, New Jersey; November 2005 to December 2005. Provide UXO support to Sampling at Open Burn/Open Detonation Site, NWS Earle, New Jersey. Mobilized 1 UXO Technician to the site 2 separate times and provided management support until project completion. UXO support equals 20 man-days.

UXO Manager; D. R. Horton Developers/Tetra Tech EMI, Former Conway Bombing Range UXO Support; Conway, South Carolina; September 2005 to November 2007. Provide cost estimate, Site Health and Safety Plan Review, and Work Plan to the Project Manager for UXO support to complete Geophysical survey, and Anomaly investigation at the proposed construction site at Former Conway Bombing Range, Conway, South Carolina. Mobilized 2 UXO Technicians to the site multiple times and provided management support until project completion. UXO support equals 50 man-days.

UXO Manager; Site 37 Land Survey and Sediment Sampling UXO Support; Naval District Washington Dahlgren Site; Dahlgren, Virginia; November 2005 to November 2005. Provide UXO support to complete Land Survey and Sediment Sampling at Site 37, Dahlgren, Virginia. Mobilized 1 UXO Technician to the site 2 separate times and provided management support until project completion. UXO support equals 8 man-days.

UXO Manager; OB/OD Improvement UXO Support Cost Estimate; Marine Corps Base Quantico, Virginia; August 2005 to August 2005. Provide Manpower estimate for UXO support to complete an Improvement project at the Open Burn/Open Detonation site at MCB Quantico. UXO support total estimate at 972 man-hours.

UXO Manager; Cultural Resources Assessment UXO Support Cost Estimate; HI-Tech Park Area, Picatinny Arsenal, New Jersey; August 2005 to August 2005. Provide cost estimate for UXO support to complete a Cultural Resources Assessment at a planned construction site. UXO support total estimate at $63,553.

UXO Manager; Task Order Proposal to Develop an Order-of-Magnitude Cost Estimate; Sandia National Laboratories; Tonopah Test Range, Nevada; August 2005 to August

2005. Participate as part of a team providing the estimate for UXO support to an Order-of-Magnitude Cost Estimate. Final input covered four sites on Tonopah Test Range with UXO support total estimate at $11,763,337.

CHRONOLOGICAL WORK HISTORY:

Unexploded Ordnance (UXO) Manager; Tetra Tech NUS, Inc.; Stone Mountain, Georgia; July 2005 to Present.

UXO Safety/QC; URS Corporation; Franklin, TN; January 2005 to July 2005. Performed as the UXO Safety/QC for a 15 person UXO project at former Ft. McClellan, AL. Duties included all levels of safety and quality control during survey, brush cutting, UXO surface sweep, geophysical survey, data interpretation, UXO intrusive operation, and project closeout. Ordnance encountered included: projectiles, fuses, grenades.

Field UXO Senior Supervisor (SUXOS); Shaw Environmental E&I, Inc; Monroeville, PA; October 2004 to January 2005. Field UXO Senior Supervisor for a project at former Ft. McClellan, AL. Duties included using magnetometers for anomaly avoidance, and escort duties on a lead abatement project. Worked with construction crews, and soil sample crews. Operated excavator when required. Ordnance encountered included: small arms.

UXO Technician III (Team Leader); URS Corporation; Franklin, TN; September 2004 to October 2004. UXO Team Leader for a 6 person UXO team at Sidney, NE (Sioux Army Depot) using magnetometers for UXO excavation, and disposal. Ordnance encountered included: projectiles, rockets, grenades, and bombs.

Field UXO Senior Supervisor (SUXOS); Shaw Environmental E&I, Inc; Monroeville, PA; August 2004 to September 2004. UXO III (Field UXO Senior Supervisor) for a 3X Scrap project at former Ft. McClellan, AL. Duties included using magnetometers while in level B PPE. Worked with construction crews during excavation and sifting operations. Operated Bob-cat when required. Ordnance encountered included: projectiles, and various chemical vials, bottles, and containers.

UXO Technician III (SUXOS); URS Corporation; Franklin, TN; March 2004 to July 2004. UXO Team Leader and SUXOS for teams at Cranbury, NJ and former Black Hills Army Depot using magnetometers for anomaly avoidance, escort duties, surface sweeps, and intrusive operations. Worked with survey crews, and local regulators. Ordnance encountered included: projectiles, rockets, grenades, bombs & small arms.

Field UXO Senior Supervisor (SUXOS); Shaw Environmental E&I, Inc; Monroeville, PA; July 2003 to February 2004. Field UXO Senior Supervisor for a landfill removal project at Patuxent River, MD. Duties included anomaly avoidance, ordnance removal, and escort duties. Provided support to construction crews during excavation. Escorted survey crews, soil and

water sample crews, and operated excavators and sifters. Ordnance encountered included: projectiles, rockets, and bombs.

UXO Technician III (Team Leader); USA Environmental; Tampa, FL; April 2003 to July 2003. UXO Team Leader for a 6 person UXO team at Sidney, NE (Sioux Army Depot) using magnetometers for UXO excavation, and disposal. Used level C PPE while working in an asbestos environment. Ordnance encountered included: projectiles, rockets, grenades, and bombs.

Field UXO Senior Supervisor (SUXOS); Shaw Environmental E&I, Inc; Monroeville, PA; June 2002 to April 2003. UXO III (Field UXO Senior Supervisor) at former Ft. McClellan, AL. Duties included using magnetometers for anomaly avoidance and escort duties. Worked with construction crews, well drill crews, survey crews, and soil and water sample crews. Some operations required level C PPE. Ordnance encountered included: projectiles, rockets and small arms.

UXO Technician III (Team Leader); USA Environmental; Tampa, FL; January 2002 to June 2002. UXO Team Leader for a 6 person UXO team at former Ft. McClellan, AL, and Massachusetts Military Reservation, MA using magnetometers for UXO excavation, and disposal. Operated a backhoe when required. Ordnance encountered included: projectiles, rockets, grenades, and land mines.

EOD Specialist, to EOD Operations Sergeant Major; US Army; March 1978 to October 2001. EOD Technician at the following locations; Ft. Knox, KY, Ft. Richardson, AK, Picatinny Arsenal, NJ, Ft. Stewart, GA, Ft. Lewis, WA, Ft. Gillem, GA. Deployed twice to Kuwait as part of an EOD unit while stationed at Ft. Stewart, GA. Retired from the US Army after 26 years as an EOD Operations Sergeant Major.

PROFESSIONAL AFFILIATIONS: N/A

PUBLICATIONS: N/A

JEFFREY M. FOURNIER

ENVIRONMENTAL ENGINEER

STONE MOUNTAIN, GEORGIA

EDUCATION:

B.S., Environmental Engineering, Kennedy-Western University, 2005

CERTIFICATIONS:

Explosive Ordnance Disposal Specialist, Naval School Explosive Ordnance Disposal, Indianhead, Maryland, 1993
DOE level II Certified Radiological Worker, 2000 (expired)
Risk Assessment Methodology/Water Utilities, RAM-W, 2002
NITON Radiation Safety Training, 2004
US Army Corp of Engineers (USACE) UXO # 0302

TRAINING:

OSHA 1910.120 Annual Refresher Training; 8 Hours – 2006
Georgia Tank & Environmental Contractors (GTEC) convention - 2006
FEMA IS-200, Incident Command System, Basic, 2005
American Red Cross Sponsored Adult CPR and First Aid - 2004
OSHA 1910.120 Supervisory Training; 8 Hours - 2001
OSHA 1910.120 HAZWOPER Training; 40 Hours - 1996
Defense Nuclear Agency Nuclear Emergency Team Operations Course - 1996
Sandia National Laboratories Joint Nuclear Explosive Ordnance Disposal Course - 1995
Los Alamos National Laboratory Radiation Sources and Hazards in a Nuclear Emergency Search Team Environment - 1995
Department of Defense Hazardous Material Handling Course - 1994
Department of the Army Hazardous Communication Training - 1994
Emergency Management Institute, Hazardous Materials - A Citizen's Orientation - 1994
Joint UK-US Explosive Ordnance Disposal Exercise, Bassingbourn Barracks, Royston, Hertfordshire, England – 1994
Advanced Access and Disablement (Nuclear terrorism and Weapons of Mass Destruction) - 1994
Department of the Navy Explosive Ordnance Disposal School - 1992-1993

EXPERIENCE SUMMARY:

Mr. Fournier is a Project Manager and Project Engineer with over 10 years of experience in the environmental industry. He has experience in construction and site management, health and safety management, and unexploded ordnance operations; assists in the preparation of proposals, cost estimates and work plans; field sampling techniques; remediation design, operation and maintenance; subcontracting management; permitting; project management, spill prevention plans; compliance audits; surveying and computer aided drafting.

He currently is a project manager for the Underground Storage Tank Assessment and Remediation Contract for the Georgia Environmental Protection Division. He also has performed in multiple capacities for various contracts for the US EPA, US Navy, US Air Force, US Army Corp of Engineers, and other federal, state, and private contractors.

Additionally, Mr. Fournier is qualified as a UXO Technician II with experience involving explosive, chemical, nuclear, propellant, and pyrotechnic UXO. He has trained and supervised personnel to

recognize and identify UXO, and has supported Federal, State, and local officials involving military ordnance, commercial chemicals and explosives, military toxic chemicals and nuclear materials. Mr. Fournier has training and experience involving bomb threat response, recognition, search techniques, and area security. He has participated in security operations involving US Secret Service, US State Department, and several other state and federal agencies to include presidential protection details and the security of foreign diplomats and other VIP's. Mr. Fournier's training also includes anti-nuclear terrorism and weapons of mass destruction. He has participated in exercises conducted by Sandia National Laboratories, Los Alomos National Laboratories, the US military and joint US/UK anti-terrorism training. He was also a part of the emergency response effort in Washington, D.C. to search, sample, and decontaminate the federal buildings affected by high grade Anthrax.

Mr. Fournier is also trained in the operation of geophysical survey instruments (magnetometers etc.) to locate and map buried anomalies for subsequent sampling, investigation, water sampling, exploratory trenching and UXO avoidance. He has extensive experience operating GPS equipment and various geophysical survey and mapping instruments.

PROJECT EXPERIENCE:

Field Operations Leader; Navy CLEAN IV, BRAC PMO Southeast, Naval Air Station (NAS) Atlanta; Marietta, Georgia; November 2006 to present. Responsible for assisting in the writing of work plans, coordinating fieldwork, and requisition of subcontractors and equipment as the Field Operation Leader. Coordinate and supervise groundwater sampling investigation for TCE at the eastern boundary site to complete an Environmental Condition of Property (ECP), phase II assessment under BRAC SE.

Project Manager/Project Engineer; Underground Storage Tank Assessment and Remediation Contract; Georgia Environmental Protection Division UST Management Program; Various Sites in Georgia; August 2005 to Present. Responsible for project management, construction management, and remedial system design, installation, operation and maintenance at several state site throughout Georgia.

Remediation System Project Manager; American Foods; Georgia Environmental Protection Division UST Management Program; Decatur, Georgia; August 2005 to present – Managed and coordinated the installation of a vacuum enhanced pump and treatment remediation system with air sparge and a catalytic oxidation unit. System consists of 16 remediation wells piped to a self contained treatment system located on three separate properties and under a major roadway. Responsibilities include system operations, maintenance, and repairs; data collection and management; reporting to state and county agencies; and procurement of all supplies and equipment. Over 1 million gallons of contaminated groundwater has been treated and discharged and the system has operated at 115% of scheduled runtime since startup.

Remediation System Project Manager; Doug's Convenience Store; Georgia Environmental Protection Division UST Management Program; Dudley, Georgia; August 2005 to present – Managed and coordinated the installation of a soil vapor extraction with air sparge remediation system. System consists of 9 remediation wells piped to a self contained, trailer mounted

treatment system. Responsibilities include system operations, maintenance, and repairs; coordination of Inter-company assets; data collection and management; reporting to state and county agencies; and procurement of all supplies and equipment. The system is managed remotely through EOS software and has operated at 103% of scheduled runtime since startup.

Site Manager; Elkton Farms Firehole, Removal Action; United States Environmental Protection Agency (USEPA), START region III; Elkton, MD; February 2005 – August 2005.
The Elkton Farm Firehole is an historic burn pit associated with the disposal and burning of waste explosives from the former Triumph Explosives Manufacturing Plant. Primary responsibilities include the procurement and oversight of site security measures, producing the site health and safety plan (HASP), providing cost estimates for the removal, transportation, and disposal of unexploded ordnance (UXO) and related debris. A geophysical survey utilizing EM-61 Mk 2 technology was conducted covering approximately 50 acres including and surrounding the Fire hole burn pit. A geophysical report was produced detailing the results of the survey and recommendations for future actions. Oversight and technical expertise were also provided to EPA and the Maryland Department of the Environment (MDE) throughout the course of the investigation and survey. The EPA is currently in discussion with the Army Corps of Engineers to determine the next course of action for the site.

Site Safety and Health Officer/Construction Manager; Horse Pasture Restoration Project; Air Force Center for Environmental Excellence; Robins Air Force Base, Warner Robins, GA; December 2003 – August 2005.
The project site is located within an active horse pasture and stable facility at Robins AFB and involves two main undertakings. The first phase, completed in December 2004, involved the removal and disposal of more than 80,000 tons of soil contaminated with volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and heavy metals, and subsequent restoration of the excavation sites. Mr. Fournier's primary duties during the project are as the site safety and health officer and Construction Manager. This position includes oversight of all health and safety related issues on-site, and the reporting and coordination of health and safety related issues to the project team. The project logged over 25,000 man-hours with no accidents, incidents, or OSHA recordables. Additional duties include development of work plans and operational plans for soil excavation; review of quantity and cost estimates; supervision of personnel, contractors, and construction activities; determination of sampling requirements, collection of samples, and evaluation of analytical data; report preparation; daily coordination with Robins AFB departments and personnel with an involvement or interest in the work; and coordination with regulatory agencies during on-site visits and inspections. Upon completion of the soil remediation activities, the second phase of the work, in-situ treatment of groundwater to eliminate residual VOC contamination commenced. Initial installation of groundwater treatment wells began in December 2004. Pilot tests, involving the injection of chemical oxidation (ChemOx) fluids into contaminated groundwater, began in February 2005. ChemOx treatments are scheduled to continue periodically over an 18-month time frame, with ongoing sampling for water quality and contaminant reduction.

Unexploded Ordnance Safety and Support; D.R. Horton, The Farm at Carolina Forest; Myrtle Beach, South Carolina; January 2004 – Present.
Provide UXO support and safety during geophysical survey and mapping operations in the extended safety zones of the former Conway Bombing Range. The property is currently owned and developed as residential property by D.R. Horton. Tetra Tech EM Inc. has unearthed over 25 ordnance items to

date to include several 5-inch ZUNI rocket warheads, 2.36-inch Bazooka rockets, and 2.75-inch rocket warheads. Tetra Tech EM Inc. has coordinated all disposal operations through local and state police as well as the Fort Jackson Army Explosive Ordnance Disposal Company.

Unexploded Ordnance Safety and Support; Keiffer Park Free Product Recovery Trench Project, CONTI Environmental, Inc.; North Kingstown, RI; August 2003 – December 2004. Provided UXO support and safety to Conti Environmental, Inc. after OE material was unexpectedly unearthed during the excavation of a free product recovery trench at a Corp. of Engineers site in North Kingstown, Rhode Island. Performed UXO identification, awareness, safety, and reporting classes to all Conti personnel and union operators working at the site. Also performed daily UXO safety briefs at the tailgate safety meeting and acted as the UXO safety observer during all excavation activities. Several additional items have been uncovered during the excavation ranging from inert 5-inch Navy ZUNI rocket warheads to full-up underwater mines and depth charges. The area of OE and ordnance contamination is currently being reviewed by the COE and excavation operations are suspended until a course of action for removal and disposal of additional items has been approved.

Unexploded Ordnance Specialist/Environmental Specialist; Old Bombing Field OB/OD Unit and J-Field Remedial Site Investigation; Aberdeen Proving Grounds, Aberdeen, Maryland; April 2003 – December 2003. Performed surface and sub-surface detection of UXO, Chemical weapons material monitoring, and radiological monitoring activities on three separate sites located at the Old Bombing Field area of Aberdeen Proving Grounds and J-Field at the Edgewood area of Aberdeen Proving Grounds. This ongoing project has involved the installation, sampling, and abandonment of over 20 temporary well locations, the installation of 8 permanent monitoring wells, and the collection of over 50 surface and sub-surface soil samples. Surface soil sediment samples and surface water samples have also been collected from Chesapeake Bay, which borders the sites.

Site Safety Officer; Naval Training Center Orlando; Navy CLEAN Southern Division; Orlando, Florida; March 2003 – December 2003. Site Safety and Health Officer for ground water and surface water sampling activities at NTC Orlando. Responsible for the implementation, monitoring, and enforcement of all safety related activities on site to include daily safety briefings and safe work permits.

Site Safety Officer/UXO Specialist; Fort Pickett BRAC Office, Fort Pickett, VA; January 2003 – December 2004. Site Safety and Health Officer for the remedial investigation, UXO sweep, and geophysical survey of an approximately 30-acre former solid waste disposal area. Responsible for the implementation, monitoring, and enforcement of all safety related activities on site to include daily safety briefings, safe work permits, UXO safety and site control, and heavy equipment operations. Also participated in UXO sweep operations utilizing Schonstedt magnetic anomaly detection equipment and geophysical survey activities utilizing the EM-61 MK-2 with integrated GPS.

START Team Emergency Response; Anthrax Decontamination, Senate Buildings, Washington D.C.; U.S. Environmental Protection Agency; December 2001-January 2002. Participated in the sampling, neutralization, recovery, and clean up activities of several anthrax contaminated buildings in Washington, D.C. Acted in various capacities to include team leader, team member, and outside

support for several entries into anthrax contaminated hot zones. Conducted sampling activities to include HEPA sampling, swipe and swab sampling, high volume air sampling, and personal air monitor sampling. Assisted in the preparation of sampling plans, packing and preparation of sample media, briefing of sampling activities to be conducted, control and processing of collected samples, and debriefing of sampling activities. Conducted level C and B hot zone entries utilizing Powered Air Purifying Respirators (PAPRs), Self Contained Breathing Apparatus (SCBA), Rebreathers, and fully encapsulated protective suits. Participated in the separation and recovery of sensitive and personal items from contaminated areas. Conducted air monitoring during Chlorine Dioxide decontamination application activities.

Unexploded Ordnance Specialist/Environmental Specialist; Naval Weapons Station Charleston; Navy-CLEAN Southern Division; Charleston, South Carolina; March 2002. Performed surface and subsurface detection of UXO during the installation of fifteen temporary monitoring wells located throughout SWMU 17 at NWS Charleston. Conducted well development and ground water sampling utilizing slow flow method, and well abandonment.

Unexploded Ordnance Specialist/Environmental Specialist; Naval Surface Weapons Station Dahlgren; Navy-CLEAN North Division; Dahlgren, Virginia; January 2002-February 2002. Performed surface and subsurface detection of UXO during surface and subsurface soil sampling activities, and surface/water sediment sampling activities at three locations throughout NSWS Dahlgren. Conducted Geophysical survey utilizing the EM-61 at a suspected WWII burial mound located at site 47 collecting the field data, producing a survey map, and subsequently collecting additional data to further delineate the contamination zone. Performed GPS operations, navigating to and data capturing locations scattered throughout the saltwater marsh areas of site 13 and site 6. Conducted environmental field sampling of surface and subsurface soils, and surface/water sediments.

Unexploded Ordnance Specialist/Environmental Specialist; Naval Surface Weapons Station Dahlgren; Navy-CLEAN North Division; Dahlgren, Virginia; October 2001. Performed surface and subsurface detection of UXO during monitoring well installation, surface and subsurface soil sampling activities, and surface/water sediment sampling activities at various locations throughout NSWS Dahlgren. Conducted environmental field sampling of surface and subsurface soils, and surface/water sediments.

Unexploded Ordnance Specialist/Environmental Specialist; Open Burning / Open Detonation Unit; U.S. Army Armor Center and Fort Knox Kentucky; September 2001. Performed surface and subsurface detection of UXO during surface soil sampling and subsurface soil sampling activities utilizing direct push technology at the Crumb Range Explosive Ordnance Disposal facility. Conducted environmental field sampling of surface and subsurface soils. Performed GPS operations to capture sample locations and define site grids and boundaries.

Unexploded Ordnance Specialist/Environmental Specialist; National Fireworks, Cordova, Tennessee; U.S. Environmental Protection Agency, Region 4; September 2001. Provided UXO Support to Tetra Tech EMI personnel conducting a site inspection at the National Fireworks Facility. The site contained a burn pit used to dispose of pyrotechnic supplies and debris, chemical storage areas, and facilities used in the production of flares, grenades, smoke pots, 20-

millimeter and 40-millimeter rounds, and incendiary bombs. Flares were also tested onsite. Performed surface and subsurface detection of UXO during installation of groundwater monitoring wells and soil sampling operations utilizing hand and mechanical augers. Performed GPS operations to capture sample locations and monitoring wells. Conducted environmental field sampling of groundwater, soil, and surface/water sediment samples and well development.

Unexploded Ordnance Specialist/Environmental Specialist; Naval Weapons Station Charleston; Navy-CLEAN Southern Division; Charleston, South Carolina; June 2001. Provided UXO support and safety. Performed surface and subsurface detection of UXO during installation of groundwater monitoring wells and direct push boreholes at solid waste management units known to contain ordnance, fuse components, and missile components. Also performed radiological monitoring for possible contamination at missile site. Conducted environmental field sampling to include groundwater, soil, and surface water/sediment sampling and well development and abandonment.

Environmental Specialist; Underground Storage Tank Assessment and Remediation Contract; Georgia Environmental Protection Division UST Management Program; Various Sites in Georgia; May 2001 to December 2004. Provided field technical support for underground storage tank sites in Georgia. Responsibilities included project management, construction management, remedial system design, construction, operation and maintenance, soil and groundwater sampling, and free product recovery.

Unexploded Ordnance Specialist; Massachusetts Military Reservation (MMR); Tetra Tech NUS, Inc; Otis Air National Guard Base, Massachusetts; February 2001- December 2004. Mr. Fournier was a member of the field investigation team for the MMR Munitions Survey Project, involving the handling and disposal of unexploded ordnance (UXO) and multi-media sampling. Responsibilities included the location, identification, and disposition of suspect Ordnance/Explosive (OE) items identified by geophysical survey methods within the High Use Target Area (HUTA) of the site. Performed field operation, calibration, and troubleshooting of the EM-61 geophysical survey instrument and related geophysical data capture equipment. Performed soil sampling and OE collection and packaging for use in point source contamination studies. Mr. Fournier was also responsible for the transfer, editing, and reformatting of geophysical data from field data capture unit to office computers for use with Geosoft™ mapping software.

GPS Supervisor/Environmental Technician; Air Force Center for Environmental Excellence (AFCEE); Massachusetts Military Reservation (MMR); Tetra Tech, Inc; Camp Edwards, Massachusetts; November 2000 to February 2001. Implemented a delineation sampling program for multi-site hazardous waste characterization in accordance with approved plans and operating procedures for sample collection and decontamination. Supervised the operation of self-correcting global positioning satellite equipment to identify sample point coordinates and to integrate sample information from CAD systems to physical field locations. Responsible for electronically translating data gathered from remote sensing systems into a universal mapping system, and troubleshooting incompatible base map information schemes. Provided training and orientation to field technicians on GPS operations.

Unexploded Ordnance Supervisor; U.S. Army Corps of Engineers (USACE) Omaha District; Iowa Army Ammunition Plant, Focused FS Soils Removals; Middletown, Iowa; June 2000 to November 2000. Supervised all ordnance and explosive (OE) safety, identification, and disposition issues involved in the removal and transportation of 40,000 yards of heavily contaminated soil from the west burn pad landfill of the explosive disposal area to holding cells in the inert disposal area. Provided on-site orientation for site personnel on OE safety, recognition, and avoidance. Conducted daily OE and site-specific safety briefs. Assisted the site health and safety officer in air sampling operations and other general site safety issues. Performed escort operations for soil and groundwater sampling for the Field Analytical Data Coordinator. Also responsible for writing and updating of SOPs for ordnance avoidance.

Safety Specialist; Westbrook Power Plant Project; Cianbro Corporation; Westbrook, Maine; March 2000 to June 2000. Trained in the Cianbro Accident Prevention Program (CAPP), an in house safety and health program that has resulted in one of the lowest OSHA recordables and best safety records in the construction industry. Trained in heavy equipment safety and operations, fall protection equipment and regulations, Operation and safety regulations of various man-lift equipment, Rigging and sling loading for crane operations, and General construction safety.

Unexploded Ordnance Specialist; Fort Ord Ordnance Remediation Project; U.S. Army Corps of Engineers (USACE) Sacramento; Fort Ord, California; October 1996 to March 2000. Activities included operation within explosive and biological contamination zones, proper use and application of level D, level D modified, and level C Personal Protective Equipment, and proper contamination control and decontamination procedures. Responsible for the location, identification, removal, and disposal of Ordnance/Explosive (OE) contamination and any other environmental hazards encountered. Conducted demolition operations to include the accountability, transportation, and safe handling of explosives and related demolition material, and the execution of numerous disposal operations. Provided UXO escort operations for EPA/OSHA surveys, USACE operations, and facility maintenance operations. Performed survey operations utilizing Trimble Data Capture Equipment (TDC-1), Trimble Field Computer (TFC-1), and Pathfinder Office software program. Participated in lead abatement operations and training. Performed soil sampling for EPA/OSHA contamination testing. Responsible for operation and operational safety of heavy equipment to include backhoe, brush hog, and all-terrain forklift.

Unexploded Ordnance Specialist; Explosive Ordnance Disposal, 70th Ordnance Company (EOD); U.S. Army; Naval Submarine Base, San Diego, California; August 1995 to July 1996. Provided direct assistance and technical support to range clearance operations and EPA/OSHA issues in Anza Borrego, CA and Fort Huachuca, AZ. Responsible for hazardous materials management, training and safety management, explosive and ammunition storage and accountability, hazardous materials transportation, writing of SOPs for training, safety, and site specific EOD procedures.

Unexploded Ordnance Specialist; Explosive Ordnance Disposal, 54th Ordnance Company (EOD); U.S. Army; Fort Monmouth, New Jersey; April 1993 to July 1995. Performed range clearance and training operations at Fort Devens range and West Point range. Provided EOD support at Formerly Utilized Defense (FUD) site. Also provided security management and classified materials management and clearance verification.

CHRONOLOGICAL WORK HISTORY:

Project Manager / Staff Engineer; Tetra Tech NUS, Inc.; Stone Mountain, Georgia; August 2005 to Present.

Environmental Engineer / Unexploded Ordnance Specialist; Tetra Tech EM Inc.; Atlanta, Georgia; December 2003 to August 2005.

Unexploded Ordnance Specialist / Environmental Specialist; Tetra Tech NUS, Inc.; Stone Mountain, Georgia; February 2001 to December 2003.

UXO Supervisor / GPS Supervisor; Environmental Chemical Corporation; Burlingame, CA; May 2000 to February 2001.

Safety Specialist; Cianbro Corporation; Pittsfield, ME; March 2000 to May 2000.

UXO Specialist; USA Environmental Inc.; Tampa, Florida; October 1996 to March 2000.

Explosive Ordnance Disposal Technician; U.S. Army; April 1993 to July 1996.

Naval School
Explosive Ordnance Disposal
Eglin Air Force Base

This Certificate is awarded to

PFC JEFFREY M. FOURNIER

for the successful completion of the prescribed course of study for

Explosive Ordnance Disposal Assistant

on this 16TH *day of* DECEMBER *1992*

BY:

L. JACKSON JR., LCDR, USN
Officer in Charge

Certificate of Training

This certifies that

Jeffrey Fournier

has successfully completed the training program requirements for

40 Hour OSHA Training for Hazardous Waste Operations - 29 CFR 1910.120 (e)(g)

Tampa, Florida

Awarded on this 7 day of October 19 96

Robin Miller

CMS Environmental, Inc.

AC 303

Tetra Tech NUS, Inc.

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Jeff Fournier

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER TRAINING

Prepared and instructed by Tetra Tech NUS, Inc.

December 20, 2007
Date of Award

Certificate Number: 07-12-20-03

Eric M Samuels

Eric M. Samuels
Health and Safety Manager
Atlanta, Georgia

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Periodic Examination

EMPLOYEE:	Fournier, Jeffrey M	**COMPANY:**	TT/NUS
SSN:	XXX-XX-9993	**POSITION:**	Environmental Engineer
DATE OF EXAM:	04/28/2006	**LOCATION:**	TT/NUS-Stone Mountain
EXPIRATION DATE:	04/28/2008	**SITE:**	Atlanta

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 05/03/06

Signature: Peter P Greaney MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

Naval School
Explosive Ordnance Disposal

Certificate of Completion

Presented To

Sergeant
Sydney Rodgers, USA

For having successfully completed
the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL PHASE II

30 June 1967

Date

JOHN J. WALSH, CDR, USN

Commanding Officer

CERTIFICATION

May it be known by all who read this that

Sydney E. Rodgers

has met & surpassed all of the requirements of

CFR 1910.120 FOR HAZARDOUS WASTE OPERATIONS

Presented this 10 Day of Oct, 1991

EOD TECHNOLOGY, INC.
ORGANIZATION

Frank J. Rzykruski
SIGNED

Tetra Tech NUS, Inc.

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Sydney Rodgers

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER TRAINING

Prepared and instructed by Tetra Tech NUS, Inc.

March 15, 2008
Date of Award

Certificate Number: 08-03-15-01

Eric M. Samuels
Health and Safety Manager
Atlanta, Georgia

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination

EMPLOYEE:	Rodgers, Sydney	**COMPANY:**	TT/NUS
SSN:	XXX-XX-7222	**POSITION:**	UXO Tech III
DATE OF EXAM:	02/19/2008	**LOCATION:**	TT/NUS-Stone Mountain
EXPIRATION DATE:	02/19/2010	**SITE:**	Stone Mountain

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Qualified for biennial status.***

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 02/23/08

Signature: Peter P Greaney MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

Naval School
Explosive Ordnance Disposal

This certifies that

SERGEANT PETER R. DUMMITT 2129811/2336 USMC

having successfully completed the prescribed course of study

for BASIC Explosive Ordnance Disposal

is awarded this

Certificate

this 19TH day of JUNE A.D. 1969

D. H. Moody

D. H. MOODY, CDR, USN

COMMANDING OFFICER

O.H. MATERIALS CORP.
THE ENVIRONMENTAL SERVICES CORP.

CERTIFICATE OF COMPLETION

This is to certify that

PETER R. DUMMITT

Has successfully completed the following training:

OHM-OSHA 40-HOUR SAFETY TRAINING PROGRAM

During the period JUNE 12, 19 88 to JUNE 17, 19 88

President

Training Coordinator

Tetra Tech NUS, Inc.

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Peter Dummitt

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER TRAINING

Prepared and instructed by Tetra Tech NUS, Inc.

March 9, 2008
Date of Award

Certificate Number: 08-03-09-01

Eric M. Samuels
Health and Safety Manager
Atlanta, Georgia

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: **Periodic Examination**

EMPLOYEE:	**Dummitt, Peter**	**COMPANY:**	**TT/NUS**
SSN:	**XXX-XX-6759**	**POSITION:**	**Shift Supervisor**
DATE OF EXAM:	**08/07/2007**	**LOCATION:**	**TT/NUS-Stone Mountain**
EXPIRATION DATE:	**08/07/2009**	**SITE:**	**Stone Mountain**

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 08/10/07

Signature: Peter P Greaney MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

Naval School
Explosive Ordnance Disposal

This certifies that

SERGEANT GLEN L. CHILDERS, AF19850345, USAF

having successfully completed the prescribed course of study

for BASIC SURFACE Explosive Ordnance Disposal COURSE 5-ALN 46430

is awarded this

Certificate

this 19TH day of JUNE A.D. 1969

D. H. MOODY, CDR. USN

COMMANDING OFFICER

FIELD SCIENCES INSTITUTE

certifies that

GLEN L. CHILDERS

has successfully completed the course

HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE 40-HOUR TRAINING

as required by OSHA 29 CFR 1910.120

Dates of Course: 08/09/1993

INSTRUCTOR

Exam Date: 08/13/1993

Expiration Date: 08/13/1994

CERTIFICATE NUMBER: 40H930813007

FIELD SCIENCES INSTITUTE
A Division of CERL, Inc.
2015 Yale Blvd. SE, Box # 7 Albuquerque, New Mexico 87106 (505) 764-9251

Association of
Bay Area Governments

ABAG Training Center
www.hazmatschool.com

CERTIFICATE OF COMPLETION

Glen Childers

has successfully completed the course titled

OSHA 8-hr Annual HAZWOPER Refresher

Satisfies 29 CFR 1910.120(e)(8)

on

June 15, 2007

and has earned

IACET authorized 0.8 CEUs (Continuing Education Units) from the program

IACET

Certificate No 58478
(verify at www.hazmatschool.com)

Brian Kirking, Training Director
Sharon McCreadie, Training Coordinator
www.abag.ca.gov; (510) 464-7964

Paul W. Gantt, REA
Safety Compliance Management, Inc.

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination

EMPLOYEE:	Childers, Glen	**COMPANY:**	TT/NUS
SSN:	XXX-XX-8229	**POSITION:**	UXO Tech II
DATE OF EXAM:	01/24/2008	**LOCATION:**	TT/NUS-Stone Mountain
EXPIRATION DATE:	01/24/2010	**SITE:**	Not Indicated

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** - The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.
2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:
3. ☐ **NOT QUALIFIED**
4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Qualified for biennial status.***

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 01/30/08

Signature: Peter P Greaney MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

Naval School
Explosive Ordnance Disposal

This certifies that

Lieutenant
Robert T. Yancey, 260-76-8787, USN

having successfully completed
the prescribed course of study for

NAVY BASIC EXPLOSIVE ORDNANCE DISPOSAL

is awarded this
Certificate

this 5th day of April A.D. 1984

J. SEDLAK, JR., CDR, USN
COMMANDING OFFICER

This fax was received by GFI FAXmaker fax server. For more information, visit: http://www.gfi.com

Certificate of Training

HazTrain, Incorporated

proudly presents this award for

educational achievement to

TOM YANCEY

for satisfactorily completing the course of

40 Hour Health and Safety Training for Hazardous Waste Operations and Emergency Response

March 18-22, 1991

HazTrain, Inc.

P.O. BOX [illegible] LA PLATA, MARYLAND [illegible] [illegible]

Instructor

President

Tetra Tech NUS, Inc.

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Robert Yancey

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER TRAINING

Prepared and instructed by Tetra Tech NUS, Inc.

February 22, 2008
Date of Award

Certificate Number: 08-02-22-01

Eric M. Samuels
Health and Safety Manager
Atlanta, Georgia

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination **UPDATE**

EMPLOYEE:	Yancey, Robert T	**COMPANY:**	TT/NUS
SSN:	XXX-XX-8787	**POSITION:**	UXO Tech III
DATE OF EXAM:	08/22/2007	**LOCATION:**	TT/NUS-Stone Mountain
EXPIRATION DATE:	08/22/2008	**SITE:**	

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	[X]	[ ]	[ ]
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	[ ]	[X]	[ ]

STATUS

1. [ ] **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. [X] **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

   [X] ***Employee must wear hearing protection when exposed to loud noise.***

3. [ ] **NOT QUALIFIED**

4. [ ] **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Baseline exam based upon review of recent medical exam.***

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 01/29/08

Signature: Peter P Greaney MD

WorkCare
1320 Harbor Bay Parkway, Suite 115, Alameda, CA 94502
(510) 748-6900 • FAX (510) 748-6915

Naval School
Explosive Ordnance Disposal

Certificate of Completion

Presented To

Corporal
Frank J. Montes, USMC

For having successfully completed
the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL PHASE II

18 January 1991

Date

M. G. Mathews

G. MATHEWS, CDR, USN

Certificate of Training

This certifies that

Frank Montes

has successfully completed the training program requirements for

40 Hour OSHA Training for Hazardous Waste Operations - 29 CFR 1910.120 (e)(9)

Tampa, Florida

Awarded on this 6th day of January, 1999.

James Haldin

USA Environmental, Inc.

Certificate of Completion

Awarded to

Frank Montes

ATI

For completion of an exam and 8 hour training course entitled

"HAZARDOUS WASTE OPERATIONS and EMERGENCY RESPONSE"

Test Scores 87 and 94

THE AMERICAN BOARD OF INDUSTRIAL HYGIENE INCORPORATED
CERTIFICATION NUMBER 2054 CP
EXPIRES 6-1-2010
PENNSYLVANIA
CHARLES C. PHILLIPS, CIH

BCSP
CHARLES C. PHILLIPS
19561
CERTIFIED SAFETY PROFESSIONAL

Dr. Charles Phillips, CSP, CIH

July 26, 2007

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination

EMPLOYEE:	Montes, Frank J	**COMPANY:**	TT/NUS
SSN:	XXX-XX-3450	**POSITION:**	Not Indicated
DATE OF EXAM:	01/23/2008	**LOCATION:**	TT/NUS-Stone Mountain
EXPIRATION DATE:	01/23/2010	**SITE:**	Stone Mountain

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Qualified for biennial status.***

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 01/30/08

Signature: Peter P Greaney MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

The Texas A&M University System
Texas Engineering Extension Service
Law Enforcement & Security Training Division

EDWIN E. ALDER

has successfully completed

UXO TECHNICIAN LEVEL 1

for 200 *hours*

on

AUGUST 10, 2001

2312:0003

Director, Texas Engineering Extension Service
Associate Vice Chancellor for Engineering

The Texas A&M University System
Texas Engineering Extension Service
Emergency Services Training Institute

Edwin E. Alder

has satisfactorily completed

40 HR HAZWOPER FOR CLEAN-UP OPERATIONS - 29CFR1910.120

conducted in cooperation with

Emergency Services Training Institute

August 13-17, 2001

Director

P 701005 0024 State Board for Educator Certification #500132

06/13/2007 08:38 FAX 361 721 0405 RIVERON REALTY

Tetra Tech NUS, Inc.

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Edwin Alder

has successfully completed an 8-hour course of instruction in

OSHA 29 CFR 1910.120

GENERAL SITE WORKER REFRESHER TRAINING

Prepared and instructed by Tetra Tech NUS, Inc.

February 29, 2008
Date of Award

Certificate Number: 08-02-29-01

Eric M. Samuels
Health and Safety Manager
Atlanta, Georgia

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: Baseline Examination **UPDATE**

EMPLOYEE:	Alder, Edwin	**COMPANY:**	TT/NUS
SSN:	XXX-XX-1323	**POSITION:**	Not Indicated
DATE OF EXAM:	01/09/2007	**LOCATION:**	TT/NUS-Stone Mountain
EXPIRATION DATE:	01/09/2009	**SITE:**	Stone Mountain

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120?	☐	☒	☐
Does the employee have any limitations in the use of respirators in accordance with 29 CFR §1910.134?	☐	☒	☐

STATUS

1. ☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

2. ☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

3. ☐ **NOT QUALIFIED**

4. ☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

COMMENTS: ***Exam frequency changed to Biennial.***
Negative Drug Screen.

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 06/15/07

Signature: Peter P Greaney MD

WorkCare
300 S. Harbor Blvd., Suite 600, Anaheim, CA 92805
(714) 978-7488 • (800) 455-6155 • FAX (714) 456-2154

APPENDIX J

RECORDS OF CHANGE

FIELD CHANGE REQUEST (FCR)

CONTRACT TASK ORDER NAME:	**CTO #**	**CHANGE REQUEST NO.**
TO:	**LOCATION:**	**DATE:**

RE:

Drawing # _____ Title: _____

Specific Sections: _____ Title: _____

Other: _____

1. DESCRIPTION (items involved, submit sketch, if applicable):

2. REASON FOR CHANGE

3. RECOMMENDED DISPOSITION (Submit sketch, if applicable):

_____ Minor Change _____ Major Change (Impacts Cost, Schedule)

4. DISPOSITION: (Approval Required by Client Representative)

_____ Not Approved (give reason).

_____ Considered minor change – APPROVED per recommended disposition – Documents will not be formally revised. Field office to maintain as –built records.

_____ Considered major change – Client approval required via contract modification process

Prepared by (Signature)	**Date:**
TtNUS UXO Manager (Signature)	**Date:**
TtNUS Project Manager (Signature)	**Date:**
Navy Point of Contact / Client Representative (Signature)	**Date:**

HEALTH AND SAFETY PLAN

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Revision 1
March 2008

Health and Safety Plan
for the
Incinerator Disposal Site

Naval Auxiliary Landing Field Cabaniss
Corpus Christi, Texas

Contract Task Order 0023

March 2008

NAVFAC
Naval Facilities Engineering Command
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

TETRA TECH NUS, Inc.

REVISION 1
MARCH 2008

HEALTH AND SAFETY PLAN

FOR

SKEET AND PISTOL RANGE

NAVAL AUXILIARY LANDING FIELD CABANISS
CORPUS CHRISTI, TEXAS

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
NAVFAC SE
NAS Jacksonville
P.O. Box 30, Bldg 103
Jacksonville, Florida 32212

Submitted by:
Tetra Tech NUS, Inc.
Foster Plaza 7, 661 Andersen Drive
Pittsburgh, Pennsylvania 15220

CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 023

MARCH 2008

PREPARED UNDER THE SUPERVISION OF:

G. KENNETH GRIM, P.G.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
HOUSTON, TEXAS

APPROVED FOR SUBMITTAL BY:

MATTHEW M. SOLTIS, CIH, CSP
CLEAN HEALTH AND SAFETY MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

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1.0 INTRODUCTION

This Health and Safety Plan (HASP) is specifically written for site activities that are to be conducted at the Naval Auxiliary Landing Field Cabaniss (NALF Cabaniss), located in Corpus Christi, Texas. This investigation will provide data on various chemical concentrations in surface soils at the Incinerator Disposal Site. In addition to this HASP, a copy of the Tetra Tech NUS, Inc. (TtNUS) Health and Safety Guidance Manual (HSGM) must be at the site during the performance of site activities. This guidance manual provides detailed information pertaining to the HASP as well as TtNUS standard operating procedures (SOPs). Both documents must be present at the site to comply with the requirements stipulated in the Occupational Safety and Health Administration (OSHA) standard 29 Code of Federal Regulations (CFR) 1910.120.

This HASP has been developed using the latest available information regarding known or suspected chemical contaminants and potential physical hazards associated with the proposed work and site activities. This HASP will be modified if new information becomes available. Changes to the HASP will be requested through the TtNUS Health and Safety Manager (HSM) and the Task Order Manager (TOM). It is the responsibility of the TOM to notify affected personnel of changes to this HASP.

The elements of this HASP are in compliance with the requirements established by OSHA 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response" (HAZWOPER) and sections of 29 CFR 1926 "Safety and Health Regulations For Construction." The information contained in this plan, as well as policies on conducting on-site operations, has been obtained from the TtNUS Health and Safety Program and NALF Cabaniss policies and procedures.

1.1 AUTHORITY

This work is authorized under the Comprehensive Long - Term Environmental Action Navy (CLEAN) contract, administered through the U.S. Navy, Naval Facilities Engineering Command, Southeast (NAVFAC SE) as defined under Contract No. N62467-04-D-0055; Contract Task Order (CTO) Number 0023.

1.2 KEY PROJECT PERSONNEL AND ORGANIZATION

This section defines responsibility for site safety and health for TtNUS and subcontractor employees engaged in on-site activities. Personnel assigned to these positions will exercise the primary responsibility for on-site health and safety. These persons will be the primary points of contact for any

questions regarding the safety and health procedures and the selected control measures that are to be implemented for on-site activities.

The TtNUS TOM is responsible for the overall direction of health and safety for this project.

The Project Health and Safety Officer (PHSO) is responsible for developing the HASP in accordance with applicable OSHA regulations. Specific responsibilities include:

i. Providing information regarding site contaminants and physical hazards associated with the site.
ii. Establishing air monitoring and decontamination procedures.
iii. Assigning personal protective equipment.
iv. Determining emergency response procedures.
v. Stipulating training and appropriate training and medical surveillance requirements for TtNUS and subcontractor personnel.
vi. Identifying relevant standard work practices to minimize potential injuries and exposures associated with the project scope of work.

The TtNUS Field Operations Leader (FOL) is responsible for implementation of the HASP with the assistance of an appointed Site Safety Officer (SSO). The FOL manages field activities, executes the work plan, and enforces safety procedures as applicable to the work plan.

The SSO supports site activities by advising the FOL on the aspects of health and safety on-site. These duties may include:

i. Coordinating health and safety activities with the FOL.
ii. Selecting, applying, inspecting, and maintenance of personal protective equipment.
iii. Establishing work zones and control points in areas of operation.
iv. Implementing air monitoring program for on-site activities.
v. Verifying training and medical clearance of on-site personnel status in relation to site activities.
vi. Implementing Hazard Communication and other associated health and safety programs, as they may apply to site activities.
vii. Coordinating emergency services.
viii. Providing site-specific training for on-site personnel.
ix. Investigating accidents and injuries (see Attachment I - Illness/Injury Procedure and Report Form).

x. Providing input to the PHSO regarding the need to modify this HASP, or applicable health and safety associated documents.

- Compliance with the requirements stipulated in this HASP is monitored by the SSO and coordinated through the CLEAN HSM.

Note: In some cases one person may be designated responsibilities for more than one position. For example, at NALF Cabaniss, the FOL may also be responsible for the SSO duties. This will be performed only as credentials, experience, and availability permits.

1.3 SITE INFORMATION AND PERSONNEL ASSIGNMENTS

Site Name: NALF Cabaniss **Site Contact:** Mike Hilger

Address: Cabaniss, Corpus Christi, Texas **Phone Number:** (361) 961-5354

NAVFAC SE Engineer: Helen Lockard **Phone Number:** (843) 820-5567

Purpose of Site Visit: This field investigation will entail multiple tasks and activities (see Section 4.0). This includes: 1) multi-media sampling and analysis to identify contaminants and munitions constituents (MC) through Direct Push Technology (DPT); 2) the collection of samples from surface, and subsurface soils, sediments, surface water and groundwater; 3) X-ray Fluorescence (XRF) analysis and 4) Geophysical survey to identify anomalies. All site activities will use Unexploded Ordnance (UXO) avoidance procedures.

Proposed Dates of Work: May 2007

Project Team:

TtNUS Personnel:	**Discipline/Tasks Assigned:**
Larry Basilio	Task Order Manager (TOM)
Matthew M. Soltis, CIH, CSP	Manager of Health and Safety (HSM)
Clyde Snyder	Project Health and Safety Officer (PHSO)
Larry Basilio	Field Operations Leader (FOL)
TBD	Field Technician
TBD	Site Safety Officer (SSO)
Ralph Brooks	UXO Manager

Non-TtNUS Personnel	**Affiliation/Discipline/Tasks Assigned**
TBD	Subcontractor
TBD	Surveyor

Hazard Assessments (for purposes of OSHA 29 CFR 1910.132) and HASP preparation conducted by:

Clyde Snyder

TBD – To be determined

2.0 EMERGENCY ACTION PLAN

2.1 INTRODUCTION

This section has been developed as part of a planning effort to direct and guide field personnel in the event of an emergency. In the event of on-site emergencies, which cannot be handled by on-site personnel, site personnel will be evacuated to a safe place of refuge and the appropriate emergency response agencies will be notified. It has been determined that a majority of potential emergency situations would be better supported by outside emergency responders. Based on this determination, TtNUS and subcontractor personnel will only provide emergency response support up to the capabilities of on-site response. Workers who are ill or who have suffered a non-serious injury may be transported by site personnel to nearby medical facilities, provided that such transport does not aggravate or further endanger the welfare of the injured/ill person. The emergency response agencies listed in this plan are capable of providing the most effective response, and as such, will be designated as the primary responders. These agencies are located within a reasonable distance from the area of site operations, which ensures adequate emergency response time. This emergency action plan conforms to the requirements of OSHA Standard 29 CFR 1910.38(a), as allowed in OSHA 29 CFR 1910.120(I)(1)(ii).

TtNUS will through necessary services include incidental response measures for incidents such as:

- Incipient stage fire fighting support and prevention.
- Incipient spill control and containment measures and prevention.
- Removal of personnel from emergency situations.
- Provision of initial medical support for injuries or illnesses requiring only first-aid level support.
- Provision of site control and security measures as necessary.

2.2 EMERGENCY PLANNING

Through the initial hazard/risk assessment effort, injuries or illnesses resulting from exposure to chemical or physical hazards or fire are the most probable emergencies that could be encountered during site activities. To minimize and eliminate these potential emergency situations, emergency planning activities associated with this project include the following. The SSO and/or the FOL are responsible for:

- Coordinating with NALF Cabaniss Emergency Services personnel to ensure that TtNUS emergency action activities are compatible with existing facility emergency response procedures.

- Establishing and maintaining information at the project staging area (support zone) for easy access in the event of an emergency. This information will include the following:

  - Chemical Inventory (used on-site), with Material Safety Data Sheets (MSDS).
  - On-site personnel medical records (medical data sheets).
  - A logbook identifying personnel on site each day.
  - Emergency notification phone numbers in site vehicles.

- Identifying a chain of command for emergency action. For this field effort, the FOL and/or the SSO shall serve as Incident Coordinators in the event of an incident. In the event the release cannot be controlled, Incident Command responsibilities will be passed to the responding emergency services agency.

- Informing site workers of the hazards and control measures associated with planned activities at the site, and providing early recognition and prevention, where possible. This will be accomplished through site-specific training of this emergency action plan, HASP, and through daily briefings and through the use of task-specific Safe Work Permits.

It is understood that the use of two-way communication devices (cellular phones and radios) must be approved by the NALF Cabaniss Safety Office and such equipment will only be used with official permission. However, TtNUS is authorized to utilize two-way radio assigned to the Environmental Department. This radio is to be used only in the event of an emergency. It should only be activated if needed as the battery will only be charged periodically throughout the shift.

2.3 EMERGENCY RECOGNITION AND PREVENTION

The FOL and/or the SSO will preview site work locations prior to committing personnel or resources. They will:

- Identify, remove, and/or barricade physical hazards within the estimated work area. Ensure that approach paths and access and control points into the work area have been established to ensure that pedestrian and vehicular traffic and other installation activities are not impacted by site operations.

- Provide the necessary equipment to control potential emergencies [i.e., safety cans for flammable liquid storage, spill containment equipment, personal protective equipment (PPE), and emergency

equipment such as portable fire extinguishers and first-aid kits]. Ensure emergency equipment and resources are at the ready, should they be needed for emergency response measures.

- Secure necessary permits and clearances, such as Utility Clearances, provided by the facility. When utility clearances are obtained record the proper documentation in the log book.

- Ensure personnel are adequately trained in the provisions of this HASP and this Emergency Action Plan.

- Identify potential emergencies during site activities such as: being struck by the equipment, becoming entangled in rotating machinery, striking an underground utility, being exposed to excessive noise levels, handling material injuries, and traffic hazards. The control measures for these hazards are presented in Section 6.2 of this HASP.

2.4 SAFE DISTANCES AND PLACES OF REFUGE

The FOL and/or the SSO shall identify a safe place of refuge (in the event of an emergency). This location will be selected and conveyed to the Field Crew as part of issuing daily safety briefing. Selection will be based on the following considerations:

- A location providing telephone communications and/or shelter.

- A location from which the field crews can provide site security restricting access to the emergency area, however, a point from which the field crew may direct emergency response personnel (i.e., intersection or gate, etc.).

This location should be positioned a sufficient (safe) distance from the operation that will not be impacted by the emergency. This distance is impacted by a number of conditions (i.e., tasks being conducted; chemical, physical, and toxicological properties; potential for fire and explosion; meteorological conditions; terrain). Based on the level of reported contaminants and the low risk of encountering any significant emergency situations, it is not anticipated that emergency assembly points will need to be located significantly away from the planned work areas.

2.5 EVACUATION ROUTES AND PROCEDURES

Once an evacuation is initiated, personnel will proceed immediately to the designated place of refuge, unless doing so would further jeopardize the welfare of workers. In such an event, personnel will proceed to a designated alternate location (to be identified) and remain there until further notification from the

FOL. The use of these locations as assembly points provides communication and a direction point for emergency services, should they be needed.

Evacuation procedures will be discussed prior to the initiation of any work at the site. This shall include identifying primary and secondary evacuation routes and assembly points. Evacuation routes from the site are dependent upon the location at which work is being performed and the circumstances under which an evacuation is required. Additionally, site location and meteorological conditions (i.e., wind speed and direction) will influence the designation of evacuation routes. As a result, assembly points at NALF Cabaniss will be selected, and in the event of an emergency, field personnel will proceed to these points by the most direct route possible without further endangering themselves.

2.6 DECONTAMINATION PROCEDURES / EMERGENCY MEDICAL TREATMENT

During any site evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. Decontamination will be postponed if the incident warrants immediate evacuation. However, it is unlikely that an incident would occur which would require workers to evacuate the site without first performing the necessary decontamination procedures.

TtNUS personnel will remove personnel from emergency situations and may provide initial medical support for injury/illnesses requiring only "Basic First-Aid" level support. Basic First-Aid is considered medical treatment that can be rendered by a trained first aid provider at the injury location and not requiring follow-up treatment or examination by a physician (for example; minor cuts, bruises, stings, scrapes, and burns). Treatment beyond basic first-aid, such as second or third degree burns, cuts, lacerations requiring stitches or butterfly bandaging, heat exhaustion, severe poisonous plant or insect bite reactions, or sprains will require more advanced medical attention. Personnel providing medical assistance are required to be trained in First-Aid and in the requirements of OSHA's Bloodborne Pathogen Standard (29 CFR 1910.1030). Medical attention above basic first-aid will require assistance and support from the designated emergency response agencies**.**

2.7 EMERGENCY ALERTING AND ACTION/RESPONSE PROCEDURES

Radio communication in addition to hand signals and voice commands will comprise the mechanisms to alert site personnel of an emergency.

If an accident occurs, site personnel will initiate the following procedures:

- Initiate incident alerting procedures by radio or voice.
- Evacuate non-essential personnel.

- Initiate initial response procedures.
- Describe to the FOL (who will serve as the Incident Coordinator) what has occurred in as much detail as possible.

In the event that site personnel cannot control the incident through offensive and/or defensive measures, the FOL and SSO will enact the emergency notification procedure to secure additional outside assistance in the following manner:

- Call 911 and report the emergency. Give the emergency operator the location of the emergency and a brief description of what has occurred.
- Stay on the phone and follow the instructions given by the operator.
- The appropriate agency will be notified and dispatched.

If an accident occurs at NALF Cabaniss outside of the designated operating areas impacting field personnel, the following procedures are to be initiated:

- Initiate an evacuation (if needed) by voice commands, hand signals, air horns or two-way radio.
- Direct field personnel to proceed to the appropriate assembly points (as directed by NALF Cabaniss Emergency Services or other designated Navy personnel).

2.8 EMERGENCY CONTACTS

Prior to performing work at the site, personnel will be thoroughly briefed on the emergency procedures to be followed in the event of an incident. A cellular phone or designated land-line phone shall be identified and made available during on-site operations for the purpose of emergency notification. Table 2-1 provides a list of emergency contacts and their corresponding telephone numbers. This table must be posted on-site, where it is readily available to site personnel. If field personnel are operating at a number of isolated locations, additional copies should be made available to the field crew.

TABLE 2-1

EMERGENCY REFERENCE

INCINERATOR DISPOSAL SITE

NALF CABANISS, CORPUS CHRISTI, TEXAS

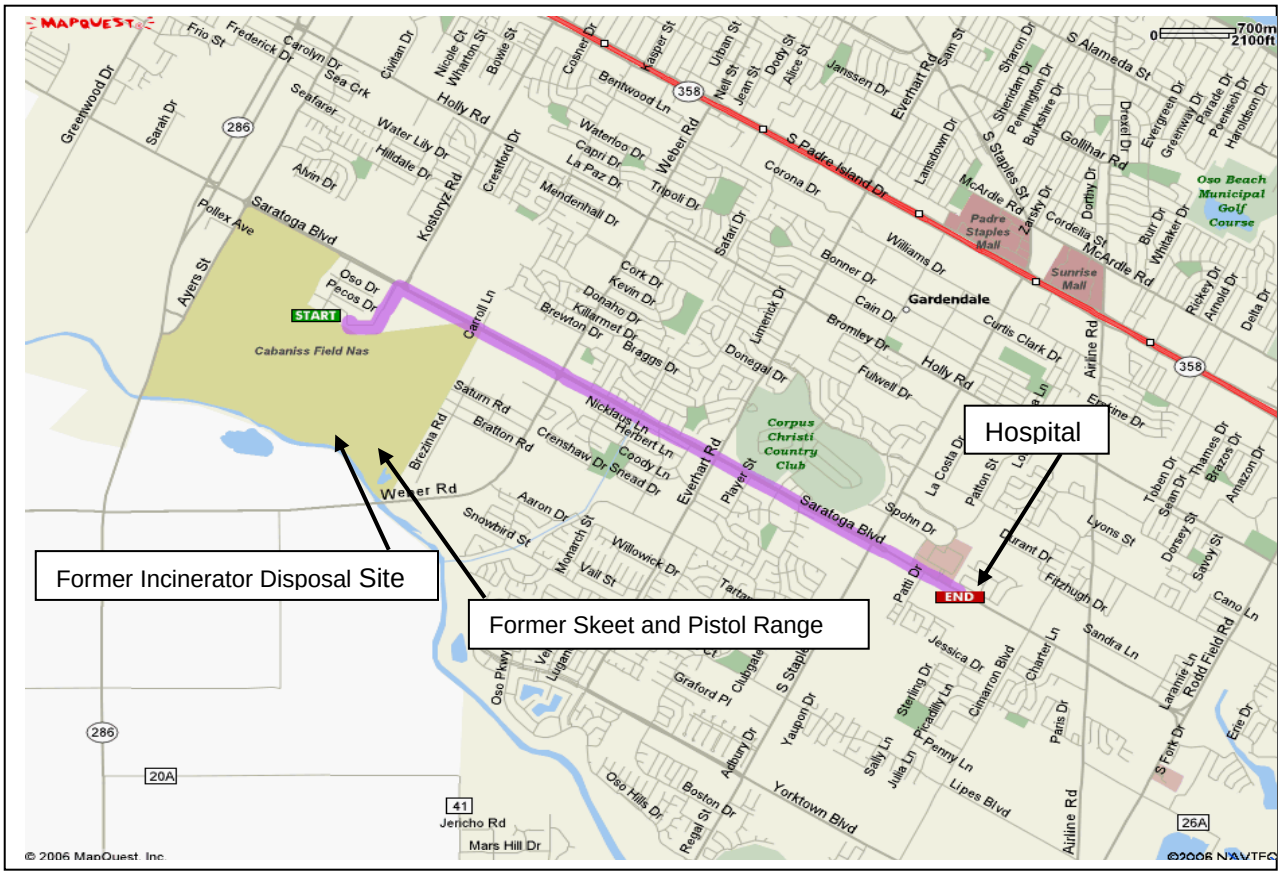
	TELEPHONE NUMBER
EMERGENCY	**911**
Christus Spohn Hospital South	(361) 985-5000
NAS Corpus Christi Base Security Dispatch	(361) 961-2375
NAS Corpus Christi Base Security Operations	(361) 961-3491
NAS Corpus Christi Base Security Operations Patrol	(361) 961-2282
Navy Onsite Representative, NAS Corpus Christi, Texas, Michael Hilger	(361) 961-5354
Poison Control Center	(800) 222-1222
Tetra Tech NUS, Inc., Houston Office Larry Basilio (Task Order Manager) (TOM)	(832) 251-6018
TtNUS Health and Safety Manager (HSM) Matthew M. Soltis, CIH, CSP	(412) 921-8912
TtNUS Project Health and Safety Officer (PHSO) Clyde Snyder	(412) 921-8904
NAVFAC SE Engineer-in-Charge Helen Lockard	(843) 820-5567

2.9 ROUTE TO THE HOSPITAL:

Christus Spohn Hospital South
5950 Saratoga Blvd
Corpus Christi, TX 78414
(361) 985-5000

Exit NALF Cabaniss, turn right on Saratoga Boulevard. Hospital is 5 miles on the right.

FIGURE 2-1
HOSPITAL ROUTE MAP



2.10 PPE AND EMERGENCY EQUIPMENT

A first aid kit, eye wash units (as necessary), and fire extinguishers will be maintained on-site at an easily accessible location and shall be immediately available for use in the event of an emergency. Based on the anticipated hazards, these emergency equipment items may be maintained near the work areas (i.e., the exclusion zones) of on-going operations. This will be at the discretion of the SSO.

The FOL and/or the SSO should ensure the first-aid kits are stocked with the necessary equipment. First-aid kits purchased for the job-site shall be American National Standards Institute (ANSI) Z308.1 approved for industrial applications. The SSO will determine the number of kits necessary based on the number of personnel and the number of remote operations being conducted under the scope of work at the same time.

2.11 INJURY/ILLNESS REPORTING

If any TtNUS personnel are injured or develop an illness as a result of working on site, the TtNUS "Injury/Illness Procedure" (Attachment I) must be followed. Following this procedure is necessary for documenting the information obtained at the time of the incident. Also, as soon as possible the Base Contact must be informed of any incident or accident that requires medical attention.

Any pertinent information regarding allergies to medications or other special conditions will be provided to medical service personnel. This information is listed on Medical Data Sheets (see Attachment II) which are to be completed for each worker and filed on-site. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel, and follow the protocol specified in Figure 2-2.

FIGURE 2-2
POTENTIAL EXPOSURE PROTOCOL

The purpose of this protocol is to provide guidance for the medical management during injury situations.

In the event of a personnel injury or accident:

- Rescue, when necessary, employing proper equipment and methods.
- Give attention to emergency health problems -- breathing, cardiac function, bleeding, and shock.
- Transfer the victim to the medical facility designated in this HASP by suitable and appropriate conveyance (i.e. ambulance for serious events).
- Obtain as much exposure history as possible (a Potential Exposure report is attached).
- If the injured person is a TtNUS employee, call the medical facility and advise them that the patient(s) is/are being sent and that they can anticipate a call from the WorkCare physician. WorkCare will contact the medical facility and request specific testing which may be appropriate. WorkCare physicians will monitor the care of the victim. Site officers and personnel should not attempt to get this information, as this activity leads to confusion and misunderstanding.
- Call WorkCare at 1-800-455-6155 and enter Extension 109, or follow the voice prompt after hours and on weekends and be prepared to provide:
  - Any known information about the nature of the injury.
  - As much of the exposure history as was feasible to determine in the time allowed.
  - Name and phone number of the medical facility to which the victim(s) has/have been taken.
  - Name(s) of the involved TtNUS, Inc. employee(s).
  - Name and phone number of an informed site officer who will be responsible for further investigations.
  - Fax appropriate information to WorkCare at (714) 456-2154.
- Contact Corporate Health and Safety Department (Matt Soltis) and Human Resources (Marilyn Duffy) at 1-800-245-2730. This number will only be accessible from 0800 through 1700 Monday through Friday.

As data is gathered and the scenario becomes more clearly defined, this information should be forwarded to WorkCare. WorkCare will compile the results of the data and provide a summary report of the incident. A copy of this report will be placed in each injured person's medical file in addition to being distributed to appropriately designated company officials. Each involved worker will receive a letter describing the incident but deleting any personal or individual comments. A personalized letter describing the individual findings/results will accompany this generalized summary. A copy of the personal letter will be filed in the continuing medical file maintained by WorkCare.

FIGURE 2-2 (continued)
POTENTIAL EXPOSURE REPORT

Name: _____ Date of Exposure: _____

Social Security No.: _____ Age: _____ Sex: _____

Client Contact: _____ Phone No.: _____

Company Name: _____

I. Exposing Agent

Name of Product or Chemicals (if known):_____

_____

Characteristics (if the name is not known)

Solid Liquid Gas Fume Mist Vapor

II. Dose Determinants

What was individual doing?_____

How long did individual work in area before signs/symptoms developed? _____

Was protective gear being used? If yes, what was the PPE? _____

Was their skin contact? _____

Was the exposing agent inhaled?_____

Were other persons exposed? If yes, did they experience symptoms? _____

III. Signs and Symptoms (check off appropriate symptoms)

Immediately With Exposure:

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Nausea / Vomiting
Dizziness
Weakness

Delayed Symptoms:

Weakness
Nausea / Vomiting
Shortness of Breath
Cough
Loss of Appetite
Abdominal Pain
Headache
Numbness / Tingling

IV. Present Status of Symptoms (check off appropriate symptoms)

Burning of eyes, nose, or throat
Tearing
Headache
Cough
Shortness of Breath
Chest Tightness / Pressure
Cyanosis
Nausea / Vomiting
Dizziness
Weakness
Loss of Appetite
Abdominal Pain
Numbness / Tingling

Have symptoms: (please check off appropriate response and give duration of symptoms)

Improved: _____ Worsened: _____ Remained Unchanged: _____

V. Treatment of Symptoms (check off appropriate response)

None: _____ Self-Medicated: _____ Physician Treated: _____

3.0 SITE BACKGROUND

This section provides information pertaining to NALF Cabaniss and the sites that are to be investigated. This information will be revised if additional information becomes available or if additional sites are going to be investigated.

3.1 FACILITY LOCATION

NALF Cabaniss is located on the eastern side of Nueces County, Texas, and lies approximately eight miles west of Naval Air Station (NAS) Corpus Christi (NASCC). The installation is immediately bounded on the east by Brezina Road, on the north by Ayers Street and FM 286, to the west by Saratoga Road, and to the south by Oso Creek. The installation encompasses a total of 923 acres and lies just outside the corporate bounds of the City of Corpus Christi. The installation boundary area includes Air Installation Compatible Use Zone (AICUZ) lands that extend northwest and southeast from the main acreage of the installation. These AICUZ lands are Navy property acquired to encompass noise zones and Accident Potential Zones in the event an accident were to occur on approach to or departing from the runways at NALF Cabaniss. NALF Cabaniss is bounded to the south by Oso Creek, a perennial water body that ultimately flows into Oso Bay. Beyond Oso Creek are agricultural and industrial properties. The area east of the installation is comprised of a mix of agricultural, industrial, and residential areas. North of the current boundary are former buildings and recreational areas that were once a part of the installation, were transferred to the General Services Administration (GSA) for disposal in 1958, and are now the property of the local school district. Residential zones lie beyond these buildings to the north. A former landfill is located directly west of the installation.

3.2 FACILITY DESCRIPTION

NALF Cabaniss is an outlying field (OLF) that supports Naval air training operations out of NASCC. NASCC, home to the Chief of Naval Air Training, maintains and operates facilities and provides services and material to support the operations of the aviation facilities of the Naval Air Training Command and other tenant activities. The general command assignment is pilot training, primarily focusing on primary and intermediate flight maneuvering and traffic pattern operations.

NALF Cabaniss is located eight miles west of NASCC. The installation was originally constructed with four 5,000-foot runways. The primary role of the installation is to support flight training operations originating from NASCC. Training Air Wing FOUR, based at the main installation, performs touch-and-go landing training between the main installation, NALF Cabaniss, and NALF Waldron, three miles south of NASCC. The airfield is lighted, so that night flight training, as well as daylight training, is possible.

NALF Cabaniss is covered with tall grasses, shrubs, trees, and other low-lying vegetation. Grasses and other vegetation near the operational runways are maintained through periodic mowing in support of flight training operations.

3.3 SPECIFIC SITE TO BE INVESTIGATED

The Incinerator Disposal Site was located in the southern portion of the installation, 750 feet southwest of the eastern end of Runway 31 and bounded to the south by Oso Creek. The Perimeter Road runs along the western and northern boundary of the site. The site is covered in dense vegetation, with open sections of wetlands on the south end near Oso Creek. The site was a former sanitary landfill that also contained a boiler used to incinerate confiscated drug material, small arms, and ordnance items. Though its exact dimensions are unknown, the site may have occupied approximately 17 acres.

NALF Cabaniss station records from the 1940s indicate the presence of an armory next to the Incinerator Disposal Site and a small arms magazine in the northeast quadrant of the installation, east of the barracks. Based on the historical use of the range, the armory likely stored only small arms ammunition (e.g., 12-, 16-, and 20-gage and .410 caliber shot, .22 caliber, .38 caliber, .45 caliber, 9-millimeter [mm]). The armory associated with the Skeet and Pistol Range is no longer present at the installation, and the date of decommissioning is not known. The former small arms magazine remains in place in an open field east of a drainage canal on property no longer owned by the installation. During an April 2004 site visit, the data collection team visually inspected the building, which was locked and appeared to be empty.

A February 1984 Initial Assessment Study (IAS) for the Naval Energy and Environmental Support Activity indicated an aircraft de-arming area at the end of Runway 31 near the taxiway. The report indicates that the area was used to de-arm aircraft returning from training missions through the 1970s. No ordnance was disposed of at this site; only munitions de-arming and transfer activities took place. This area is no longer used for de-arming operations. The same assessment study identified the Incinerator Disposal Site, located in a former sanitary landfill southwest of Runway 31, which was used to incinerate small arms and ordnance items. The ultimate disposition of the ash and debris generated from the burning operations is not known.

There are no currently operating ordnance/munitions storage facilities at NALF Cabaniss.

Information regarding the Incinerator Disposal Site is generally limited. However, visual evidence at the Incinerator Disposal Site indicated the presence of munitions scrap.

Deputy Fire Chief Gonzalez has indicated that munitions had been buried in or near an old sanitary landfill at NALF Cabaniss; fire crews working in the area were instructed to exercise caution when operating in these areas. He provided a map showing the general location of the landfill, but was not aware of the specific burial locations. A review of the IAS for NASCC and its OLFs indicated that the Army had used an eight-foot long by five-foot diameter boiler for the incineration of "small ordnance items", including .30 and .50 caliber small arms, flares, explosive cartridges from ejection seats, and "possibly 80 mm rockets" (likely 2.75-inch rockets) at a six-acre sanitary landfill facility.

The City of Corpus Christi also burned confiscated drug material in the boiler. The site was located in the same area indicated by Assistant Chief Gonzalez. The report concluded that operations at the site ceased by 1980 and that "burned remains of ordnance cover an area less than 200 square feet". No confirmation study of the site was recommended in the IAS, "since only innocuous materials were disposed at this site and only limited residual was generated from ordnance burning". This area of investigation was assumed to be approximately 17 acres (the approximate size of the former sanitary landfill) due to the unknown location of the boiler and the intent to investigate the boundaries of the former landfill. The boiler is located on the northern portion of the site, approximately 170 feet south of Perimeter Road in dense vegetation.

3.3.1 Known or Suspected Munitions of Explosive Concern (MEC) Areas

The Incinerator Disposal site has been subdivided and categorized into one of three levels of Munitions of Explosives Concern (MEC) presence including: known MEC areas, suspect MEC areas, and areas where no evidence exists to indicate that MEC are known or are suspected to be at the site.

MEC were confirmed in both the boiler location and the ground surface just off Perimeter Road and the installation fence line. The total combined acreage of these known areas is approximately 0.4 acres.

Very little is known about the operation of the Incinerator Disposal Site, including period of operation, frequency of incineration of munitions items, potential for buried or abandoned munitions items, and whether any closure activities were performed. Additionally, there is uncertainty as to how the group of thermally treated munitions scrap reached the area just off Perimeter Road, a distance of 450 feet. The immediate areas surrounding the two locations of munitions scrap and the land in between both locations are suspected to contain MEC, due to the finding of MEC in the area and the unknown operations of the site. The total acreage suspected to contain MEC is approximately three acres.

3.3.2 Areas Not Suspected to Contain MEC

Based on available documents, conversations with Environmental Division personnel at NASCC, and the site walk of the 17-acre area, it was concluded during the preliminary assessment that no areas other than the boiler location, the ground surface just off Perimeter Road, and the land between these two locations were suspected of containing MEC.

4.0 SCOPE OF WORK

This section discusses the activities that are to be performed at the site. Table 5-1 of this HASP provides information related to each of the tasks that are to be performed as part of the scope of work conducted at the site. As new phases or tasks are to be performed at the site, Table 5-1 will be modified accordingly. If tasks other than those presented below are performed at the site, this section will be modified accordingly.

A Site Inspection (SI) will be conducted to determine the presence, nature and extent of soil, sediment, and surface water contamination present at the former Incinerator Disposal Site. The SI will consist of:

- Mobilization/Demobilization.
- Clearing and grubbing of vegetation.
- Soil borings using Direct Push Technology (DPT).
  - Installation of temporary monitoring wells.
- Multi-media Sampling including collection and laboratory analysis of:
  - soil samples
  - groundwater samples
  - surface water/sediment samples
- Decontamination of sampling equipment.
- Investigative Derived Waste (IDW) Management.
- Geographical surveying of sample locations.
- Geophysical survey.

5.0 TASKS/HAZARDS/ASSOCIATED CONTROL MEASURES

Table 5-1 of this section serves as the primary portion of the site specific HASP which identifies the tasks that are to be performed as part of the scope of work. The anticipated hazards, recommended control measures, air monitoring recommendations, required PPE, and decontamination measures for each site task are discussed in detail. This table and the associated control measures will be revised, if the scope of work, contaminants of concern or other conditions change.

Through using the table, site personnel can determine which hazards are associated with each task and at each site, and what associated control measures are necessary to minimize potential exposure or injuries related to those hazards. The table also assists field team members in determining which PPE and decontamination procedures to use based on proper air monitoring techniques and site-specific conditions.

A HSGM must accompany this table and the HASP. This will require the FOL to obtain and maintain a HSGM on site. The manual is designed to further explain supporting programs and elements for other site-specific aspects as required by 29 CFR 1910.120. The HSGM should be referenced for additional information regarding air monitoring instrumentation, decontamination activities, emergency response, hazard assessments, hazard communication and hearing conservation programs, medical surveillance, PPE, respiratory protection, site control measures, standard work practices, and training requirements. Many of TtNUS' SOPs are also provided in the HSGM.

Safe Work Permits issued for major activities (See Section 10.11) will use elements defined in Table 5-1 as the primary reference. The FOL or the SSO completing the safe work permit will add additional site-specific information. In situations where the safe work permit is more conservative than the direction provided in Table 5-1 due to the incorporation of site-specific elements, the safe work permit will be followed.

5.1 GENERAL SAFE WORK PRACTICES

In addition to the task-specific work practices identified on Table 5-1, the following safe work practices will be observed when conducting work involving known and unknown site hazards. These safe work practices establish a pattern of general precautions and measures for reducing risks associated with hazardous site operations:

- Refrain from eating, drinking, chewing gum or tobacco, taking medication, or smoking in contaminated or potentially contaminated areas or where the possibility for the transfer of contamination exists.

- Wash hands and face thoroughly upon leaving a contaminated or suspected contaminated area. A thorough shower and washing must be conducted as soon as possible if excessive skin contamination occurs.

- Avoid contact with potentially contaminated substances by walking around puddles, pools, mud, or other such areas. Avoid, whenever possible, kneeling on the ground or leaning or sitting on equipment. Do not place monitoring equipment on potentially contaminated surfaces.

- Be familiar with and adhere to the instructions in the site-specific HASP.

- Be aware of the location of the nearest telephone and emergency telephone numbers. See Section 2.0, Table 2-1.

- Attend briefings on anticipated hazards, equipment requirements, Safe Work Permits, emergency procedures, and communication methods before going on site.

- Plan and mark entrance, exit, and emergency escape routes. See Section 2.0.

- Rehearse unfamiliar operations prior to implementation.

- Maintain visual contact with each other and with other on-site team members by remaining in close proximity in order to assist each other in case of emergency.

- Establish appropriate Safety Zones including Support, Contamination Reduction, and Exclusion Zones.

- Minimize the number of personnel and equipment in contaminated areas (such as the Exclusion Zone). Non-essential vehicles and equipment should remain within the Support Zone.

- Establish appropriate decontamination procedures for leaving the site.

- Immediately report injuries, illnesses, and unsafe conditions, practices, and equipment to the SSO.

- Observe coworkers for signs of toxic exposure and heat or cold stress.

- Inform co-workers of potential symptoms of illness, such as headaches, dizziness, nausea, or blurred vision.

5.2 DRILLING SAFE WORK PRACTICES

The following Safe Work Practices are to be followed when working in or around DPT Operations.

- Identify underground utilities and buried structures before drilling. Use the Utility Locating and Excavation Clearance Standard Operating Procedure provided in Attachment III.

- DPT Rig will be inspected by the SSO or designee, prior to the acceptance of the equipment at the site and prior to the use of the equipment.

- Repairs or deficiencies identified will be corrected prior to use.

- Conduct the Safety Inspection using the Equipment Inspection Checklist provided in Attachment IV.

- Inspection frequencies will be initially (prior to being put into use at the site), followed by once every 10-day shift or following repairs.

- The work area around the point of operation will be graded to the extent possible to remove any trip hazards near or surrounding rotating equipment.

- The Driller's helper will establish an equipment staging and lay-down plan in order to keep the work area clear of clutter and slip, trip, and fall hazards.

- Mechanisms to secure heavy objects such as auger flights, and drive rods will be provided to avoid the collapse of stacked equipment.

- Potentially contaminated tooling will be wrapped in polyethylene sheeting for storage and transport to the centrally located decontamination unit.

- The drill operator shall verbally alert employees and visually ensure employees are clear from dangerous parts of equipment before starting or engaging equipment.

- One employee shall be responsible for the emergency shut-off switch operation during drilling operation, such that the machinery can be shutdown quickly if an employee is in danger.

- Secure frayed or loose clothing, hair, and jewelry when working with rotating equipment.

- Personnel will minimize contact to the extent possible with contaminated tooling and environmental media.

- Support functions (sampling and screening stations) will be maintained a minimum distance from the DPT rig. This distance is typically the height of the mast plus five feet or a minimum of 25 feet, whichever is greater, to remove personnel involved in these activities from within physical hazard boundaries.

- Only qualified operators and knowledgeable ground crew personnel will participate in the operation of the DPT Rig.

- In order to minimize contact with potentially contaminated tooling and media and to minimize lifting hazards, multiple personnel should move heavy tooling, as applicable and necessary.

- Only personnel absolutely essential to the work activity will be allowed in the exclusion zone. Site visitors will be escorted.

- Equipment used within the exclusion zone will undergo a complete decontamination and evaluation by the SSO to determined cleanliness prior to moving to the next location, exiting the site, or prior to down time for maintenance.

- Motorized equipment will be fueled prior to the commencement of the day's activities. During fueling operations equipment will be shutdown and bonded to the fuel provider, where applicable.

- When not in use the DPT rig will be shutdown, emergency brakes set, and wheels chocked (vehicles over one ton rated capacity).

- Areas subjected to subsurface investigative methods will be restored to equal or better condition than original to remove any contamination brought to the surface and to remove any physical hazards.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Task/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Types and Action Levels	Personal Protective Equipment *(Items in italics are optional as conditions or the FOL or SSO require)*	Decontamination Procedures
Mobilization/Demobilization This activity includes, but is not limited to: - Equipment Preparation and Evaluation - Resource acquisition and unpacking of supplies - Site clearance and preparation – Utility clearances, etc. - Establish and construct access routes to sample/work locations - Construct decontamination and IDW operation and storage facilities, as applicable.	***Chemical hazards:*** 1) Site contaminants are not anticipated to be encountered during this activity. However, chemical hazards may be associated with chemicals that are brought on-site. ***Physical hazards:*** 2) Lifting (strain/muscle pulls) 3) Cuts and lacerations 4) Pinches and compressions/Struck by 5) Slips, trips, and falls 6) Vehicular and foot traffic ***Natural hazards:*** 7) Insect and animal bites and poisonous plants 8) Inclement weather	1) The on-site Hazard Communication Program [Section 5.0 TtNUS Health and Safety Guidance Manual (HSGM)] will be followed. This effort shall include - Accurate Chemical Inventory List (Entries will match chemicals brought on-site, as the names appear on the MSDS and the label). This list will also contain quantities and storage locations. - MSDS's will be maintained in a central location available to site personnel. - Containers will have labels specifying the following information: a) Chemical Identity (As it appears on the label, MSDS, and Chemical Inventory List) b) Appropriate Warning (i.e., Eye and skin irritation, flammable, etc.) c) Manufacturer's Name Address and Phone Number The FOL and/or the SSO is responsible to ensure that this is completed. Personnel will be required to review the appropriate MSDS's, prior to the use of a chemical substance. 2) During mobilization/demobilization personnel are required to handle equipment, supplies, and resources in preparation for site activities. This hazard becomes more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue). The following provisions shall be instituted in order to minimize hazards of this nature: - Use machinery or multiple personnel for heavy lifts. - Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are obtainable. - Minimize the horizontal distance to the center of the lift to your center of gravity. - Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. Ensure there is adequate room to lift and maneuver the load. Ensure the area of the lift is free of work place clutter, slippery surfaces, etc. - Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. - Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. - Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. 3) To prevent cuts and lacerations associated with unpacking or packing equipment and supplies, during site preparation (clearing access routes): - Always cut away from yourself and others, then, if a knife slips, you will not impale yourself or others. - Do not place items to be cut in your hand or on your knee. - Change blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting attachments. - If hand tools (brush hooks, machetes, etc.) are used to gain access to sample locations, the following precautions are recommended: --Ensure handles are of good construction (no cracks, splinters, loose heads/cutting apparatus). --Ensure cutting tools are maintained. Blades shall be sharp without nicks and gouges in the blade. --Hand tools (brush hooks, machetes, etc.) with cutting blades shall be provided with a sheath to protect individuals when not in use and when carrying these items over rough or slippery terrain. 4) Do not modify tooling without manufacturer's expressed permission. - Keep any machine guarding in place, avoid moving parts. - Use tools or equipment where necessary to avoid placing hands in areas vulnerable to pinch points. - Adjust machine guarding as necessary to minimize distance between guards and point of operation. - When staging equipment, ensure stacked loads, shelving, are adequately secure to avoid creating a hazard from falling objects. 5) Preview work locations for unstable/uneven terrain. - Cover, guard and barricade open pits, ditches, and openings to subsurface structures, as necessary. - The FOL and the SSO during site surveys and site preparation should identify these potential hazards. - Activities conducted greater than 6-feet above ground surface require protection (i.e. handrails and platforms) or accepted fall protection harnesses. 6) As part of site preparation activities and zone construction, when preparing traffic and equipment considerations are to include the following: - Self-propelled equipment shall be equipped with movement warning systems. - The FOL and/or the SSO as a precautionary measure to remove or demarcate physical hazards shall preview traffic routes (foot and vehicular) and work areas before the commitment of personnel and resources. 7) Avoid nesting areas – Activities are to take place within light industrial areas. Mosquitoes, ticks, and fire ants are anticipated to be problems. See Section 6.3 of this HASP as well as Section 4.0 of the HSGM. - Wear light color clothes to easily detect ticks and insects. - Tape pant legs to work boots to block direct access. - Use commercially available insect repellents – follow application instructions provided by the manufacturer. 8) In the event of electrical storms, high winds or other inclement weather, suspend or terminate operations until directed otherwise by SSO.	Visual observation of work practices by the FOL and/or the SSO to minimize potential physical hazards (i.e., improper lifting, unsecured loads, cutting practices, etc.).	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Steel toe safety shoes/boots - *Safety glasses (when potential eye hazards exist)* - *Hardhat (when overhead hazards exists, or identified as a operation requirement)* - *Reflective vest for high traffic areas* - *Hearing protection for high noise areas (As directed on an operation by operation scenario or at the direction of the FOL and/or the SSO).* As site conditions may change, the following equipment will be maintained during on-site activities as prescribed in Section 2.0 of this HASP - Fire extinguishers - First-aid kit ***Note:*** *The FOL and/or the SSO shall determine the number of fire extinguishers and first-aid kits to be made available based on the number of remote or separated operations to be conducted at any given time.*	Not required. Good personal hygiene practices should be employed prior to lunch breaks or other periods when hand to mouth contact occurs. This will minimize potential ingestion exposures.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Task/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring and Action Levels	Personal Protective Equipment *(Items in italics are optional as conditions or the FOL or SSO require)*	Decontamination Procedures
Soil boring using Direct Push Technology or other approved drilling methods including installation of temporary monitoring wells.	***Chemical hazards:*** 1) The potential health hazards associated with soil boring at the Incinerator Site (NALF Cabaniss) include inhalation, ingestion, and dermal contact of various contaminants that may be present in soil and groundwater. The metal lead and PAH'S have been identified as potential contaminants of concern. Exposure via inhalation is unlikely unless significant airborne dusts are generated as a result of site activities. Further information on these contaminants and/or components of these contaminants are presented in Section 6.1 and Table 6-1. **NOTE: There is a possibility that asbestos laden materials may be encountered during field operations. Dust should be minimized by using area wetting methods to suppress particulate matter. If suspected asbestos containing material is encountered cease field operations and notify the PHSO, TtNUS HSM and the TOM.** 2) Transfer of contamination into clean areas or onto persons. ***Physical hazards:*** 3) Heavy equipment hazards (pinch/compressions points, rotating equipment, hydraulic lines, etc.) 4) Noise in excess of 85 dBA 5) Energized systems (contact with underground or overhead utilities) 6) UXO Hazards 7) Lifting (strain/muscle pulls) 8) Slips, trips, and falls 9) Vehicular and foot traffic 10) Flying projectiles ***Natural hazards:*** 11) Inclement weather 12) Animal and insect bites and encounters 13) Water Hazards	1) Avoid contact with contaminated media (air, water, soils, etc.). Control measures to minimize potential exposures include good work and personal hygiene practices. Avoid hand-to-mouth contact, wash hands and face prior to breaks or lunch. Real time monitoring instruments and PPE will be used to support protective measures. Positive readings at source areas will require the SSO to monitor airborne concentrations in worker's breathing zone. Airborne dusts/particulates will be avoided or otherwise controlled through the use of area wetting methods since site contaminants may be bound to particulates. 2) Transfer of contamination will be minimized by restricting the use of equipment and supplies between locations and by going through a suitable decontamination. Work practices include: - A decontamination procedure for equipment between locations - Poly ethylene sheeting shall be used to place contaminated tooling for transport to the central decontamination unit as applicable. 3) Heavy equipment will be inspected in accordance with the Equipment Inspection Checklist found in Attachment III of this HASP. - Operated and supported by qualified operators and ground crew. - Used within safe work zones, with routes of approach clearly marked. Personnel not directly supporting this operation will remain a distance of at least the height of the mast + 5-feet but no less than 25-feet from the rig. See Section 9.1 for initial exclusion zone boundaries. In addition to equipment considerations, the following safe operating procedures will be incorporated: - Only manufacturer-approved equipment may be used in conjunction with equipment repair procedures (e.g., auger flight connectors, pressure fittings, etc.). - Work areas will be kept clear of clutter. - Self-propelled equipment shall be equipped with movement warning systems. - Personnel will be instructed in the location and operation of emergency shut-off device(s). These devices will be tested initially (and then periodically) to ensure proper operation. - Areas will be inspected prior to the movement of the drill rig and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. - The drill rig and support vehicles will be moved no closer than 5-feet to unsupported side-walls of excavations and embankments. - See additional safe work procedures for drilling in Section 5.2 of this HASP. 4) Hearing protection will be used during activities when noise levels are > 85 dBA . Use the rule of thumb: *Excessive noise levels (>80dBA) are being approached when you have to raise your voice to talk to someone within 2 feet of your location*. In these situations always use hearing protection. - Control noise hazards by establishing boundaries to limit the affect of the noise hazard (i.e. height of the mast + 5 feet or 25 feet). 5) Drilling activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment II of this HASP. Utility clearances will be obtained, in writing, and locations identified and marked, prior to activities. 6) UXO Hazards - UXO control measures shall be instituted. A summary of these provisions include: - All initial entry pathways and established pathways shall be cleared by an EOD-Qualified Technician. - An EOD-Qualified Technician shall preview all sample media and sample acquisition locations in areas of possible UXO concerns. - All personnel shall practice UXO avoidance techniques including the following: Do not to pick up, kick or otherwise harass unknown items or debris on the ground. If you encounter items that show wires or other means of activation, mark it using pins flags or other identifier, report the item(s) to the EOD-qualified Technician for assessment. See TtNUS UXO SOP as found in Attachment VI of this HASP. 7) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques as described in Section 6.2.2 and in the mobilization/demobilization entry for Table 5-1. 8) Preview work locations for unstable/uneven terrain/raised platforms/excavations. - Cover, guard and barricade open pits, ditches, and openings of subsurface structures, as necessary. - Ruts, roots, and other tripping hazards should be eliminated to minimize trips and falls when near rotating/operating equipment. - Maintain a clutter free work area. - Construct fences or other means of demarcation (i.e. signs and postings) to control traffic into the control zones, or staging area. - Raised work platforms greater than 4-feet surface require a handrail and applicable toe-boards meeting specifications as defined in 29 CFR 1910.23. 9) Use traffic-warning signs, flag persons, and high visibility vests as determined by the SSO when working along traffic thoroughfares. In addition, use physical barricades when working within normal traffic flow patterns/traffic lanes. 10) Cover or guard high-pressure operating systems to deflect flying or pressurized media in the event of a leak. - Complete Equipment Inspection Checklist (Attachment IV of this HASP). 11) To minimize hazards of this nature, the following provisions shall be used: - Wear appropriate clothing for weather conditions. - Provide replacement liquids for field crews as relief from excessive ambient temperatures. - Electrical storms/high winds - Suspend or terminate operations until directed otherwise by SSO. Follow the provisions as specified in Section 4.0 of the Tetra Tech NUS, Inc. HSGM regarding the identification and evaluation of heat/cold stress related conditions. 12) Avoid nesting – Preview routes, avoid nests, if possible. Check existing well casings for spider and bee nests. - Wear light color clothes. This will allow easier detection of ticks and insects crawling on your body. It will also assist in heat stress control.	It is not anticipated that significant airborne concentrations will be present in worker breathing zones. Furthermore, site activities are unlikely to generate airborne dusts. A direct reading instrument such as FID or a PID with a 9.6 eV lamp or higher will be used to detect volatile organic compounds (VOCs) associated with fuel oils and diesel fuel. The FID/PID will be used to screen potential source (sample locations, boreholes, etc.) areas to detect the presence of any VOCs. Positive readings at a source area will require that worker's breathing zone be monitored to determine exposure potentials. Any sustained readings greater than background (> 1 minute in duration) in a worker's breathing zone, or observations of symptoms of exposure, will require that site activities be suspended until the readings subside to background levels or the source is determined.	Drilling operations will be initiated in Level D protection, including the following articles: **Sampler/Oversight Personnel** - Standard field dress (long pants, sleeved shirts) - Steel toe safety shoes/ boots - Hard hat - Safety glasses - Layered nitrile surgeon style gloves for sampling - Impermeable boot covers - *Tyvek or washable cotton coveralls* - *Reflective vest for traffic areas* **Driller and Driller Helper** -Standard field attire including sleeved shirt and long pants - Steel toe safety shoes/ boots - Safety glasses - Neoprene outer gloves; Nitrile inner gloves - Hearing protection - Hard hat - Impermeable boot covers - *Impermeable outer garments such as PVC Rain-suit or Saranex®, PE coated Tyvek® due to contact with contaminated tooling. An impermeable apron is an acceptable alternative.* As site conditions may change, the following equipment will be maintained during on-site activities - Fire Extinguishers - First-aid Kit **Note:** The Safe Work Permit(s) for this task (Attachment V) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified	**Personnel Decontamination** will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). **For DPT Operations:** The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; Decontamination personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable. Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands or use hygienic wipes to remove associated contaminants. Note: For remote locations away from the centralized decontamination unit, hygienic wipes may be used for cleaning hands and face, as well as bagging items for transport back to the centralized decontamination unit. Stage 6: If appropriate based on ambient conditions, levels of PPE, or signs and symptoms of heat/cold stress, perform medical evaluation. This evaluation consists of pulse, breathing rate, and oral temperature. **Heavy/Sampling Equipment Decontamination** - Heavy and sampling equipment decontamination will proceed in accordance with the directives provided in Table 5-1 for that task. Heavy equipment will have the wheels and tires cleaned along with any loose debris removed, prior to transporting to the central decontamination area. Roadways shall be cleared of any debris resulting from the onsite activity. Portable pieces will be wrapped in polyethylene sheeting for transport to a centrally located decontamination facility. The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Task/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring and Action Levels	Personal Protective Equipment *(Items in italics are optional as conditions or the FOL or SSO require)*	Decontamination Procedures
		- Tape pant legs to work boots to block direct access. - Use commercially available repellents – Permanone should be applied liberally to the clothing, but not the skin as it may cause irritation. Concentrate on areas where ticks and other insects may access your body such as pant cuffs, shirt to pants, and collars. - Upon exiting the high brush and wooded areas perform a close body inspection to remove any ticks or other insects that have attached to your clothing or skin. 13) Water Hazards – These hazards are predominant when sampling from a boat or along waters edge. The following provisions shall be employed to control these types of hazards: - All personnel working aboard a boat or skiff for the purpose of surface water, sediment, fish sampling, etc. shall employ a Type III United States Coast Guard Approved Floatation Device/Life Jacket. - The boat and/or skiff shall be equipped with an extraction hook or a Type IV Throwable Floatation Device with at least 90-feet of rope to pull personnel from the water should someone accidentally fall in. Water's Edge (Within four feet of navigable waters edge) – When personnel are working on water's edge the following provisions shall apply: - Type IV Throwable Floatation Device with at least 90-feet of rope to pull personnel from the water should someone accidentally fall in.		task.	

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Tasks/Operation/Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring - Type and Action Levels	Personal Protective Equipment *(Items in italics are optional as conditions or the FOL or SSO require)*	Decontamination Procedures
Decontamination of Sampling and Heavy Equipment It is anticipated that this activity will take place at centralized location. Gross contamination will be removed to the extent possible at the site. Contaminated tooling then will be wrapped in polyethylene sheeting for transport to the centralized location for a full decontamination and evaluation.	***Chemical hazards:*** 1) The potential health hazards associated with soil boring at the Incinerator Site (NALF Cabaniss) include inhalation, ingestion, and dermal contact of various contaminants that may be present in soil and groundwater. The metal lead and PAH'S have been identified as potential contaminants of concern. Exposure via inhalation is unlikely unless significant airborne dusts are generated as a result of site activities. Further information on these contaminants and/or components of these contaminants are presented in Section 6.1 and Table 6-1. 2) Decontamination fluids - Liquinox (detergent); isopropanol (decontamination solvent). ***Physical hazards:*** 3) Lifting (strain/muscle pulls) 4) Noise in excess of 85 dBA 5) Flying projectiles 6) Slips, trips, and falls ***Natural hazards:*** 7) Inclement weather	1) and 2) Employ protective equipment to minimize contact with site contaminants and hazardous decontamination fluids. Control potential non-occupational exposures through good work hygiene practices (i.e., avoid hand to mouth contact; wash hands and face before breaks and lunch; minimize contact with contaminated media). Obtain manufacturer's MSDS for any decontamination fluids used on-site. Solvents may only be used in well-ventilated areas, such as outdoors. Use appropriate PPE as identified on MSDS or within this HASP. Chemicals used must be listed on the Chemical Inventory for the site, and site activities must be consistent with the Hazard Communication Program provided in Section 5.0 of the TtNUS HSGM. 3) Use multiple persons where necessary for lifting and handling heavy equipment such as auger flights for decontamination purposes. - Employ proper lifting techniques as described in Table 5-1, Mobilization/Demobilization. 4) Wear hearing protection when operating the pressure washer. Sound pressure levels measured during the operation of similar pieces of equipment indicate a range of 87 to 93 dBA. 5) Use eye and face protective equipment when operating the pressure washer and/or steam cleaner, due to flying projectiles. Other personnel must be restricted from the area. In addition to minimize hazards (flying projectiles, water lacerations and burns) associated with this operation, the following controls will be implemented. - A Fan Tip 25° or greater will be used on pressurized systems over 3,000 psi. This will reduce the possibility of water lacerations or punctures. - Conduct visual evaluations of hoses and fittings for structural defects. - Construct deflection screens as necessary to control overspray and to guard against dispersion of contaminants driven off by the spray. 6) The decontamination pad should be constructed to contain wash waters generated during decontamination procedures. Temporary decontamination pads are usually 10-30 mil polyethylene or polyvinyl chloride tarp construction. Although these items when used as a liner offer containment, they also present a slipping hazard. When these temporary liners are used, it is recommended that a light coating of sand be spread over the walking surface to provide traction. - In addition, adequate slope should be provided to the pad to permit drainage away from the object being cleaned. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks. - Hoses should be gathered when not in use to eliminate potential tripping hazards. 7) Suspend or terminate operations until directed otherwise by SSO.	Use visual observation and real-time monitoring instrumentation (PID) to ensure that equipment has been properly cleaned of contamination and dried. Monitoring instrumentation will be used to determine if the decontamination solvent (isopropanol) has been removed through the rinse process. Any positive indication/results greater than background require the article that has been decontaminated to be re-rinsed and scanned again. If necessary this process should be repeated until no measurable indication of the decontamination solvent exists. Monitoring of the decontamination station for purposes of worker safety is not anticipated to be performed based on anticipated concentrations. Should concerns of elevated contaminant concentrations at this station occur, previous provided action levels shall be used, as well as, the protective measures used in response to achieving those action levels.	**For Heavy Equipment** This applies to pressure washing and/or steam cleaning operations and soap/water wash and rinse procedures. Level D Minimum requirements: - Standard field attire (long sleeve shirt and pants) - Steel toe safety shoes/boots - Chemical resistant boot covers - Neoprene outer gloves over nitrile inner gloves - Safety glasses underneath a splash shield - Hearing protection (plugs or muffs) - PVC Rain suit or coveralls - Impermeable aprons may be used instead of coveralls if they offer adequate protection against overspray and back splash. **For sampling equipment** (trowels, bailers, etc.), the following PPE is required: **Note**: Consult MSDS for PPE guidance. Otherwise, observe the following. Level D Minimum requirements - - Standard field attire (long sleeve shirt and pants) - Steel toe safety shoes/boots - Neoprene outer gloves over nitrile inner gloves - Safety glasses - Impermeable (butyl or neoprene) apron In the event of overspray of chemical decontamination fluids cannot be controlled using aprons, employ PVC rain suits or PE or PVC coated Tyvek as necessary. **Note:** The Safe Work Permit(s) for this task (See Attachment V) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** in support of this activity will consist of a soap/water wash and rinse for reusable and non-reusable outer protective equipment (boots, gloves, PVC splash suits, as applicable). The sequential procedure is as follows: Stage 1: Equipment drop, remove outer protective wrapping; personnel will wipe down the outer shell and pass hand equipment through as necessary. Stage 2: Soap/water wash and rinse of outer boots and gloves. Stage 3: Soap/water wash and rinse of the outer splash suit, as applicable. Stage 4: Disposable PPE will be removed and bagged. Stage 5: Wash face and hands. The FOL or the SSO will be responsible for evaluating equipment arriving on-site, leaving the site, and between locations. No equipment will be authorized access, exit, or movement to another location without this evaluation.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Task/Operation/ Location	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring –Types and Action Levels	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SSO require.)*	Decontamination Procedures
Vegetative Clearing and Grubbing	***Chemical hazards:*** 1) The potential health hazards associated at the Incinerator Site (NALF Cabaniss) include inhalation, ingestion, and dermal contact of various contaminants that may be present in soil. The metal lead and PAH'S have been identified as potential contaminants of concern. Further information on these contaminants are presented in Section 6.1 and Table 6-1. ***Physical hazards:*** 2) Heavy equipment/machinery hazards (moving equipment, struck by hazards, etc.) 3) Energized systems (contact with underground or overhead utilities) 4) Noise in excess of 85 dBA 5) Vehicular and equipment traffic 6) Strain from heavy lifting 7) Slips, trips, and falls 8) Ambient temperature extremes (heat stress) 9) Cut, abrasions, and lacerations 10) Loading trucks with construction rubble. 11) UXO Hazards ***Natural hazards:*** 12) Inclement weather	1) If airborne concentrations exceed 2 mg/m^3 (visible dust) the use of area wetting methods employing a water truck will be performed to reduce dust. In addition, good work and personal hygiene measures will be employed to control exposure through ingestion. Avoid hand to mouth contact to the extent possible wash hands and face or use hygienic wipes to remove potential contaminants from hands and face prior to breaks or lunch or other hand to mouth activities. A Mini Ram Dust Monitor will also be used to monitor airborne dust concentrations. **2) Heavy equipment hazards** - Equipment will be: - Inspected in accordance with Federal safety and transportation guidelines, OSHA (1926.600.601.602), and manufacturer's design, as applicable. Inspections will be documented using the Equipment Inspection Checklist found in Attachment III of this HASP. - Operated and supported by certified operators and knowledgeable ground crew. - Only manufacturer-approved equipment may be used in conjunction with equipment repair procedures (e.g., flight connectors). - Work areas will be kept clear of clutter. - Self-propelled equipment with a restricted view moving backwards will be equipped with a back up alarm. - Personnel will be instructed in the location and operations of the emergency shut-off device(s). This device will be tested initially (and then periodically) to ensure its operational status. - Areas will be inspected prior to the movement of the back-hoe and support vehicles to eliminate any physical hazards. This will be the responsibility of the FOL and/or SSO. 3) Utility clearances shall be obtained prior to clearing and grubbing activities. These activities will proceed in accordance with the Utility Locating and Excavation Clearance SOP in Attachment III of this HASP. Utility clearances will be obtained, in writing, and locations identified and marked prior to activities. 4) Hearing protection will be used during subsurface activities using the excavator when noise levels are >85 dBA. (during operation). Boundaries will be established to limit noise hazard. Length of the boom + 5 feet or a minimum of 25 feet is normal. Excessive noise levels are being approach when you have to raise your voice to talk to someone within 2 feet of your location. 5) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e., fully extended boom + 5 feet). - Equipment with a restricted field of vision moving backwards will be equipped with a Back-up alarm. - Operators will be required to wear safety belts and follow the site traffic rules. 6) For heavy lifts, use machinery or multiple personnel. Use proper lifting techniques. See mobilization/demobilization for lifting recommendations. 7) Preview work locations for unstable/uneven terrain. Avoid working/walking too close to excavation and other areas of unsure footing. 8) Wear appropriate clothing for weather conditions. Provide acceptable shelter and liquids for field crews. Additional information regarding heat stress concerns is provided in Section 4.0 of the TtNUS HSGMI. 9) Wear leather or cut-resistant gloves when handling sharp objects. 10) Loading/Transport – Trucks will be loaded, tarped, and decontaminated (as necessary). 11) UXO Hazards – UXO controls measure shall be instituted. A summary of these provisions include: - All initial entry pathways and established pathways shall be cleared by an EOD-Qualified Technician. - An EOD-Qualified Technician shall preview all sample media and sample acquisition locations in areas of possible UXO concerns. - All personnel shall practice UXO avoidance techniques including the following: • Do not to pick up, kick or otherwise harass unknown items or debris on the ground. If you encounter items that show wires or other means of activation, mark it using pins flags or other identifier, report the item(s) to the EOD-qualified Technician for assessment. See TtNUS UXO SOP as found in Attachment VI of this HASP. 12) Suspend or terminate operations until directed otherwise by SSO. See Mobilization/Demobilization for weather alert conditions and response measures.	Monitoring may be conducted under the following conditions: **Dusts/Particulates** Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure will be controlled by using water suppression, by avoiding dust plumes, or evacuating the operational area till dust subsides. **Noise** Quantify the type of equipment being used. Noise monitoring will be conducted at the discretion and direction of the PHSO and/or the PHSO.	Clearing and grubbing operations will be performed in Level D protection, including the following articles: Operator - Safety glasses - Standard field dress (long pants, sleeved shirts) - Steel toe safety shoes/boots - Hard hat (not necessary in an enclosed cab) - Hearing protection (not be necessary in an enclosed cab) - Impermeable boot covers - Tyvek or washable cotton coveralls when there is a chance to soil work clothes Personnel must closely inspect PPE prior to beginning any on-site activities. This table addresses minimum content based on anticipated hazards and recommended control measures. The Safe Work Permit for this activity is presented in Attachment V. This is to be completed by the FOL and/or the SSO. In the completion, these permits are to incorporate site-specific information and may actually establish requirement above and beyond that presented in this table. In these cases, the most conservative measures will apply. As site conditions may change, the following equipment will be maintained during on-site activities - Fire Extinguishers - First-aid Kit	**Personnel Decontamination** – This decontamination procedure for **Level D** protection will consist of - Equipment drop - Remove disposable outer protective garments as applicable.. - Wash hands and face, leave contamination reduction zone **Equipment Decontamination** – Heavy equipment decontamination will take place at a centralized decontamination pad utilizing a steam cleaner or pressure washer. Site vehicles will have restricted access to exclusion zones, and have their wheels/tires sprayed off as not to track mud onto the roadways servicing this installation. Roadways shall be cleared of any debris resulting from the on-site activity. During excavation activities the primary concern with contamination is the bucket and boom, wheels and tires (due to direct contact with contaminants).

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SSO require.)*	Decontamination Procedures
Multi-media sampling, including: • Surface, subsurface and sediment soils. • Groundwater • Surface waters • XRF	*Chemical Hazards* 1) The potential health hazards associated with soil boring at the Incinerator Site (NALF Cabaniss) include inhalation, ingestion, and dermal contact of various contaminants that may be present in soil and groundwater. The metal lead and PAH'S have been identified as potential contaminants of concern. None of the contaminants are anticipated to be present in concentrations that would present an inhalation hazard. Table 6-1 provides additional information about each of the identified contaminants of concern. **NOTE: There is a possibility that asbestos laden materials may be encountered during field operations. Dust should be minimized by using area wetting methods to suppress particulate matter. If suspected asbestos containing material is encountered cease field operations and notify the PHSO, TtNUS HSM and the TOM.** 2) Transfer of contamination into clean areas ***Physical hazards*** 3) Lifting (strain/muscle pulls) 4) Pinches and compressions 5) Slips, trips, and falls 6) Vehicular and foot traffic ***Natural hazards*** 7) Insect/animal bites and stings, poisonous plants, etc. 8) Inclement weather	1) Use real-time monitoring instrumentation, action levels, and identified PPE to control exposures to potentially contaminated media such as air, water, and soils. 2) Decontaminate all equipment and supplies between sampling locations and prior to leaving the site. 3) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 4) Avoid moving parts. Use tools or equipment where necessary to avoid contacting pinch points. - A remote sampling device must be used to sample soils near advancing tools. The equipment operator shall shutdown machinery if the sampler is near moving machinery parts. 5) Preview work locations for unstable/uneven terrain. 6) Traffic and equipment considerations are to include the following: - Establish safe zones of approach (i.e. Boom + 5 feet). See Section 9 of the HASP for specific safety zones based on media being sampled. - All equipment shall be equipped with movement warning systems. - All activities are to be conducted consistent with the site requirements. 7) Avoid nesting areas, use repellents. Report potential hazards to the SSO. Follow guidance presented in Section 4 of the HSGM. 8) Suspend or terminate operations until directed otherwise by the SSO.	A direct reading Photoionization Detector (PID) with a 9.6 eV lamp or higher, or a Flameionization Detector (FID), will be used to screen samples and to detect the presence of any volatile organics. Source monitoring of the sample collection area will be conducted at regular intervals to be determined by the SSO. Positive sustained results at a source or downwind location(s) which may impact operations crew will require the following actions: - Monitor the breathing zone of at-risk and downwind employees. Any sustained readings (greater than 1 minute in duration) above background in the breathing zone of the at-risk employees requires site activities to be suspended and site personnel to retreat to an unaffected area. - Work may only resume if airborne readings in worker breathing zone return to background. If elevated readings in worker breathing zone persist, the PHSO and HSM will be contacted to determine necessary actions and levels of protection. Site contaminants may adhere to or be part of airborne dusts or particulates generated during site activities. Generation of dusts should be minimized to avoid inhalation of contaminated dusts or particulates. Evaluation of dust concentrations will be performed by observing work conditions for visible dust clouds. Potential exposure to contaminated dust will be controlled using water suppression, by avoiding dust plumes, or evacuating the operation area until dust subsides.	Level D protection will be utilized for the initiation of all sampling activities. Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Steel toe safety shoes - Surgical style gloves *(double-layered if necessary)* - Safety glasses - *Reflective vest for high traffic areas* - *Tyvek coveralls and disposable boot covers if surface contamination is present or if the potential for soiling work attire exists.* **Note:** The Safe Work Permit(s) for this task (see Attachment V) will be issued at the beginning of each day to address the tasks planned for that day. As part of this task, additional PPE may be assigned to reflect site-specific conditions or special considerations or conditions associated with any identified task.	**Personnel Decontamination** will consist of a removal and disposal of non-reusable PPE (gloves, coveralls, etc., as applicable). The decon function will take place at an area adjacent to the site activities. This procedure will consist of: - Equipment drop - Outer coveralls, boot covers, and/or outer glove removal (as applicable) - Removal, segregation, and disposal of non-reusable PPE in bags/containers provided - Soap/water wash and rinse of reusable PPE (e.g., hardhat) if potentially contaminated - Wash hands and face, leave contamination reduction zone.
IDW Management	***Chemical hazards:*** The only anticipated hazard associated with IDW management is the potential for a spill. ***Physical hazards:*** *1*) Lifting Hazards/Back Injuries 2) Compression Injuries 3) Loading bulk transport containers ***Natural Hazards:*** 4) Inclement weather 5) Insect/animal bites or stings, poisonous plants, etc.	1) & 2) Strains and sprains (lifting hazards)/Back Injuries - Use machinery (preferred method) or multiple personnel for heavy lifts. - Use proper lifting techniques including: --Lift with your legs, not your back, bend your knees move as close to the load as possible, and ensure good hand holds are available. --Minimize the horizontal distance to the center of the lift to your center of gravity. --Minimize turning and twisting when lifting as the lower back is especially vulnerable at this time. --Break lifts into steps if the vertical distance (from the start point to the placement of the lift) is excessive. --Plan your lifts – Place heavy items on shelves between the waist and chest; lighter items on higher shelves. --Periods of high frequency lifts or extended duration lifts should provide sufficient breaks to guard against fatigue and injury. 2) & 3) Compression injuries – material-handling devices shall be used for moving drums. This includes drum dollies with pneumatic tires, drum grapplers, etc. These pieces of equipment are engineered to allow placement of these containers while removing hands from the point of operation. 4) Suspend or terminate operations until directed otherwise by SSO 5) Avoid nesting areas, use repellents. Report potential hazards to the SSO. Follow guidance presented in Section 4 of the HSGM.	None Required, unless spill containment provisions are invoked. Then monitoring will proceed as described in the activity associated with the task when the materials were generated such as soil boring or well installation.	Level D - (Minimum Requirements) - Standard field attire (Sleeved shirt; long pants) - Steel toe safety shoes - Leather or canvas work gloves - Safety glasses (When utilizing cables or slings to move the containers) - Hardhat (when overhead hazards exists, or identified as a operation requirement) PPE changes may be made with the implementation of the Spill Containment Program. This represents the only anticipated modification to this level of protection.	Not required, unless the implementation of the Spill Containment Program is required due to a spill and/or release. At that point the decontamination procedures for those activities such as soil borings and/or well installation. The reference reflects the tasks conducted when the materials were generated.

TABLE 5-1
TASKS/HAZARDS/CONTROL MEASURES
INCINERATOR DISPOSAL SITE, CORPUS CHRISTI, TEXAS

Tasks/Operation/ Locations	Anticipated Hazards	Recommended Control Measures	Hazard Monitoring	Personal Protective Equipment *(Items in italics are deemed optional as conditions or the FOL or SSO require.)*	Decontamination Procedures
Geographical and Geophysical Surveying	***Chemical Hazard:*** Exposure to site contaminants during this activity is considered unlikely given the limited contact with potentially contaminated media. ***Physical Hazard:*** 1) Lifting (strain/muscle pulls) 2) Slip, trips, and falls 3) Equipment for clearing line of sight (machete, axe, etc.). Cuts or lacerations 4) Inclement weather 5) Insect/animal bites and stings, poisonous plants, etc. 6) UXO Hazards	***Physical Hazard:*** 1) Use machinery or multiple personnel for heavy lifts. Use proper lifting techniques. 2) Preview work locations for unstable/uneven terrain. All activities are to be conducted consistent with the Base requirements. 3) Keep equipment in sheath when not in use. Wear leather gloves and safety glasses. Assure that equipment is sharp and handles are not loose. ***Natural Hazards:*** 4) Suspend or terminate operations until directed otherwise by the SSO. 5) Wear appropriate PPE. Avoid nesting areas, use commercially available repellents. Report potential hazards to the SSO. Follow guidance presented in Attachment II of this HASP. 6) UXO Hazards - UXO controls measure shall be instituted. A summary of these provisions include: - All initial entry pathways and established pathways shall be cleared by an EOD-Qualified Technician. - An EOD-Qualified Technician shall preview all sample media and sample acquisition locations in areas of possible UXO concerns. - All personnel shall practice UXO avoidance techniques including the following: Do not to pick up, kick or otherwise harass unknown items or debris on the ground. If you encounter items that show wires or other means of activation, mark it using pins flags or other identifier, report the item(s) to the EOD-qualified Technician for assessment. See TtNUS UXO SOP as found in Attachment VI of this HASP. .	Not required, minimal exposure.	Level D - (Minimum Requirements) - Standard field attire (long sleeve shirt; long pants) - Leather work gloves - Safety shoes (steel toe/shank for geographical surveying; sturdy work shoes for geophysical surveying) - *Safety glasses, hard hats (if working around equipment or clearing lines of sight).* - *Snake chaps for heavily wooded areas where encounters are likely.* - *Reflective vest for high traffic areas* - *Tyvek coveralls for protection against poisonous plants and insects, particularly ticks.*	A structured decontamination is not required due to limited contact with contaminated media. However, survey parties should inspect one another (and individually) for the presence of ticks when leaving wooded areas, grassy fields, etc.

6.0 HAZARD ASSESSMENT

The following section provides information regarding the chemical and physical hazards associated with the activities that are to be conducted as part of the scope of work. Table 6-1 provides information related to the chemical hazards that may be present at the site. Specifically, toxicological information, exposure limits, symptoms of exposure, physical properties, and air monitoring and sampling data are discussed in the table. It should be noted that the contaminants of concern might vary between tasks.

6.1 CHEMICAL HAZARDS

The potential health hazards associated with the scope of work include inhalation, ingestion, and dermal contact of site contaminants. Exposure is most likely to occur through ingestion (hand-to-mouth contact) and inhalation of contaminated soil or water, or contact with the skin. For this reason, PPE and basic hygiene practices (washing face and hands before leaving site) is extremely important.

6.1.1 Site Specific Chemical Hazards

No previous analytical data exists. Suspected contaminants from previous site operations include:

- Metals (Lead)
- General Polyaromatic hydrocarbons (PAHs)

None of the contaminants of concern are expected to present an inhalation hazard to site workers, as a precautionary measure action levels above background will require site evacuation. Site personnel have limited potential for contact with contaminants based on the planned activities, and the generation of contaminant-laden dusts is unlikely to be present. As a precaution, exposures (via inhalation, ingestion, or skin contact) to potential contaminants of concern will be minimized by the use of PPE and good hygiene practices. Site personnel will also use the safe work practices outlined in this HASP. For further information on these contaminants and other potential contaminants see Table 6-1.

NOTE: There is a possibility that asbestos laden materials may be encountered during field operations. Dust should be minimized by using area wetting methods to suppress particulate matter. If suspected asbestos containing material is encountered cease field operations and notify the PHSO, TtNUS HSM and the TOM.

TABLE 6-1

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL AUXILLIARY LANDING FIELD CABANISS
CORPUS CHRISTI, TEXAS

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
Lead	7439-92-1	Particulate form - Unable to be detected by either PID or FID.	OSHA: 0.05 mg/m^3 ACGIH: 0.05 mg/m^3 NIOSH: 0.10 mg/m^3 IDLH: 100 mg/m^3 as lead	The use of a air purifying, full-face respirator with high efficiency particulate air filter for up to 2.5 mg/m^3. **Recommended gloves:** This is in the particulate form. Therefore any glove suitable to prevent skin contact (Nitrile has been the one most widely used for the other substances).	**Boiling Pt:** 3164°F; 1740°C **Melting Pt:** 621°F; 327°C **Solubility:** Insoluble **Flash Pt:** Not applicable (Airborne dust may burn or explode when exposed to heat, flame, or incompatible chemicals). **LEL/LFL:** Not applicable **UEL/UFL:** Not applicable **Vapor Density:** Not available **Vapor Pressure:** 0 mmHg **Specific Gravity:** 11.34 **Incompatibilities:** Strong oxidizers, peroxides, sodium acetylide, zirconium, and acids. **Appearance and Odor:** Metal: A heavy ductile, soft gray solid.	Overexposure to this substance via ingestion or inhalation may result in metallic taste in the mouth, dry throat, thirst, gastrointestinal disorders (burning stomach pain, nausea, vomiting, possible diarrhea sometimes bloody or black, accompanied by severe bouts of colic), CNS effects (muscular weakness, pain, cramps, headaches, insomnia, depression, partial paralysis possibly coma and death). Extended exposure may result in damage to the kidneys, gingival lead line, brain, and anemia.

TABLE 6-1

CHEMICAL, PHYSICAL, AND TOXICOLOGICAL DATA
NAVAL AUXILLIARY LANDING FIELD CABANISS
CORPUS CHRISTI, TEXAS

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information
General PAHs / Coal Tar Pitch Volatiles / Creosote / cresol (Fluoranthene, pyrene, benzo(a) anthracene, benzo(a) pyrene, benzo(f)fluoranthene, benzo(k)fluoranthene), etc.) Coal Tar Pitch is the black or dark brown residue which remains after *Coal Tar* is distilled. It is used in coatings and paints, for roofing and paving, and as a binder, extender and sealant. Cresols are used in disinfectants, fumigants and photographic developers.	(CAS numbers vary depending on specific compound)	PID: I.P. of 8.97 eV, relative response ratio unknown. FID: Response factor unknown but given the substances flammability, detection by FID can be anticipated.	**General PAHs**: Most PAHs have no established exposure limits. Other Coal Tar Pitch Volatiles / PAHs such as chrysene and benzo(a)pyrene have an exposure limit of 0.2 mg/m^3 (OSHA and ACGIH). 0.1 mg/m^3 - (NIOSH) **Creosote / Cresol:** OSHA; ACGIH: 5 ppm NIOSH: 2.3 ppm IDLH: 80 mg/m^3	Adequate - use a full-face air-purifying respirator with organic vapor/dust/mist cartridge up to 250 ppm. Cresol has an Odor Threshold of 0.00005-0.0079 ppm. **Recommended gloves:** Viton >96.00 hrs; butyl rubber >90.00 hrs; neoprene >4.50 hrs	Properties of various PAHs/Coal Tar Pitch Volatiles vary depending upon the specific compound**.** *For Creosote/Cresol:* **Boiling Pt:** 376-397°F; 191-203°C **Melting Pt:** 52-96°F; 10.9-35.5°C **Solubility:** Insoluble **Flash Pt:** 178°F; 81°C **LEL/LFL:** Not available **UEL/UFL:** Not available **Vapor Density:** 3.72 **Vapor Pressure:** 1 mmHg @ 100-127°F; 38-53°C **Specific Gravity:** 1.030-1.038 **Incompatibilities:** Nitric acid, oleum, chlorosulfonic acid, oxidizers. **Appearance and Odor:** Yellowish or colorless, flammable, oily liquid (often brownish because of impurities or oxidation).	Regulated based on effects on respiratory tract and skin irritation Other effects may include eye irritiation and central nervous system, distrubances. Acute exposures may result in difficulty breathing, respiratory failure and skin and eye irritation and burns. Chronic exposure may damage the liver, kidneys, lungs and skin and cause photosensitivity. IARC, NTP, NIOSH, ACGIH, and the EPA list some PAHs such as benzo(a)pyrene as a potential carcinogen (ARC 2A, NTP-2, ACGIH TLV-A2, NIOSH-X, EPA-B2).

6.2 PHYSICAL HAZARDS

The following is a list of physical hazards that may be encountered at the site or may present during the performance of site activities associated with the scope of work. Some of these hazards are discussed below while the rest are discussed in the TtNUS HSGM.

- Slips, trips, and falls.
- Cuts (or other injuries associated with hand tool use).
- Energized systems (contact with underground or overhead utilities).
- Lifting (strain/muscle pulls).
- Ambient temperature extremes (cold and heat stress).
- Pinches and compressions.
- Heavy equipment hazards (rotating equipment, hydraulic lines, etc.).
- Vehicular and foot traffic.
- Noise in excess of 85 Decibels (dBA).
- Exposure to X-rays generated from the X-Ray Fluorescence (XRF) Detector (Innov-X).

6.2.1 Slips, Trips, and Falls

Conditions such as steep terrain and/or heavy vegetation may create an increased potential for slip, trip, and fall hazards.

- The safest approach to sample points will be identified and cleared to permit field crew access to sample locations.
- Establish anchor points and rope handrails for traversing/ascending/descending angles and slopes greater than 45% grade.
- Footwear with an adequate traction.
- Prepare work areas by removing tripping hazards (ruts, roots, debris). This is especially critical around operating equipment, where a fall could be life threatening.

6.2.2 Cuts or Other Injuries Associated with Hand Tool Use

The control measures presented below will help minimize the potential for injuries associated with sharp objects or material handling activities related to field work.

- Wear leather or heavy cotton work gloves when using tools to protect against blisters, cuts, or other hand injuries.

- Wear eye protection (safety glasses with side shields) to protect the eyes from flying debris.
- Wear long pants and long-sleeved shirts to protect against abrasions.
- Inspect hand tools before each use.
- Ensure knives are sharp to facilitate cutting action. This will avoid persons forcing to cut and increasing potential hazards.
- Use the proper tool for the intended purpose. This will avoid potential injury possibly created through improper cutting procedures.

6.2.3 Contact with Unexploded Ordnance (UXO)

Because of the prior uses of the areas to be investigated, there is a possibility that UXO may be encountered during operations. All activities in areas suspected to contain UXO will be conducted consistent with the UXO procedures discussed in Appendix VI of this HASP.

- In general, field personnel will practice UXO avoidance techniques.
  - Do not pick-up or kick any unknown materials.
  - Notify the explosive ordnance disposal (EOD) Specialist if you encounter unknown materials.
  - Where the potential exists for UXO materials the EOD Specialist will clear all access routes and work areas.

- To minimize the risk of a UXO encounter, a trained UXO or EOD Specialist will provide support during selected site activities. In all cases, an exclusion zone of 300 feet will be established before detection activities begin.

- When soil-boring operations are conducted, the area and access roads will be swept. The borehole will be cleared down to a depth of two (2) feet and a magnetic gradiometer (down-hole instrument) or similar instrument will be lowered into the hole to clear the borehole. This clearance procedure will continue until the borehole has been cleared to a depth of ten (10) feet. This will be accomplished by hand. Advancement through mechanical means may proceed within a two foot radius of the clearance boring.

The site-specific training in avoidance techniques and safe work practices will be discussed in detail during site-specific training.

6.2.4 Energized Systems (Contact with Underground or Overhead Utilities)

Underground utilities such as pressurized lines, water lines, telephone lines, buried utility lines, and high voltage power lines are known to be present throughout the facility. Clearance of underground and overhead utilities for each sample location will be coordinated with NALF Cabaniss personnel. Work must be consistent with the SOP for Utility Locating and Excavation Clearance (See Attachment III of this HASP). In certain cases, NALF Cabaniss personnel may need to de-energize electrical cables to ensure that electrical hazards are eliminated.

The following safe work practices will be followed:

- Be on the lookout for power lines and equipment.
- Treat every power line as if it were energized.
- Before working on the site conduct a through survey to identify power lines, utility poles, guy wires, service drops and other power related equipment.
- Use a spotter when operating heavy equipment.
- Establish a clearance boundary around power lines before work begins.
- Be aware of electrical hazards when guiding a load.
- As voltage increases the need for greater clearance from the power source increases.
- Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be de-energized or tests shall be made to determine if electrical charge is induced on the crane. The following precautions shall be taken when necessary to dissipate induced voltages:
    - The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom.
    - Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters.

Nonconductive poles with large alligator clips or other similar protection will attached the ground cable to the load.

- Using the minimum safe working distances stated in the TtNUS Utility Locating and Excavation Clearance SOP the following distances are established: For 12 kilovolt (KV), and 34.5 KV a minimum of 10 feet and for 115 KV a minimum of 13 feet.

- If the maximum reaching capabilities of any piece of equipment could bring any part of the equipment or load within the clearance distance, the equipment must be properly grounded before any work begins in that area.

6.2.5 X-Rays from Innov-X

The XRF instrument (Innov-X) contains a sealed radioisotope source that is used to produce an x-ray that irradiates the sample. X-rays produced by these instruments undergo either scattering or absorption by atoms contained within the sample (soil). It is the absorption of the x-rays (known as the photoelectric effect) that ultimately leads to the detection of metal compounds within the soil. The instruments used for XRF analysis do not present a significant ionizing radiation exposure concern provided they are operated in accordance with manufacturer's instruction. Site personnel must be trained and knowledgeable in the operation of the XRF unit. Site personnel using the XRF will refer to the operators manual and will use appropriate engineering and administrative controls to prevent exposure to x-rays. Radiation dosimetry conducted during similar projects using XRF instruments, did not indicate a radiation exposure concern.

6.2.6 Strains/Muscle Pulls

This hazard potential is greatest during mobilization/demobilization activities or when handling sampling coolers when most of the physical lifting is accomplished. Other activities which present this hazard include handling heavy auger flights and bags of Portland cement (~94 pounds) and bags of sand during well installation and construction.

Worker injuries resulting from improper manual material handling activities are easily prevented through observation of proper lifting and carrying methods. These types of injuries are not limited to merely the factor of the weight of the load. Other considerations include:

- How many lifts will be involved (i.e., repetitive lifting of even small loads).
- The size, shape, and/or configuration of the load to be lifted.
- Whether or not the load will need to be lifted to another height or carried to another location.
- The area available to maneuver the lift.

Workers involved with these types of activities are to be instructed by the SSO in the following manner:

- First estimate the weight and configuration of the load. See if it is too bulky or hard to safely grasp/lift/control alone. If so, either use a mechanical lifting device or obtain help from another employee to lift the load (Note: The use of mechanical lifting devices is preferable over manual lifting).

- Bend at the knees (not at the waist) when attempting a lift.

- Ensure that a firm hold is obtained, and keep the load as close to the body as possible.

- Lift the load using your legs, and not the back.

- Avoid turning or twisting while holding a load.

- If the load is to be moved, preview the path of travel first to identify and eliminate any tripping hazards.

- Do not attempt to carry loads that obstruct the line of sight.

- When setting a load down, again use the leg muscles and do not bend at the waist.

- Take rest breaks as necessary to prevent fatigue and injury.

You are most vulnerable to hazards of this nature early in the day prior to limbering and stretching and late in the day due to fatigue. Additional care should be exercised during these periods.

6.2.7 Noise in Excess of 85 dBA

Worker exposure to noise that can approach hazardous levels is a common potential hazard on most project work sites. Workers who must work in areas or who must perform operations where noise levels can approach an 8-hour time weighted average of 85 decibels must have received hearing conservation training within the past 12 month period (this is normally provided as part of the 8-hour refresher training). If personnel have not had this training within the last 12 months they will be provided such training by the SSO at the project site prior to participating in high noise level activities. On this project, high noise levels

may be encountered when working near the DPT rig, and during decontamination operations when using a pressure washer.

As a general rule-of-thumb to prevent worker exposure to high noise levels, workers will be informed to observe the following:

- If ambient noise levels are loud enough that they have to raise their voice in order to communicate with another person who is less than two feet away, hearing protection will be required.

- Also, if any existing base operations are posted as high noise areas or that hearing protection is required in that area, then hearing protection will be used.

Site boundaries for exclusion zone demarcation have included sufficient distances to accommodate potential noise hazards associated with the identified operations. This information is provided in Section 9.1.

Hearing protection will be the primary control measure for personnel who must work within the vicinity of excessive noise levels. Those activities anticipated to have excessive noise levels have been identified in Table 5-1.

6.3 NATURAL HAZARDS

Insect/animal bites and stings, poisonous plants, and inclement weather are natural hazards that may be present given the location of activities to be conducted. As previously discussed, some portions of the site include vegetated areas which increases the potential for field crews to encounter ticks, bees, mosquitoes/insects, snakes, and poisonous vegetation.

6.3.1 Insect Bites and Stings

Insect/animal bites and stings are difficult to control given the climate and environmental setting of NALF Cabaniss. However, in an effort to minimize this hazard the following control measures will be implemented where possible.

- Commercially available bug sprays and repellents will be used whenever possible – Pesticides analytical screening includes chlordane, endrin, lindane, methoxychlor, toxaphene and heptachlor. Commercially available repellants may be used providing they don't contain substances which appear on the analytical list for pesticide analysis. Products such as DEET (N,N-diethyl-meta-

toluamide) should not be applied directly to the skin due to potential irritation. This product, when permitted for use, should be applied over clothing articles.

- Where possible, loose-fitting and light-colored clothing with long sleeves should be worn. This will also aid in insect control by providing a barrier between the field person and the insects and to provide easy recognition of crawling insects against the lighter background. Pant legs should be secured to the work-boots using duct tape to prevent access by ticks.

- Clothing/limited body checks for ticks and other crawling insects should be conducted upon exiting heavily vegetated areas. Workers should perform a more detailed check of themselves when showering in the evening. Ticks prefer moist areas of the body (arm-pits, genitals, etc.) and will migrate to those locations.

- The FOL/SSO will preview access routes and work areas in an effort to identify physical hazards including nesting areas in and around the work sites. These areas will be flagged and communicated to site personnel.

- The FOL/SSO must determine if site personnel (through completion of Medical Data Sheets), suffer allergic reactions to bee and other insect stings and bites. Field crewmembers that are allergic to bites should have their emergency kit containing antihistamine and a preloaded syringe of epinephrine readily available.

- Any allergies (insect bites, bee stings, etc.) must be reported on the Medical Data Sheet and to the SSO.

Tick and Mosquito Transmitted Illnesses and Diseases

Ticks and mosquitoes have been identified in the transmission of diseases including Lyme's disease and malaria. Warm months (Spring through early Fall) are the most predominant time for this hazard. Information concerning Lyme's Disease including recognition, evaluation, tick removal, and control is provided in Section 4.0 of the HSGM.

Malaria may occur when a mosquito or other infected insect sucks blood from an infected person, and the insect becomes the carrier to infect other hosts. The parasite reproduces within the mosquito, and is then passed on to another person through the biting action. Acute symptoms include chills accompanied by fever and general flu like symptoms. This generally terminates in a sweating stage. These symptoms may recur every 48 to 72 hours.

The Corpus Christi and Texas State Department of Health has been monitoring the arrival of West Nile Virus in the state. Crows found in Marion and Floyd Counties are the first positive indicator that West Nile virus has officially arrived in Corpus Christi, Texas. State health officials say that although this is the first time West Nile encephalitis virus, which is transmitted by mosquitoes, has been identified in the state, it is not unexpected. No human cases have been found in Corpus Christi, Texas. West Nile Encephalitis cases occur primarily in the late summer or early fall.

Mild infections are common and include fever, headache, and body aches, often with skin rash and swollen lymph glands. More severe infection is marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions, paralysis and, rarely, and death (especially in the elderly and very young). The incubation period of West Nile encephalitis is usually 3 to 12 days. There is no specific therapy or vaccine against West Nile encephalitis.

Precautions include:

- Limit outdoor activities during peak mosquito times – at dusk and dawn.
- Avoid standing water.
- Wear long-sleeved shirts and long pants whenever you are outdoors.
- Apply insect repellent according to manufacturers instruction to exposed skin. An effective repellent will contain 20% to 30% DEET (N,N-diethyl-meta-toluamide). Avoid products containing more than 30% DEET.
- Spray clothing with repellents containing permethrin or DEET, mosquitoes may bite through thin clothing.

6.3.2 Snakes and Other Wild Animals

Indigenous animals including snakes (poisonous and non-poisonous varieties), raccoons, and other animals native to the region may be present at the site. These animals may be encountered if work locations encroach on nesting or territories claimed by these animals.

To avoid the obvious hazards conveyed as part of a direct encounter, the following actions will be taken to minimize impact on the field crews and/or operations. The FOL/SSO will preview access routes and work locations for nesting areas or signs of animal activities (tracks, foraging areas, etc.). Identified suspect areas will be communicated to the field crews. Snake chaps will be required as a precaution.

Venomous Snakes of Texas

There are few poisonous snakes in Texas. Texas's poisonous snakes are very heavy-bodied – they look "fat." They also have broad, spade-shaped heads that are distinctly wider than their narrow necks. The heads of non-venomous snakes are typically about the same width as their bodies. Such distinctions are not completely reliable, as some species such as water snakes can be rather stout, and many species of snakes will flatten their heads when bluffing, giving the head a spade-like shape as well. The pupils of the venomous snakes of Texas are vertical slits rather than round. This distinction may not hold elsewhere, but works in this state.

Do not attempt to handle or kill a snake that you believe may be venomous. Simply keep at a safe distance and move on your way. Snakes do not actively seek out people and bite them. Given the chance, snakes will almost always try to escape an encounter. If you leave them alone, they will make every effort to leave you alone as well. Be very careful to avoid the head when handling dead snakes. A snake's reflexes can remain functional hours after death, and supposedly "dead" snakes have bitten people.

Coral Snakes - Are extremely poisonous snakes with small, blunt heads and brightly colored bodies. They do not strike as effectively as other venomous snakes, but they bite. They are dangerous if stepped on or handled. The *eastern* coral snake generally ranges from 20 to 40 inches in length. Its body is encircled by broad black and red bands separated by narrow yellow ones. Just behind the snake's black snout is a wide yellow band followed by a black band. Some are covered with black pigment that hides much of the red color. Some nonpoisonous snakes look like coral snakes because they have similar coloring. But coral snakes have red bands next to yellow ones. The harmless snakes have red bands next to black ones.

Copperhead - The most common venomous species is the copperhead, and even it has a restricted range in the hills of Texas.

Appearance: The copperhead is a moderately large snake that typically measures 24 to 36 inches in length. Its head is reddish-brown in color and its body is tan. The body is marked with 15 to 19 mahogany lateral bands with darker edges that are wide on the sides and narrow on the back. The lateral bands are occasionally interrupted along the midline. Viewed from above, these bands appear hourglass shaped. Irregular brown spots are often found between the bands. The copperhead has a wedge-shaped head, sensory pits, and vertically elliptical "cat-like" pupils. The young are pale with a yellow tipped tail and are 8 to 9 inches in length.

Ecology: The copperhead is found primarily in high, dry, rocky and well-forested areas dominated by oaks and hickories. This species is very secretive and does not tolerate human presence. The copperhead is active at night the warmest part of the year and is more likely to defend itself during the evening hours. It can be found resting under logs, in cracks of foundations, and under rocks. Small rodents such as mice are its primary prey, but it also eats large moth larvae and lizards.

Timber Rattlesnakes - Timber rattlesnakes are rare and usually restricted to some of the forested hills in south central Corpus Christi, Texas.

Appearance: These snakes are Texas's largest, averaging 48 to 72 inches in length with a rattle on the end of their tail. They can be found in the hill country and south central Texas. The timber rattlesnake is a thick-bodied snake with a wide head distinct from the neck, typical of venomous snakes. The color pattern of the timber rattler is very variable, ranging from sulfur yellow and buff brown, to dark gray. Regardless of the pattern, a series of wide black cross bands line the back along the length of the body. These cross bands have been described as "blunt chevrons." Its distinctly wedge-shaped head, sensory pit, and elliptical eye slits are characteristic of snakes in the viper family.

Ecology: The timber rattlesnake is native to heavily forested areas in the hills of southern Corpus Christi, Texas. It feeds on small mammals and birds. The timber rattler hibernates inside the cracks and crevices of rocky hillsides. Timber rattlesnakes do not stalk their prey, but rather remain motionless and wait for their prey to move within striking distance. Populations of timber rattlesnakes are mostly limited to areas fairly isolated from human development.

Snake Bites

Initial efforts will be directed to avoid, where possible, nesting and territorial areas. However, should field personnel come in contact with these animals and receive a bite, the following actions are necessary.

- Obtain a detailed description of the snake. This and the bite mark will enable medical personnel administering medical aid to provide prompt and correct antidotes, as necessary.

- Immobilize the bite victim to the extent possible. Physical exertion will mobilize the toxins (if poisonous varieties) from the bite point systemically through the body.

- Apply a pressure wrap (for extremities), just above and over the bite area. With a couple wraps of the pressure wrap in place over the bite area, apply a splint, and continue the application of the pressure

wrap. The purpose for the splint is to restrict the movement of the extremity, this along with the pressure wrap will aid in restricting the toxins from leaving the site of the bite.

- Seek medical attention immediately.

6.3.3 Poisonous Plants

Various plants which can cause allergic reactions may be encountered during field work. These include, poison ivy, poison oak, and poison sumac. Contact with these plants may occur when clearing vegetation for access to work areas, or as a result of movement through these plants. An irritating, allergic reaction can occur after direct contact with the plant or indirect contact through some piece of equipment or clothing article. Oils are transferred from the plant to exposed skin, clothing, or piece of equipment. The degree of the irritating, allergic reaction can vary significantly from one person to the next.

Protective measures to control and minimize the effects of this hazard may include, but not be limited to, the following:

- Identify plants for field personnel.

  - Poison Ivy - Characterized by climbing vines, three leaf configuration ovate to elliptical in shape, deep green leaves with a reddish tint, greenish flowers, and white berries.

  - Poison Sumac - Characterized as a tall bush of the sumac family bearing compound leaves (7-13 entire leaflets), branched from a central axis, drooping, with axillary clusters of white fruit: However, these white fruits and berries may exist only during pubescent stages.

  - Poison oak - Characterized as similar to poison ivy consisting of a shrub, stems erect, 0.3 to 2.0 meters tall, leaflets consist of broad thick lobes coarsely serrated configuration, denser at the base, less so than the top.

- Protective measures may include wearing disposable garments such as Tyvek when clearing brush. These may be carefully removed and disposed along with any oils accumulated from the plants.

- Personal Hygiene - The oils obtained from the plants will only elicit an allergic response when the person's bare skin layer is contacted. This can be aggravated when skin pores are open (perspiring), or through breaks in the skin such as cuts, nicks, scratches, etc. This can also be accomplished

when using excessively hot water for cleaning the skin, which also causes pores to open. Prior to break time, lunchtime, etc. personnel should wash with cool water and soap to remove as much of the oils as possible. In heavily vegetated areas of these plants, additional measures including barrier creams and blocks may be used to prevent the oils from accessing and penetrating the skin.

These plants present an airborne sensitization hazard when burned. This is not to occur as part of this scope of work and therefore will not be addressed.

6.3.4 Inclement Weather

Project tasks under this Scope of Work will be performed outdoors. As a result, inclement weather may be encountered. In the event that adverse weather conditions arise (electrical storms, tornados, hailstorms, etc.), the FOL and/or the SSO will be responsible for temporarily suspending or terminating activities until hazardous conditions no longer exist.

6.4 WATER HAZARDS

Planned activities involve locations that are near bodies or on bodies of water. Sampling activities will be conducted from the water edge, wading out a short distance from the shore or from a non-motorized boat. To avoid potential hazards associated with working near water (drowning), the field team shall employ lifelines (tie-off procedure), safety harnesses, when within 4 feet of the water edge.

When working out of a canoe or other boat, U.S. Coast Guard (USCG) approved personal floatation devices (PFD) will be used. Due to the obvious hazards associated with working on or near water edge during inclement weather, all field activities may be temporarily suspended or terminated at the discretion and direction of the FOL or SSO. The USCG. requires all boats to have one personal floatation device per person and a sound producing device such as an air horn or whistle which can be heard one half mile.

6.4.1 USCG Floatation Device Types

Use the following information to determine the proper type of USCG PFD.

Off Shore Life Jacket (Type I, 22 lbs buoyancy)

Type I life jacket is the best choice for rough or open waters. This type will float you the best and is favorable if rescue may be long in coming. This type will turn an unconscious person upright in the water. Though it is bulky, this jacket does have a highly visible color for easier detection.

Near Shore Buoyant Vest (Type II, 15.5 lbs buoyancy)

Type II is a good choice for calmer waters. It will turn most unconscious persons face-up in the water. Though it is less bulky than Type I, it is not intended for long hours in calm or rough water.

Floatation Aid (Type III, 15.5 lbs buoyancy)

Type III is probably the most comfortable device offering more freedom of movement, such as taking water samples, but is not intended for rough water. Also, an unconscious person may end up face-down in the water.

Throwable Devices (Type IV)

Throwable devices are intended for calm waters with heavy boat traffic where help is always close. It is not intended for unconscious persons or non-swimmers or long hours in the water. They are good backups to the other devices.

All personnel shall wear Type III personal floatation devices in the event someone falls overboard, boats sinks or capsizes. Type IIIs were selected as they offer the most flexibility for working while still meeting minimum requirements for buoyancy. In situations where personal floatation devices cannot be worn due to the task to be conducted, the floatation devices shall be immediately available/accessible. It is recommended that personal floatation devices be worn at all times during colder months due to the potential for hypothermia to restrict muscle movement and therefore, self rescue and maintaining buoyancy. In addition, a single Type IV Throwable Floatation Device shall be maintained on board the boat with at least 90 feet of 3/8 polypropylene line.

When work activities take personnel within four feet of waters edge personnel will have immediately accessible a lifeline with a throwing bag or Type IV floatation device facilitate extraction from the water. All personnel working on waters edge will do so using the buddy system to assist in rescue efforts, if needed.

7.0 MONITORING

Direct reading instruments will be used at the site to evaluate the presence of contaminants and other potentially hazardous conditions. Air monitoring measures and requirements are established in Table 5-1 pertaining to the specific task and operations. Additionally, the HSGM, Section 1.0, contains detailed information regarding direct reading instrumentation, as well as general calibration procedures of various instruments.

7.1 INSTRUMENTS AND USE

Instruments will be used primarily to monitor source points and worker breathing zone areas, while observing instrument action levels. Action levels are discussed in Table 5-1 as they may apply to a specific task or location.

7.1.1 Photoionization Detector or Flame Ionization Detector

Although significant concentrations of volatile organic compounds (VOCs) are not expected to be encountered, a Photoionization Detector (PID) with a lamp energy of 9.6 electron volts (eV) will be used to monitor for any detectable substances that may present an exposure concern. This instrument will be used to monitor potential source areas (boreholes, sampling locations, etc.) and to screen the breathing zones of employees during site activities. The PID has been selected because it is capable of detecting numerous organic vapors (NOTE**:** A Flame Ionization Detector [FID] may be used as an alternative to the PID).

Prior to the commencement of any field activities, the background levels of the site must be determined and noted. Daily background readings will be taken away from any areas of potential contamination. These readings, any influencing conditions (i.e., weather, temperature, humidity) and site location must be documented in the field operations logbook or other site documentation (e.g., sample log sheet).

7.1.2 Hazard Monitoring Frequency

Table 5-1 presents the frequencies that hazard monitoring will be performed as well as the action levels which will initiate the use of elevated levels of protection. The SSO may decide to increase these frequencies based on instrument responses and site observations. The frequency at which monitoring is performed will not be reduced without the prior consent of the PHSO or HSM.

7.2 INSTRUMENT MAINTENANCE AND CALIBRATION

Hazard monitoring instruments will be maintained and pre-field calibrated by the TtNUS Equipment Manager. Operational checks and field calibration will be performed on the instruments each day prior to their use. Field calibration will be performed on instruments according to manufacturer's recommendations (for example, the PID must be field calibrated daily and an additional field calibration must be performed at the end of each day to determine any significant instrument drift). These operational checks and calibration efforts will be performed in a manner that complies with the employees health and safety training, the manufacturer's recommendations, and with the applicable manufacturer standard operating procedure (copies of which can be found in the HSGM which will be maintained on site for reference). Calibration efforts must be documented. Figure 7-1 is provided for documenting these calibration efforts. This information may instead be recorded in a field operations logbook, provided that the information specified in Figure 7-1 is recorded. This required information includes the following:

- Date calibration was performed
- Individual calibrating the instrument
- Instrument name, model, and serial number
- Any relevant instrument settings and resultant readings (before and after) calibration
- Identification of the calibration standard (lot no., source concentration, supplier)
- Any relevant comments or remarks

7.3 DOCUMENTING INSTRUMENT READINGS

The SSO is responsible for ensuring that monitoring instruments are used in accordance with the specifications of this HASP and with manufacturer's specifications/recommendations. In addition, the SSO is also responsible for ensuring that the instrument use is documented. This requirement can be satisfied either by recording instrument readings on pre-printed sampling log sheets or in a field log book. This includes the requirement for documenting instrument readings that indicate no elevated readings above noted daily background levels (i.e., no-exposure readings). At a minimum, the SSO must document the following information for each use of an air monitoring device:

- Date, time, and duration of the reading
- Site location where the reading was obtained
- Instrument used
- Personnel present at the area where the reading was noted
- Other conditions that are considered relevant to the SSO (such as possible instrument interferences, etc.)

FIGURE 7-1

DOCUMENTATION OF FIELD CALIBRATION

SITE NAME: _____ **PROJECT NO.:**_____

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot Number)	Remarks/ Comments
				Pre-Calibration	Post-Calibration	Pre-Calibration	Post-Calibration		

8.0 TRAINING/MEDICAL SURVEILLANCE REQUIREMENTS

8.1 INTRODUCTORY/REFRESHER/SUPERVISORY TRAINING

This section specifies health and safety training and medical surveillance requirements for both TtNUS and subcontractor personnel participating in on-site activities. The TtNUS and subcontractor personnel who will engage in field associated activities as described in this HASP must have:

- Completed 40 hours of introductory hazardous waste site training or equivalent work experience as defined in OSHA Standard 29 CFR 1910.120(e).

- Completed 8-Hour Refresher Training, if the identified persons had introductory training more than 12 months, prior to this site work.

- Completed 8-hour Supervisory training in accordance with 29 CFR 1910.120(e) (4), if their assigned function will involve the supervision of subordinate personnel.

Documentation of introductory training or equivalent work experience, supervisory, and refresher training, as well as, site-specific training will be maintained at the site. Copies of certificates or other official documentation will be used to fulfill this requirement and to track site personnel's training status. The SSO shall be responsible for insuring training qualifications through review of training documentation and for monitoring the status of on-site personnel to insure during the course of this project site personnel do not cycle outside of their training compliance status. The documentation supporting training compliance and status shall be maintained at the project site and be made available, upon request.

8.2 SITE-SPECIFIC TRAINING

TtNUS SSO will provide site-specific training to TtNUS employees and subcontractor personnel who will perform work on this project.

Figure 8-1 will be used to document the provision and content of the project-specific and associated training. Site personnel will be required to sign this form prior to commencement of site activities. This training documentation will be employed to identify personnel who through record review and attendance of the site-specific training are cleared for participation in site activities. This document shall be posted to maintain an active list of cleared site personnel.

TtNUS will conduct a pre-activities training session prior to initiating site work. Additionally, a brief meeting may be held daily to discuss operations planned for that day as well as, a short meeting may be held at the end of the day to discuss the operations completed and any problems encountered. This activity will be supported through the use of a Safe Work Permit System (See Section 9.10) and/or documented in the Project Logbook.

8.3 MEDICAL SURVEILLANCE

TtNUS and subcontractor personnel participating in project field activities will have had a physical examination. Physical examinations shall meet the minimum requirements of paragraph (f) of OSHA 29 CFR 1910.120. The physical examinations will be performed to ensure that personnel are medically qualified to perform hazardous waste site work using respiratory protection.

Documentation for medical clearances will be maintained at the job site and made available, as necessary. A letter from an officer of the company or a medical clearance authorized by the physician can be used as documentation. Documentation must indicate that clearance provided are in accordance with medical surveillance as determined by 29 CFR 1910.120 (f).

The SSO shall be responsible for ensuring that personnel participating in this project provide documentation regarding their medical qualifications. Personnel associated with this project will maintain a current status regarding medical surveillance as determined by 29 CFR 1910.120 (f) or the prescribed interval as determined by the Licensed Occupational Health Care Provider. Documentation supporting medical surveillance compliance and status shall be made available, upon request.

Medical Data Sheet

Each field team member, including subcontractors and visitors, entering the exclusion zone(s) shall be required to complete and submit a copy of the Medical Data Sheet (see Attachment II). This shall be filled out and collected, reviewed and maintained by the SSO. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention.

8.4 SUBCONTRACTOR EXCEPTION

If through the execution of their contract elements the subcontractor will not enter the exclusion zone and there is no potential for exposure to site contaminants, subcontractor personnel may be exempt from the training and medical surveillance requirements with the exception of Section 8.2. Examples of subcontractors who may qualify as exempt from training and medical surveillance requirements may

include surveyors who perform surveying activities in site perimeter areas or areas were there is no potential for exposure to site contaminants and support or restoration services. Use of this Subcontractor Exception is strictly limited to the authority of the TtNUS Health and Safety Manager.

FIGURE 8-1

SITE-SPECIFIC TRAINING DOCUMENTATION

My signature below indicates that I am aware of the potential hazardous nature of performing investigation activities at NALF Cabaniss, and that I have received site-specific training that included the elements presented below:

- Names of personnel and alternates responsible for site safety and health
- Safety, health and other hazards present on site
- Use of personal protective equipment
- Work practices to minimize risks from hazards
- Safe use of engineering controls and equipment
- Medical surveillance requirements
- Signs and symptoms of overexposure
- The contents of the health and safety plan including Table 5-1 and 6-1
- Emergency response procedures (evacuation and assembly points)
- Review contents of relevant Material Safety Data Sheets
- Review of Safe Work Permits

I have been given the opportunity to ask questions and that my questions have been answered to my satisfaction. The dates of my training and my medical surveillance requirements are accurate and correct to the best of my knowledge.

Name (Printed and Signature)	Site-Specific Training Date	40-Hour Training (Date)	8-Hour Refresher Training (Date)	8-Hour Supervisory Training (Date)	Medical Exam

9.0 SITE CONTROL

This section outlines the means by which TtNUS will delineate work zones and use these work zones in conjunction with decontamination procedures to prevent the spread of contaminants into previously unaffected areas of the site. It is anticipated that a three-zone approach will be used during work at this site: Exclusion Zone, Contamination Reduction Zone, and Support Zone. It is also anticipated that this control measure will be used to control access to site work areas. Use of such controls will restrict the general public, minimize potentials for the spread of contaminants and protect individuals who are not cleared to enter the work areas.

9.1 EXCLUSION ZONE

The Exclusion Zone will be considered those areas of the site of known or suspected contamination. It is not anticipated that significant amounts of surface contamination are in the proposed work areas of this site. It is anticipated that this will remain so until/unless contaminants are brought to the surface by intrusive activities such as drilling operations. Furthermore, once such activities have been completed and surface contamination has been removed, the potential for exposure is again diminished and the area can then be reclassified as part of the Contamination Reduction Zone or support zone. Therefore, the Exclusion Zones for this project will be limited to those areas of the site where active work is being performed, plus a designated area surrounding the point of operation. Exclusion Zones will also be delineated and may include the use of barrier tape, cones and /or drive poles, and postings to inform and direct facility personnel. Exclusion zone boundaries are as follows:

- DPT Operations/Soil sampling – The exclusion zone boundary (horizontal distance) for this operation will be set equal to or greater than the height of the mast plus five feet. It is determined at this horizontal distance, non-essential personnel will be removed from potential physical hazards associated with this operation. This determination would include catastrophic failure of the boom and associated cables.

- Decontamination – Using pressure washers/steam cleaners 25-feet surrounding the point of operation or 15 feet surrounding a constructed pad.

- Clearing and grubbing. The exclusion zone for this activity will be set at 10-feet surrounding someone with a brush hook or machete.

9.2 CONTAMINATION REDUCTION ZONE

The contamination reduction zone will be split to represent two separate functions. The first function will be a control/supply point for supporting exclusion zone activities. The second function, which may take place a sufficient distance from the exclusion zone, is the decontamination of personnel and heavy equipment.

In order to move from the exclusion zone to a separate location the following activities will be used:

- As samplers move from location to location during sampling activities, dedicated sampling devices and PPE will be removed, separated, and bagged. Personnel will use hygienic wipes, such as Handy Wipes, as necessary to clean hands and face until they can access soap and water.

- Muddy over-boots and gloves may be required to go through a gross contamination wash at the exclusion zone or be bagged until they can be cleaned at a central decontamination location.

- Potentially contaminated tooling will be wrapped, when necessary, for transport to the decontamination area.

- Upon completion of the assigned tasks personnel will move through the central decontamination area to clean reusable PPE and field equipment.

9.3 SUPPORT ZONE

The Support Zone for this project will include a staging area where site vehicles will be parked, equipment will be unloaded, and where food and drink containers will be maintained. The Support Zones will be established at areas of the site where exposure to site contaminants would not be expected during normal working conditions or foreseeable emergencies.

9.4 SAFE WORK PERMITS

Exclusion Zone work conducted in support of this project will be performed using Safe Work Permits to guide and direct field crews on a task by task basis. An example of the Safe Work Permit to be used is provided in Figure 9-1. Partially completed permits for the work to be performed are included in Attachment V. The daily meetings conducted at the site will further support these work permits. This effort will ensure the site-specific considerations and changing conditions are incorporated into the planning effort, as well as, give personnel an opportunity to ask questions and make suggestions. The permits require the signature of the FOL or SSO.

FIGURE 9-1
SAFE WORK PERMIT

Permit No. _____ Date: _____ Time: From _____ to _____

SECTION I: General Job Scope

I. Work limited to the following (description, area, equipment used): _____

II. Primary Hazards: _____

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

SECTION II: General Safety Requirements (To be filled in by permit issuer)

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: None anticipated

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures

Primary Route of Exposure/Hazard: _____

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☐ Yes	☐ No
Safety Glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☐ No
Chemical/splash goggles	☐ Yes	☐ No	Radio/Cellular Phone	☐ Yes	☐ No
Splash Shield	☐ Yes	☐ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type –_____)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☐ No
Steel toe Work shoes or boots	☐Yes	☐ No	Chemical Resistant Boot Covers	☐ Yes	☐ No
High Visibility vest	☐Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First Aid Kit	☐Yes	☐ No	Fire Extinguisher	☐ Yes	☐ No
Safety Shower/Eyewash	☐Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

Use of these permits will provide the communication line for reviewing protective measures and hazards associated with each operation. This HASP will be used as the primary reference for selecting levels of protection and control measures. The work permit will take precedence over the HASP when more conservative measures are required based on specific site conditions.

Upon completion of the tasks for which the permit was assigned, the permit shall be turned into the FOL and/or the SSO.

9.5 SITE VISITORS

Site visitors for the purpose of this document are identified as representing the following groups of individuals:

- Personnel invited to observe or participate in operations by TtNUS
- Regulatory personnel
- Southern Division Navy Personnel
- Other authorized visitors

Site visitors will be directed to the FOL, who will sign them in to the field logbook. Information to be recorded in the logbook will include the individual's name (proper identification required), who they represent, and purpose for the visit.

9.6 SITE SECURITY

Site security will be accomplished using TtNUS field personnel. TtNUS will retain complete control over active operational areas. As these activities will take place at a United States Navy facility the first line of security will take place at the Main Gate. The second line of security will take place at the exclusion zone using exclusion zone barriers, signs, and other indicators to restrict direct the general public. The final line of security will take place at the work site referring interested parties to the FOL or designee. The FOL will serve as a focal point for non-project interested parties, and serve as the final line of security and the primary enforcement contact.

9.7 SITE MAP

Once the areas of contamination, access routes, topography, and dispersion routes are determined, a site map will be generated and adjusted as site conditions change. When possible, these maps will be posted to illustrate up-to-date collection of contaminants and adjustment of zones and access points.

9.8 BUDDY SYSTEM

Personnel engaged in on site activities will practice the "buddy system" to ensure the safety of personnel involved in this operation.

9.9 MATERIAL SAFETY DATA SHEET (MSDS) REQUIREMENTS

TtNUS and subcontractor personnel will provide MSDSs for chemicals brought on site. The contents of these documents will be reviewed by the SSO with the user(s) of the chemical substances prior to any actual use or application of the substances on site. A chemical inventory of the chemicals used on site will be developed using the HSGM. The MSDSs will then be maintained in a central location (i.e., temporary office) and will be available for anyone to review upon request.

9.10 COMMUNICATION

Based on the defined scope of work it is anticipated that personnel will be working in proximity to one another during field activities, a supported means of communication between field crews members such as hand held radios, will not be necessary. External communication will be accomplished by using the telephones at predetermined and approved locations or through cellular phones.

10.0 SPILL CONTAINMENT PROGRAM

10.1 SCOPE AND APPLICATION

It is not anticipated that quantities of bulk potentially hazardous materials (greater than 55-gallons per container) will be handled during the site activities conducted as part of this scope of work. Significant quantities of waste water (decontamination, purge and development) and soil cuttings to be collectively referred to as investigative-derived wastes (IDW) may be generated, as part of site activities. It is not anticipated, however, that spillage of these materials would constitute a significant danger to human health or the environment.

Purge and development waters and soils will be profiled based on the information derived from the sampling data. This information will be used to determine the most appropriate disposal measures. Once characterized, they can be removed from the staging area and disposed of in accordance with Federal, State and local regulations.

10.2 PERSONNEL TRAINING AND SPILL PREVENTION

Personnel will be instructed in the procedures for incipient spill prevention, containment, and collection of hazardous materials in the site-specific training. The FOL and the SSO will serve as the Spill Response Coordinators for this operation, should the need arise.

10.3 LEAK AND SPILL DETECTION

To establish an early detection of potential spills or leaks, a periodic walk-around by personnel staging or disposing of containers will be conducted at least once each day during working hours, to visually determine that containers are not leaking. Any leaks identified will be collected and contained using absorbents such as Oil-dry, vermiculite, or sand, stored at the staging area in an appropriate replacement vessel or container conspicuously marked. This material too, will be containerized for disposal pending analyses. Site inspections will be documented in the Project Logbook.

10.4 SPILL PREVENTION AND CONTAINMENT EQUIPMENT

The following represents examples of the types of equipment that should be maintained at the staging areas for the purpose of supporting this Spill Containment/Control Plan.

- Sand, clean fill, vermiculite, or other non combustible absorbent (i.e., Oil-dry)
- Extra Drums (i.e., 55-gallon U.N. 1A2) to transfer material from leaking containers.
- Necessary means for transferring liquids from leaking containers (i.e., pumps, tubing, buckets, etc.)

- Drum Repair Kit
- Shovels, rakes, and brooms
- Container labels
- Personal Protective Equipment
  - Nitrile outer gloves
  - Splash Shield
  - Impermeable over-boots
  - Rain suit or impermeable apron

10.5 SPILL CONTAINMENT/CONTROL RESPONSE PLAN

This section describes the procedures the TtNUS field personnel will employ upon the detection of a spill or leak.

- Notify the SSO or FOL immediately upon detection of a leak or spill.

- The FOL or the SSO shall assess the leak and make a determination as to whether the response measure required is within the capabilities of the field crew or whether it is necessary to notify designated emergency response units.

Within the capabilities of the Field Crew:

- Employ the personal protective equipment stored at the staging area. Take immediate actions to stop the leak or spill by plugging or patching the container or raising the leak to the highest point in the vessel. Spread the absorbent material in the area of the spill, covering it completely.

- Transfer the material to a new vessel; collect and containerize the absorbent material. Label the new container appropriately. Await analyses for treatment and disposal options.

- Recontainerize spills, including 2-inch of top cover (if over soils) impacted by the spill. Await test results for treatment or disposal options.

Outside of the Capabilities of the Field Crew/Notify Emergency Response Units:

- Activate emergency alerting procedures for that area to remove non-essential personnel.

- Take defensive measures such as:
  - Spread the absorbent material in the area of the spill, covering it completely.

- Raising the leak to the highest point in the vessel.

- Establish site security, direct emergency crews to the area of the leak.

It is not anticipated that a spill would occur that the field crew cannot handle. Should this occur, notification of the appropriate Emergency Response agencies will be carried out by the FOL or SSO in accordance with the procedures specified in Section 2.0 of this HASP.

11.0 CONFINED SPACE ENTRY

Personnel under the provisions of this HASP are not allowed, under any circumstances, to enter confined spaces. A confined space is defined as an area that has one or more of the following characteristics:

- Is large enough and so configured that an employee can bodily enter and perform assigned work.
- Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry).
- Is not designed for continuous employee occupancy.
- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential to engulf an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor that slopes downward and tapers to a smaller cross-section.
- Contains any other recognized, serious, safety or health hazard.

For further information on confined space consult the HSGM or call the Manager, Health Sciences. If confined space operations are to be performed as part of the scope of work, detailed procedures and training requirements will be addressed in an addendum or the site specific health and safety plan.

12.0 MATERIALS AND DOCUMENTS

The TtNUS FOL shall ensure the following materials/documents are taken to the project site and used when required.

- A complete copy of this HASP
- HSGM
- Incident Reports
- Medical Data Sheets
- Material Safety Data Sheets for chemicals brought on site, including decon solutions, fuels, lime, sample preservatives, calibration gases, etc.
- A full-size OSHA Job Safety and Health Poster (posted in the site trailers)
- Training/Medical Surveillance Documentation Form (Blank)
- Emergency Reference Information (Section 2.0, extra copy for posting)

MATERIALS TO BE POSTED OR MAINTAINED AT THE SITE

The following documentation is to be posted or maintained at the site for quick reference purposes. In situations where posting these documents is not feasible, (such as no office trailer), these documents should be separated and immediately accessible.

Chemical Inventory Listing (posted) - This list represents chemicals brought on-site, including decontamination solutions, sample preservations, fuel, etc. This list should be posted in a central area.

Material Safety Data Sheets (MSDS) (maintained) - The MSDSs should also be in a central area accessible to site personnel. These documents should match the listings on the chemical inventory list for substances used on-site. It is acceptable to have these documents within a central folder and the chemical inventory as the table of contents.

The OSHA Job Safety & Health Protection Poster (posted) - This poster, as directed by 29 CFR 1903.2 (a)(1), should be conspicuously posted in places where notices to employees are normally posted. Each FOL shall ensure that this poster is not defaces, altered, or covered by other material.

Site Clearance (maintained) - This list is found within the training section of the HASP (See Figure 8-1). This list identifies site personnel, dates of training (including site-specific training), and medical surveillance. The list indicates not only clearance but also status. If personnel do not meet these requirements, they do not enter the site while site personnel are engaged in activities.

Emergency Phone Numbers and Directions to the Hospital(s) (posted) - This list of numbers and directions will be maintained at phone communications points and in each site vehicle.

Medical Data Sheets/Cards (maintained) - Medical Data Sheets will be filled out by on-site personnel and filed in a central location. The Medical Data Sheet will accompany any injury or illness requiring medical attention to the medical facility. A copy of this sheet or a wallet card will be given to personnel to be carried on their person.

Hearing Conservation Standard (29 CFR 1910.95) (posted) - This standard will be posted anytime hearing protection or other noise abatement procedures are employed.

Personnel Monitoring (maintained) - Results generated through personnel sampling (levels of airborne toxins, noise levels, etc.) will be posted to inform individuals of the results of that effort.

Placards and Labels (maintained) - Where chemical inventories have been separated because of quantities and incompatibilities, these areas will be conspicuously marked using Department of Transportation (DOT) placards and acceptable (Hazard Communication 29 CFR 1910.1200(f)) labels.

The purpose of maintaining or posting this information, as stated above, is to allow site personnel quick access. Variations concerning location and methods of presentation are acceptable, providing the objection is accomplished.

13.0 GLOSSARY

ACGIH	American Conference of Governmental Industrial Hygienists
AICUZ	Air Installation Compatible Use Zone
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CLEAN	Comprehensive Long-Term Environmental Action Navy
CNS	Central Nervous System
CSP	Certified Safety Professional
CTO	Contract Task Order
dBA	Decibels
DEET	N,N-diethyl-meta-toluamide
DOT	Department of Transportation
DPT	Direct Push Technology
EOD	Explosive Ordnance Disposal
eV	electron Volts
FID	Flame Ionization Detector
FOL	Field Operations Leader
GSA	Government Services Administration
HSGM	Health and Safety Guidance Manual
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IAS	Initial Assessment Study
IDLH	Immediately Dangerous to Life and Health
IDW	Investigation Derived Waste
kV	Kilovolt
N/A	Not Available
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
mm	millimeter
MSDS	Material Safety Data Sheet
NIOSH	National Institute Occupational Safety and Health
NALF	Naval Auxiliary Landing Field
NASCC	Naval Air Station Corpus Christi
NAVFAC SE	Naval Facilities Engineering Command Southeast

OLF	Outlying Field
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PAH	Polyaromatic Hydrocarbons
PFD	Personal Floatation Device
PHSO	Project Health and Safety Manager
PID	Photo Ionization Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
SI	Site Inspection
SOP	Standard Operating Procedure
SSO	Site Safety Officer
TBD	To Be Determined
TOM	Task Order Manager
TtNUS	TtNUS, Inc.
USCG	United States Coast Guard
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
XRF	X-ray Flourescence

ATTACHMENT I

INJURY/ILLNESS PROCEDURE AND REPORT FORM

TETRA TECH NUS, INC.

INJURY/ILLNESS PROCEDURE
WORKER'S COMPENSATION PROGRAM

WHAT YOU SHOULD DO IF YOU ARE INJURED OR DEVELOP AN ILLNESS AS A RESULT OF YOUR EMPLOYMENT:

- Stop work as needed to ensure no further harm is done.
- If injury is minor, obtain appropriate first aid treatment.
- If injury or illness is severe or life threatening, obtain professional medical treatment at the nearest hospital emergency room. Check with your office location or project health and safety plan for specific instructions.
- If incident involves an injury, illness, or chemical exposure on a project work site, follow instructions in the Health & Safety Plan.
- Immediately report any injury or illness to your supervisor or office manager. In addition, you must contact your Human Resources representative, Marilyn Duffy at (412) 921-8475, and the Corporate Health and Safety Manager, Matt Soltis at (412) 921-8912 within 24 hours of the injury. You will be required to complete an Injury/Illness Report. You may also be required to participate in a more detailed investigation with the Health Sciences Department.
- In the event of a serious near-miss incident, a "Serious Near Miss Report" (Form AR-2, available online at https://go2.tetratech.com under "Departments", "Health and Safety", "Accident Reporting Procedures", hyperlink for "Serious Near Miss Report") must be completed and faxed to the Corporate Health and Safety Manager within 48 hours.
- If further medical treatment is needed, our insurance carrier, ACE, will provide information on the authorized providers customized to the location of the injured employee. You can find this information by accessing the website of ACE's claims handler, ESIS, at : **www.esis.com**. These providers are to be used for treatment of Worker's Compensation injuries subject to the laws of the state in which you work.

ADDITIONAL QUESTIONS REGARDING WORKER'S COMPENSATION:

Contact your local Human Resources representative (Marilyn Duffy), Corporate Health and Safety Manager (Matt Soltis), or Corporate Administration in Pasadena, California, at (626) 351-4664.

Worker's compensation is a state-mandated program that provides medical and disability benefits to employees who become disabled due to job related injury or illness. Tetra Tech, Inc. and its subsidiaries pay premiums on behalf of their employees. This program is based on a no-fault system, and benefits are provided for covered events as an exclusive remedy to the injured employee regardless of fault. The types of injuries or illnesses covered and the amount of

benefits paid are regulated by the state worker's compensation boards and vary from state to state. Corporate Administration in Pasadena is responsible for administering the Company's worker's compensation program. The following is a general explanation of worker's compensation provided in the event that you become injured or develop an illness as a result of your employment with Tetra Tech or any of its subsidiaries. Please be aware that the term used for worker's compensation varies from state to state.

WHO IS COVERED:

All employees of Tetra Tech, whether they are on a full-time, part-time or temporary status, working in an office or in the field, are entitled to worker's compensation benefits from the first day of work. All employees must follow the above injury/illness reporting procedures. If you are working out-of-state and away from your home office, you are still eligible for worker's compensation benefits.

Consultants, independent contractors, and employees of subcontractors and employees from temporary employment agencies are not covered by Tetra Tech's Worker's Compensation plan.

WHAT IS COVERED:

If you are injured or develop an illness caused by your employment, worker's compensation benefits are available to you subject to the laws of the state you work in. Injuries do not have to be serious; even injuries treated by first aid practices are covered and must be reported.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT

To: _____
Subsidiary Health and Safety Representative

cc: _____
Workers Compensation Administrator

Project name: _____

Project number: _____

Prepared by: _____

Position: _____

Office: _____

Telephone number: _____

Fax number: _____

Information Regarding Injured or Ill Employee

Name: _____

Home address: _____

_____

Home telephone number: _____

Occupation (regular job title): _____

Department: _____

Office: _____

Gender: M ☐ F ☐ No. of dependents: _____

Marital status: _____

Date of birth: _____

Social security number: _____

Date of Accident: _____

Time Employee Began Work: _____

Time of Accident: _____ a.m. ☐ p.m. ☐

☐ Check if time cannot be determined

Location of Incident

Street address: _____

City, state, and zip code: _____

County: _____

Was place of accident or exposure on employer's premises? Yes ☐ No ☐

Information About the Incident

What was the employee doing just before the incident occurred? Describe the activity as well as the tools, equipment, or material the employee was using. Be specific. Examples: "Climbing a ladder while carrying roofing materials"; "Spraying chlorine from hand sprayer"; "Daily computer key-entry"

What Happened? Describe how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time"

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Information About the Incident (Continued)

What was the injury or illness? Describe the part(s) of the body affected and how it was affected. Be more specific than "hurt," "pain," or "sore." Examples "Strained back"; "Chemical burn, right hand"; "Carpal tunnel syndrome, left wrist"

Describe the Object or Substance that Directly Harmed the Employee: Examples: "Concrete floor"; "Chlorine"; "Radial arm saw." If this question does not apply to the incident, write "Not applicable."

Did the employee die? Yes ☐ No ☐ Date of death: _____

Was employee performing regular job duties? Yes ☐ No ☐

Was safety equipment provided? Yes ☐ No ☐ Was safety equipment used? Yes ☐ No ☐

Note: Attach any police reports or related diagrams to this report.

Witness (Attach additional sheets for other witnesses.)

Name: _____

Company: _____

Street address: _____

City: _____ State: _____ Zip code: _____

Telephone number: _____

Medical Treatment Required? ☐ Yes ☐ No ☐ First aid only

Name of physician or health care professional: _____

If treatment was provided away from the work site, provide the information below.

Facility name: _____

Street address: _____

City: _____ State:_____ Zip code: _____

Telephone number: _____

Was the employee treated in an emergency room? ☐ Yes ☐ No

Was the employee hospitalized over night as an in-patient? ☐ Yes ☐ No

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

Corrective Action(s) Taken by Unit Reporting the Accident:

Corrective Action Still to be Taken (by whom and when):

Name of Tetra Tech employee the injury or illness was first reported to: _____

Date of Report: _____ **Time of Report:** _____

I have reviewed this investigation report and agree, to the best of my recollection, with its contents.

_____ _____

Printed Name of Injured Employee Telephone Number

_____ _____

Signature of Injured Employee Date

The signatures provided below indicate that appropriate personnel have been notified of the incident.

Title	Printed Name	Signature	Telephone Number	Date
Office Manager				
Project Manager				
Site Safety Coordinator or Office Health and Safety Representative				

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

TETRA TECH, INC.

ACCIDENT AND ILLNESS INVESTIGATION REPORT (Continued)

To Be Completed by the Subsidiary Health and Safety Representative

Classification of Incident:

☐ Injury ☐ Illness

Result of Incident:

☐ First aid only

☐ Days away from work

☐ Remained at work but incident resulted in job transfer or work restriction

☐ Incident involved days away and job transfer or work restriction

☐ Medical treatment only

No. of days away from work _____

Date employee left work _____

Date employee returned to work _____

No. of days placed on restriction or job transfer: _____

OSHA Recordable Case Number _____

To Be Completed by Human Resources

Social security number: _____

Date of hire: _____ Hire date for current job: _____

Wage information: $ _____ per ☐ Hour ☐ Day ☐ Week ☐ Month

Position at time of hire: _____

Current position: _____ Shift hours: _____

State in which employee was hired: _____

Status: ☐ Full-time ☐ Part-time Hours per week: _____ Days per week: _____

Temporary job end date: _____

To Be Completed during Report to Workers Compensation Carrier

Date reported: _____ Reported by: _____

Confirmation number: _____

Name of contact: _____

Field office of claims adjuster: _____

This form contains information relating to employee health and must be used in a manner that protects the confidentiality of the employee to the extent possible while the information is being used for occupational safety and health purposes.

ATTACHMENT II

MEDICAL DATA SHEET

MEDICAL DATA SHEET

This brief Medical Data Sheet will be completed by all onsite personnel and visitors who are cleared and will enter defined areas of operation. The medical data sheets will be kept in a central location during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project: NALF Cabaniss – CTO 0023

Name: _____ Home Telephone: _____

Address: _____

_____

Age: _____ Height: _____ Weight: _____

Name of Next Kin: _____

Telephone Numbers: Home: _____ Work: _____ Cell: _____

Address _____

_____

Drug or other Allergies: _____

Particular Sensitivities: _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Overexposure to Hazardous Chemicals Resulting in signs and symptoms of overexposure and/or the necessity for Medical Attention and/or First-aid: _____

_____

Do you have any medical restrictions? _____

Past Medical History/Review of Systems (Check if you have had positive history)

- ☐ Heart Conditions (Chest pains, angina, heart attacks)
- ☐ Gastrointestinal Conditions (Ulcers, liver, GI Bleeding)
- ☐ Pulmonary (Difficulty in breathing, coughing, asthma, pneumonia)
- ☐ Neurological [Headaches, dizziness, strokes (CVA, TIA)]
- ☐ Kidney/Urological Disorder (kidney stones, renal failure) fever, etc.)
- ☐ Endocrine (Thyroid, diabetes)
- ☐ Hematological (Clotting, anemia)
- ☐ Cancer
- ☐ Muscular/Skeleton (Arthritis, Fractures, etc.)
- ☐ Other (Recent Illnesses, weight loss,

Comments: (Please explain positive indications): _____

_____

Immunization History: Last Tetanus Shot or Booster (Date): _____ Pneumonia Vaccination (Date): _____

Flu Vaccination (Date): _____ Other: _____

Name, Address, and Phone Number of personal physician: _____

_____

_____

ATTACHMENT III

UTILITY LOCATING

AND

EXCAVATION CLEARANCE

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1.0 PURPOSE

Utilities such as electric service lines, natural or propane gas lines, water and sewage lines, telecommunications, and steam lines are very often in the immediate vicinity of work locations. Contact with underground or overhead utilities can have serious consequences including employee injury/fatality, property and equipment damage, substantial financial impacts, and loss of utility service to users.

The purpose of this procedure is to provide minimum requirements and technical guidelines regarding the appropriate procedures to be followed when performing subsurface and overhead utility locating services. It is the policy of Tetra Tech NUS, Inc. (TtNUS) to provide a safe and healthful work environment for the protection of our employees. The purpose of this Standard Operating Procedure (SOP) is to aid in achieving the objectives of this policy, to present the acceptable procedures pertaining to utility locating and excavation clearance activities, and to present requirements and restrictions relevant to these types of activities. This SOP must be reviewed by any employee potentially involved with underground or overhead utility locating and avoidance activities.

2.0 SCOPE

This procedure applies to all TtNUS field activities where there may be potential contact with underground or overhead utilities. This procedure provides a description of the principles of operation, instrumentation, applicability, and implementability of typical methods used to determine the presence and avoidance of contact with utility services. This procedure is intended to assist with work planning and scheduling, resource planning, field implementation, and subcontractor procurement. Utility locating and excavation clearance requires site-specific information prior to the initiation of any such activities on a specific project. This SOP is not intended to provide a detailed description of methodology and instrument operation. Specialized expertise during both planning and execution of several of the methods presented may also be required.

3.0 GLOSSARY

Electromagnetic Induction (EMI) Survey - A geophysical exploration method whereby electromagnetic fields are induced in the ground and the resultant secondary electromagnetic fields are detected as a measure of ground conductivity.

Magnetometer – A device used for precise and sensitive measurements of magnetic fields.

Magnetic Survey – A geophysical survey method that depends on detection of magnetic anomalies caused by the presence of buried ferromagnetic objects.

Metal Detection – A geophysical survey method that is based on electromagnetic coupling caused by underground conductive objects.

Vertical Gradiometer – A magnetometer equipped with two sensors that are vertically separated by a fixed distance. It is best suited to map near surface features and is less susceptible to deep geologic features.

Ground Penetrating Radar – Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture.

4.0 RESPONSIBILITIES

Project Manager (PM)/Task Order Manager (TOM) - Responsible for ensuring that all field activities are conducted in accordance with this procedure.

Site Manager (SM)/Field Operations Leader (FOL) - Responsible for the onsite verification that all field activities are performed in compliance with approved SOPs or as otherwise directed by the approved project plan(s).

Site Health & Safety Officer (SHSO) – Responsible to provide technical assistance and verify full compliance with this SOP. The SHSO is also responsible for reporting any deficiencies to the Corporate Health and Safety Manager (HSM) and to the PM/TOM.

Health & Safety Manager (HSM) – Responsible for preparing, implementing, and modifying corporate health and safety policy and this SOP.

Site Personnel – Responsible for performing their work activities in accordance with this SOP and the TtNUS Health and Safety Policy.

5.0 PROCEDURES

This procedure addresses the requirements and technical procedures that must be performed to minimize the potential for contact with underground and overhead utility services. These procedures are addressed individually from a buried and overhead standpoint.

5.1 Buried Utilities

Buried utilities present a heightened concern because their location is not typically obvious by visual observation, and it is common that their presence and/or location is unknown or incorrectly known on client properties. This procedure must be followed prior to beginning any subsurface probing or excavation that might potentially be in the vicinity of underground utility services. In addition, the Utility Clearance Form (Attachment 3) must be completed for every location or cluster of locations where intrusive activities will occur.

Where the positive identification and de-energizing of underground utilities cannot be obtained and confirmed using the following steps, the PM/TOM is responsible for arranging for the procurement of a qualified, experienced, utility locating subcontractor who will accomplish the utility location and demarcation duties specified herein.

1. A comprehensive review must be made of any available property maps, blue lines, or as-builts prior to site activities. Interviews with local personnel familiar with the area should be performed to provide additional information concerning the location of potential underground utilities. Information regarding utility locations shall be added to project maps upon completion of this exercise.

2., A visual site inspection must be performed to compare the site plan information to actual field conditions. Any findings must be documented and the site plan/maps revised. The area(s) of proposed excavation or other subsurface activities must be marked at the site in white paint or pin flags to identify those locations of the proposed intrusive activities. The site inspection should focus on locating surface indications of potential underground utilities. Items of interest include the presence of nearby area lights, telephone service, drainage grates, fire hydrants, electrical service vaults/panels, asphalt/concrete scares and patches, and topographical depressions. Note the location of any emergency shut off switches. Any additional information regarding utility

locations shall be added to project maps upon completion of this exercise and returned to the PM/TOM.

3. If the planned work is to be conducted on private property (e.g., military installations, manufacturing facilities, etc.) the FOL must identify and contact appropriate facility personnel (e.g., public works or facility engineering) before any intrusive work begins to inquire about (and comply with) property owner requirements. It is important to note that private property owners may require several days to several weeks advance notice prior to locating utilities.

4. If the work location is on public property, the state agency that performs utility clearances must be notified (see Attachment 1). State "one-call" services must be notified prior to commencing fieldwork per their requirements. Most one-call services require, by law, 48- to 72-hour advance notice prior to beginning any excavation. Such services typically assign a "ticket" number to the particular site. This ticket number must be recorded for future reference and is valid for a specific period of time, but may be extended by contacting the service again. The utility service will notify utility representatives who then mark their respective lines within the specified time frame. It should be noted that most military installations own their own utilities but may lease service and maintenance from area providers. Given this situation, "one call" systems may still be required to provide location services on military installations.

5. Utilities must be identified and their locations plainly marked using pin flags, spray paint, or other accepted means. The location of all utilities must be noted on a field sketch for future inclusion on project maps. Utility locations are to be identified using the following industry-standard color code scheme, unless the property owner or utility locator service uses a different color code:

white	excavation/subsurface investigation location
red	electrical
yellow	gas, oil, steam
orange	telephone, communications
blue	water, irrigation, slurry
green	sewer, drain

6. Where utility locations are not confirmed with a high degree of confidence through drawings, schematics, location services, etc., the work area must be thoroughly investigated prior to beginning the excavation. In these situations, utilities must be identified using safe and effective methods such as passive and intrusive surveys, or the use of non-conductive hand tools. Also, in situations where such hand tools are used, they should always be used in conjunction with suitable detection equipment, such as the items described in Section 6.0 of this SOP. Each method has advantages and disadvantages including complexity, applicability, and price. It also should be noted that in some states, initial excavation is required by hand to a specified depth.

7. At each location where trenching or excavating will occur using a backhoe or other heavy equipment, and where utility identifications and locations cannot be confirmed prior to groundbreaking, the soil must be probed using a device such as a tile probe which is made of non-conductive material such as fiberglass. If these efforts are not successful in clearing the excavation area of suspect utilities, hand shoveling must be performed for the perimeter of the intended excavation.

8. All utilities uncovered or undermined during excavation must be structurally supported to prevent potential damage. Unless necessary as an emergency corrective measure, TtNUS shall not make any repairs or modifications to existing utility lines without prior permission of the utility owner, property owner, and Corporate HSM. All repairs require that the line be locked-out/tagged-out prior to work.

5.2 Overhead Power Lines

If it is necessary to work within the minimum clearance distance of an overhead power line, the overhead line must be de-energized and grounded, or re-routed by the utility company or a registered electrician. If protective measures such as guarding, isolating, or insulating are provided, these precautions must be adequate to prevent employees from contacting such lines directly with any part of their body or indirectly though conductive materials, tools, or equipment.

The following table provides the required minimum clearances for working in proximity to overhead power lines.

Nominal Voltage	Minimum Clearance
0 -50 kV	10 feet, or one mast length; whichever is greater
50+ kV	10 feet plus 4 inches for every 10 kV over 50 kV or 1.5 mast lengths; whichever is greater

6.0 UNDERGROUND LOCATING TECHNIQUES

A variety of supplemental utility locating approaches are available and can be applied when additional assurance is needed. The selection of the appropriate method(s) to employ is site-specific and should be tailored to the anticipated conditions, site and project constraints, and personnel capabilities.

6.1 Geophysical Methods

Geophysical methods include electromagnetic induction, magnetics, and ground penetrating radar. Additional details concerning the design and implementation of electromagnetic induction, magnetics, and ground penetrating radar surveys can be found in one or more of the TtNUS SOPs included in the References (Section 8.0).

Electromagnetic Induction

Electromagnetic Induction (EMI) line locators operate either by locating a background signal or by locating a signal introduced into the utility line using a transmitter. A utility line acts like a radio antenna, producing electrons, which can be picked up with a radiofrequency receiver. Electrical current carrying conductors have a 60HZ signal associated with them. This signal occurs in all power lines regardless of voltage. Utilities in close proximity to power lines or used as grounds may also have a 60HZ signal, which can be picked up with an EM receiver. A typical example of this type of geophysical equipment is an EM-61.

EMI locators specifically designed for utility locating use a special signal that is either indirectly induced onto a utility line by placing the transmitter above the line or directly induced using an induction clamp. The clamp induces a signal on the specific utility and is the preferred method of tracing since there is little chance of the resulting signals being interfered with. A good example of this type of equipment is the Schonstedt® MAC-51B locator. The MAC-51B performs inductively traced surveys, simple magnetic locating, and traced nonmetallic surveys.

When access can be gained inside a conduit to be traced, a flexible insulated trace wire can be used. This is very useful for non-metallic conduits but is limited by the availability of gaining access inside the pipe.

Magnetics

Magnetic locators operate by detecting the relative amounts of buried ferrous metal. They are incapable of locating or identifying nonferrous utility lines but can be very useful for locating underground storage tanks (UST's), steel utility lines, and buried electrical lines. A typical example of this type of equipment is the Schonstedt® GA-52Cx locator. The GA-52Cx is capable of locating 4-inch steel pipe up to 8 feet deep.

Non-ferrous lines are often located by using a typical plumbing tool (snake) fed through the line. A signal is then introduced to the snake that is then traced.

Ground Penetrating Radar

Ground Penetrating Radar (GPR) involves specialized radar equipment whereby a signal is sent into the ground via a transmitter. Some portion of the signal will be reflected from the subsurface material, which is then recorded with a receiver and electronically converted into a graphic picture. In general, an object which is harder than the surrounding soil will reflect a stronger signal. Utilities, tunnels, UST's, and footings will reflect a stronger signal than the surrounding soil. Although this surface detection method may determine the location of a utility, this method does not specifically identify utilities (i.e., water vs. gas, electrical vs. telephone); hence, verification may be necessary using other methods. This method is somewhat limited when used in areas with clay soil types or with a high water table.

6.2 Passive Detection Surveys

Acoustic Surveys

Acoustic location methods are generally most applicable to waterlines or gas lines. A highly sensitive Acoustic Receiver listens for background sounds of water flowing (at joints, leaks, etc.) or to sounds introduced into the water main using a transducer. Acoustics may also be applicable to determine the location of plastic gas lines.

Thermal Imaging

Thermal (i.e., infrared) imaging is a passive method for detecting the heat emitted by an object. Electronics in the infrared camera convert subtle heat differentials into a visual image on the viewfinder or a monitor. The operator does not look for an exact temperature; rather they look for heat anomalies (either elevated or suppressed temperatures) characteristic of a potential utility line.

The thermal fingerprint of underground utilities results from differences in temperature between the atmosphere and the fluid present in a pipe or the heat generated by electrical resistance. In addition, infrared scanners may be capable of detecting differences in the compaction, temperature and moisture content of underground utility trenches. High-performance thermal imagery can detect temperature differences to hundredths of a degree.

6.3 Intrusive Detection Surveys

Vacuum Excavation

Vacuum excavation is used to physically expose utility services. The process involves removing the surface material over approximately a 1' x 1' area at the site location. The air-vacuum process proceeds with the simultaneous action of compressed air-jets to loosen soil and vacuum extraction of the resulting

debris. This process ensures the integrity of the utility line during the excavation process, as no hammers, blades, or heavy mechanical equipment comes into contact with the utility line, eliminating the risk of damage to utilities. The process continues until the utility is uncovered. Vacuum excavation can be used at the proposed site location to excavate below the "utility window" which is usually 8 feet.

Hand Excavation

When the identification and location of underground utilities cannot be positively confirmed through document reviews and/or other methods, borings and excavations may be cleared via the use of non-conductive hand tools. This should always be done in conjunction with the use of detection equipment. This would be required for all locations where there is a potential to impact buried utilities. The minimum hand-excavation depth that must be reached is to be determined considering the geographical location of the work site. This approach recognizes that the placement of buried utilities is influenced by frost line depths that vary by geographical region. Attachment 2 presents frost line depths for the regions of the contiguous United States. At a minimum, hand excavation depths must be at least to the frost line depth (see Attachment 2) plus two (2) feet, but never less than 4 feet below ground surface (bgs). For hand excavation, the hole created must be reamed large enough to be at least the diameter of the drill rig auger or bit prior to drilling. For soil gas surveys, the survey probe shall be placed as close as possible to the cleared hand excavation. It is important to note that a post-hole digger must not be used in this type of hand excavation activity.

Tile Probe Surveys

For some soil types, site conditions, and excavation requirements, non-conductive tile probes may be used. A tile probe is a "T"-handled rod of varying lengths that can be pushed into the soil to determine if any obstructions exist at that location. Tile probes constructed of fiberglass or other nonconductive material are readily-available from numerous vendors. Tile probes must be performed to the same depth requirements as previously specified. As with other types of hand excavating activities, the use of a non-conductive tile probe, should always be in conjunction with suitable utility locating detection equipment.

7.0 INTRUSIVE ACTIVITIES SUMMARY

The following list summarizes the activities that must be performed prior to beginning subsurface activities:

1. Map and mark all subsurface locations and excavation boundaries using white paint or markers specified by the client or property owner.

2. Notify the property owner and/or client that the locations are marked. At this point, drawings of locations or excavation boundaries shall be provided to the property owner and/or client so they may initiate (if applicable) utility clearance.

   Note: Drawings with confirmed locations should be provided to the property owner and/or client as soon as possible to reduce potential time delays.

3. Notify "One Call" service. If possible, arrange for an appointment to show the One Call representative the surface locations or excavation boundaries in person. This will provide a better location designation to the utilities they represent. You should have additional drawings should you need to provide plot plans to the One Call service.

4. Implement supplemental utility detection techniques as necessary and appropriate to conform utility locations or the absence thereof.

5. Complete Attachment 3, Utility Clearance Form. This form should be completed for each excavation location. In situations where multiple subsurface locations exist within the close proximity of one another, one form may be used for multiple locations provided those locations are noted on the Utility Clearance Form. Upon completion, the Utility Clearance Form and revised/annotated utility location map becomes part of the project file.

8.0 REFERENCES

OSHA Letter of Interpretation, Mr. Joseph Caldwell, Attachment 4
OSHA 29 CFR 1926(b)(2)
OSHA 29 CFR 1926(b)(3)
TtNUS Utility Locating and Clearance Policy
TtNUS SOP GH-3.1; Resistivity and Electromagnetic Induction
TtNUS SOP GH-3.2; Magnetic and Metal Detection Surveys
TtNUS SOP GH-3.4; Ground-penetrating Radar Surveys

ATTACHMENT 1
LISTING OF UNDERGROUND UTILITY CLEARANCE RESOURCES

American Public Works Association
2345 Grand Boulevard, Suite 500, Kansas City, MO 64108-2625
Phone (816) 472-6100 • Fax (816) 472-1610
Web www.apwa.net • E-mail apwa@apwa.net

ONE-CALL SYSTEMS INTERNATIONAL CONDENSED DIRECTORY

Alabama
Alabama One-Call
1-800-292-8525

Alaska
Locate Call Center of Alaska, Inc.
1-800-478-3121

Arizona
Arizona Blue Stake
1-800-782-5348

Arkansas
Arkansas One Call System, Inc.
1-800-482-8998

California
Underground Service Alert North
1-800-227-2600
Underground Service Alert of Southern California
1-800-227-2600

Colorado
Utility Notification Center of Colorado
1-800-922-1987

Connecticut
Call Before You Dig
1-800-922-4455

Delaware
Miss Utility of Delmarva
1-800-282-8555

Florida
Sunshine State One-Call of Florida, Inc.
1-800-432-4770

Georgia
Underground Protection Center, Inc.
1-800-282-7411

Hawaii
Underground Service Alert North
1-800-227-2600

Idaho
Dig Line Inc.
1-800-342-1585
Kootenai County One-Call
1-800-428-4950
Shoshone - Benewah One-Call
1-800-398-3285

Illinois
JULIE, Inc.
1-800-892-0123
Digger (Chicago Utility Alert Network)
312-744-7000

Indiana
Indiana Underground Plant Protection Service
1-800-382-5544

Iowa
Iowa One-Call
1-800-292-8989

Kansas
Kansas One-Call System, Inc.
1-800-344-7233

Kentucky
Kentucky Underground Protection Inc.
1-800-752-6007

Louisiana
Louisiana One Call System, Inc.
1-800-272-3020

Maine
Dig Safe System, Inc.
1-888-344-7233

Maryland
Miss Utility
1-800-257-7777
Miss Utility of Delmarva
1-800-282-8555

Massachusetts
Dig Safe System, Inc.
1-888-344-7233

Michigan
Miss Dig System, Inc.
1-800-482-7171

Minnesota
Gopher State One Call
1-800-252-1166

Mississippi
Mississippi One-Call System, Inc
1-800-227-6477

Missouri
Missouri One-Call System, Inc.
1-800-344-7483

Montana
Utilities Underground Protection Center
1-800-424-5555
Montana One Call Center
1-800-551-8344

Nebraska
Diggers Hotline of Nebraska
1-800-331-5666

Nevada
Underground Service Alert North
1-800-227-2600

New Hampshire
Dig Safe System, Inc.
1-888-344-7233

New Jersey
New Jersey One Call
1-800-272-1000

New Mexico
New Mexico One Call System, Inc.
1-800-321-2537
Las Cruces- Dona Ana Blue Stakes
1-888-526-0400

New York
Dig Safely New York
1-800-962-7962
New York City- Long Island One Call Center
1-800-272-4480

North Carolina
The North Carolina One-Call Center, Inc.
1-800-632-4949

North Dakota
North Dakota One-Call
1-800-795-0555

Ohio
Ohio Utilities Protection Service
1-800-362-2764
Oil & Gas Producers Underground Protect'n Svc
1-800-925-0988

Oklahoma
Call Okie
1-800-522-6543

Oregon
Oregon Utility Notification Center/One Call Concepts
1-800-332-2344

Pennsylvania
Pennsylvania One Call System, Inc.
1-800-242-1776

Rhode Island
Dig Safe System, Inc.
1-888-344-7233

South Carolina
Palmetto Utility Protection Service Inc.
1-888-721-7877

South Dakota
South Dakota One Call
1-800-781-7474

Tennessee
Tennessee One-Call System, Inc.
1-800-351-1111

ATTACHMENT 1 (Continued)

Texas
Texas One Call System
1-800-245-4545
Texas Excavation Safety System, Inc.
1-800-344-8377
Lone Star Notification Center
1-800-669-8344

Utah
Blue Stakes of Utah
1-800-662-4111

Vermont
Dig Safe System, Inc.
1-888-344-7233

Virginia
Miss Utility of Virginia
1-800-552-7001
Miss Utility (Northern Virginia)
1-800-257-7777

Washington
Utilities Underground Location Center
1-800-424-5555
Northwest Utility Notification Center
1-800-553-4344
Inland Empire Utility Coordinating Council
509-456-8000

West Virginia
Miss Utility of West Virginia, Inc.
1-800-245-4848

Wisconsin
Diggers Hotline, Inc.
1-800-242-8511

Wyoming
Wyoming One-Call System, Inc.
1-800-348-1030
Call Before You Dig of Wyoming
1-800-849-2476

District of Columbia
Miss Utility
1-800-257-7777

Alberta
Alberta One-Call Corporation
1-800-242-3447

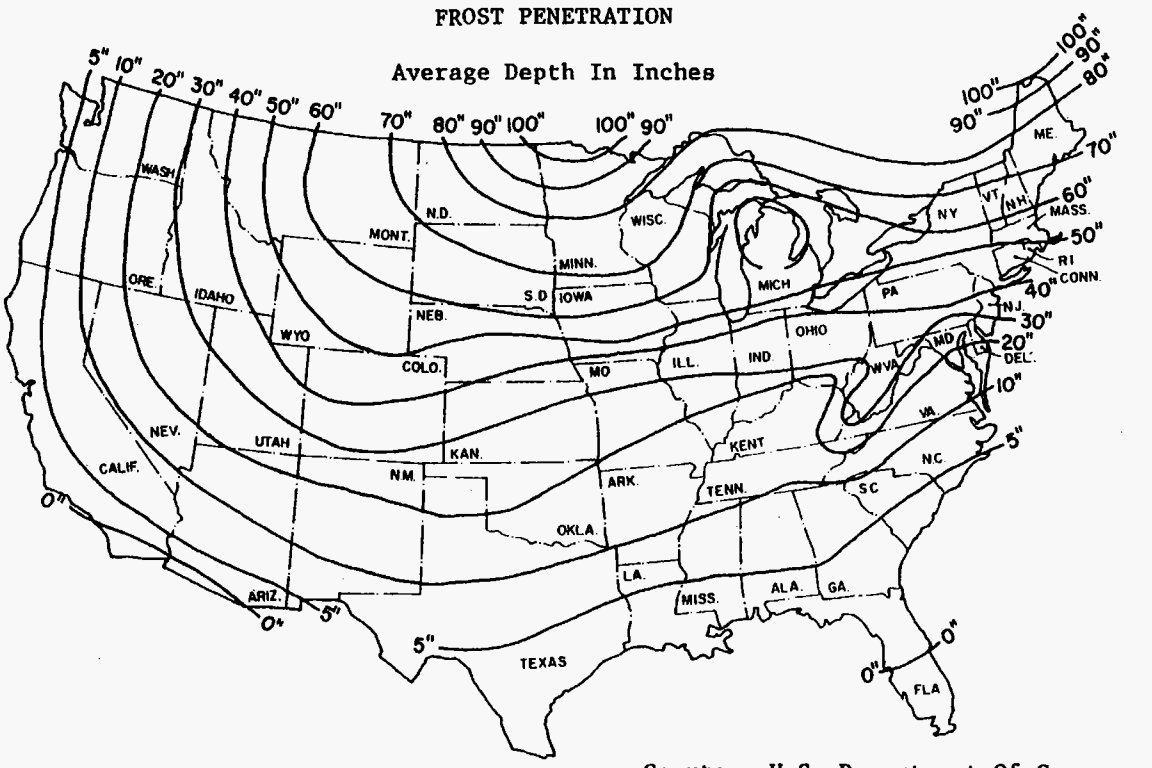
British Columbia
BC One Call
1-800-474-6886

Ontario
Ontario One-Call System
1-800-400-2255

Quebec
Info-Excavation
1-800-663-9228

ATTACHMENT 2

FROST LINE PENETRATION DEPTHS BY GEOGRAPHIC LOCATION



Courtesy U.S. Department Of Commerce

ATTACHMENT 3
UTILITY CLEARANCE FORM

Client: _____ Project Name: _____

Project No.: _____ Completed By: _____

Location Name: _____ Work Date: _____

Excavation Method/Overhead Equipment: _____

1. Underground Utilities — Circle One

a)	Review of existing maps?	yes	no	N/A
b)	Interview local personnel?	yes	no	N/A
c)	Site visit and inspection?	yes	no	N/A
d)	Excavation areas marked in the field?	yes	no	N/A
e)	Utilities located in the field?	yes	no	N/A
f)	Located utilities marked/added to site maps?	yes	no	N/A
g)	Client contact notified Name _____ Telephone: _____ Date: _____	yes	no	N/A
g)	State One-Call agency called? Caller: _____ Ticket Number: _____ Date: _____	yes	no	N/A
h)	Geophysical survey performed? Survey performed by: _____ Method: _____ Date: _____	yes	no	N/A
i)	Hand excavation performed (with concurrent use of utility detection device)? Completed by: _____ Total depth: _____ feet Date: _____	yes	no	N/A
j)	Trench/excavation probed? Probing completed by: _____ Depth/frequency: _____ Date: _____	yes	no	N/A

2. Overhead Utilities — Present Absent

a)	Determination of nominal voltage	yes	no	N/A
b)	Marked on site maps	yes	no	N/A
c)	Necessary to lockout/insulate/re-route	yes	no	N/A
d)	Document procedures used to lockout/insulate/re-route	yes	no	N/A
e)	Minimum acceptable clearance (SOP Section 5.2): _____			

3. Notes:

_____

_____

_____

Approval:

_____ _____

Site Manager/Field Operations Leader Date

c: PM/Project File
Program File

ATTACHMENT 4
OSHA LETTER OF INTERPRETATION

Mr. Joseph Caldwell
Consultant
Governmental Liaison
Pipeline Safety Regulations
211 Wilson Boulevard
Suite 700
Arlington, Virginia 22201

Re: Use of hydro-vacuum or non-conductive hand tools to locate underground utilities.

Dear Mr. Caldwell:

In a letter dated July 7, 2003, we responded to your inquiry of September 18, 2002, regarding the use of hydro-vacuum equipment to locate underground utilities by excavation. After our letter to you was posted on the OSHA website, we received numerous inquiries that make it apparent that aspects of our July 7 letter are being misunderstood. In addition, a number of industry stakeholders, including the National Utility Contractors Association (NUCA), have provided new information regarding equipment that is available for this work.

To clarify these issues, we are withdrawing our July 7 letter and issuing this replacement response to your inquiry.

Question: *Section 1926.651 contains several requirements that relate to the safety of employees engaged in excavation work. Specifically, paragraphs (b)(2) and (b)(3) relate in part to the safety of the means used to locate underground utility installations that, if damaged during an uncovering operation, could pose serious hazards to employees.*

Under these provisions, what constitutes an acceptable method of uncovering underground utility lines, and further, would the use of hydro-vacuum excavation be acceptable under the standard?

Answer

Background

Two sections of 29 CFR 1926 Subpart P (Excavations), 1926.651(Specific excavation requirements), govern methods for uncovering underground utility installations. Specifically, paragraph (b)(2) states:

> When utility companies or owners cannot respond to a request to locate underground utility installations within 24 hours * * * or cannot establish the exact location of these installations, the employer may proceed, provided the employer does so with caution, and provided detection equipment or other acceptable means to locate utility installations are used. (emphasis added).

Paragraph (b)(3) provides:

ATTACHMENT 4 (Continued)

> When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means. (emphasis added).

Therefore, "acceptable means" must be used where the location of the underground utilities have not been identified by the utility companies and detection equipment is not used.

Subpart P does not contain a definition of either "other acceptable means" or "safe and acceptable means." The preambles to both the proposed rule and the final rule discussed the rationale behind the wording at issue. For example, the preamble to the proposed rule, 52 Fed. Reg. 12301 (April 15, 1987), noted that a 1972 version of this standard contained language that specified "careful probing or hand digging" as the means to uncover utilities. The preamble then noted that an amendment to the 1972 standard later deleted that language "to allow other, *equally effective means* of locating such installations." The preamble continued that in the 1987 proposed rule, OSHA again proposed using language in section (b)(3) that would provide another example of an acceptable method of uncovering utilities that could be used *where the utilities have not been marked and detection equipment is not being used* – "probing with hand-held tools." This method was rejected in the final version of 29 CFR 1926. As OSHA explained in the preamble to the final rule, 54 Fed. Reg. 45916 (October 31, 1989):

> OSHA received two comments * * * and input from ACCSH [OSHA's Advisory Committee on Construction Safety and Health] * * * on this provision. All commenters recommended dropping 'such as probing with hand-held tools' from the proposed provision, because this could create a hazard to employees by damaging the installation or its insulation.

In other words, the commenters objected to the use of hand tools being used unless detection equipment was used in conjunction with them. OSHA then concluded its discussion relative to this provision by agreeing with the commentators and ultimately not including any examples of "acceptable means" in the final provision.

Non-conductive hand tools are permitted

This raises the question of whether the standard permits the use of hand tools alone -- without also using detection equipment. NUCA and other industry stakeholders have recently informed us that non-conductive hand tools that are appropriate to be used to locate underground utilities are now commonly available.

Such tools, such as a "shooter" (which has a non-conductive handle and a snub nose) and non-conductive or insulated probes were not discussed in the rulemaking. Since they were not considered at that time, they were not part of the class of equipment that was thought to be unsafe for this purpose. Therefore, we conclude that the use of these types of hand tools, when used with appropriate caution, is an "acceptable means" for locating underground utilities.

ATTACHMENT 4 (Continued)

Hydro-vacuum excavation

It is our understanding that some hydro-vacuum excavation equipment can be adjusted to use a minimum amount of water and suction pressure. When appropriately adjusted so that the equipment will not damage underground utilities (especially utilities that are particularly vulnerable to damage, such as electrical lines), use of such equipment would be considered a "acceptable means" of locating underground utilities. However, if the equipment cannot be sufficiently adjusted, then this method would not be acceptable under the standard.

Other technologies

We are not suggesting that these are the only devices that would be "acceptable means" under the standard. Industry stakeholders have informed us that there are other types of special excavation equipment designed for safely locating utilities as well.

We apologize for any confusion our July 7 letter may have caused. If you have further concerns or questions, please feel free to contact us again by fax at: U.S. Department of Labor, OSHA, Directorate of Construction, Office of Construction Standards and Compliance Assistance, fax # 202-693-1689. You can also contact us by mail at the above office, Room N3468, 200 Constitution Avenue, N.W., Washington, D.C. 20210, although there will be a delay in our receiving correspondence by mail.

Sincerely,

Russell B. Swanson, Director
Directorate of Construction

NOTE: OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA=s interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at http://www.osha.gov.

ATTACHMENT IV

EQUIPMENT INSPECTION CHECKLIST

EQUIPMENT INSPECTION CHECKLIST

Company:_____ **Unit/Serial No#:**_____

Inspection Date: _____/_____/_____ **Time:**_____:_____ **Equipment Type:**_____
(e.g, Drill Rigs Hollow Stem, Mud Rotary, Direct Push, HDD)

Project Name:_____ **Project No#:**_____

Yes	No	NA	Requirement	Comments
☐	☐	☐	Emergency Stop Devices	
☐	☐	☐	• Emergency Stop Devices (At points of operation)	
☐	☐	☐	• Have emergency shut off switches been identified and communicated to the field crew?	
☐	☐	☐	• Has a person been designated as the Emergency Stop Device Operator?	
☐	☐	☐	Highway Use	
☐	☐	☐	• Cab, mirrors, safety glass?	
☐	☐	☐	• Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway	
☐	☐	☐	• Seat Belts?	
☐	☐	☐	• Is the equipment equipped with audible back-up alarms and back-up lights?	
☐	☐	☐	• Horn and gauges	
☐	☐	☐	• Brake condition (dynamic, park, etc.)	
☐	☐	☐	• Tires (Tread) or tracks	
☐	☐	☐	• Windshield wipers	
☐	☐	☐	• Exhaust system	
☐	☐	☐	• Steering (standard and emergency)	
☐	☐	☐	• Wheel Chocks?	
☐	☐	☐	• Are tools and material secured to prevent movement during transport? Especially those within the cab?	
☐	☐	☐	• Are there flammables or solvents stored within the cab?	

Yes	No	NA	Requirement	Comments
☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	Fluid Levels: • Engine oil • Transmission fluid • Brake fluid • Cooling system fluid • Hoses and belts • Hydraulic oil	
☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐	Power cable and/or hoist cable Hooks • Are the hooks equipped with Safety Latches? • Is the hook showing signs of wear in excess of 10% original dimension? • Is there a bend or twist exceeding 10% from the plane of an unbent hook? • Increase in throat opening exceeding 15% from new condition • Excessive nicks and/or gouges • Clips • Number of U-Type (Crosby) Clips (5/16 – 5/8 = 3 clips minimum) (3/4 – 1 inch = 4 clips minimum) (1 1/8 – 1 3/8 inch = 5 clips minimum)	
☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	Wire Rope (Hoist Mechanism) • Reduction in Rope diameter (5/16 wire rope>1/64 reduction nominal size -replace) (3/8 to 1/2 wire rope>1/32 reduction nominal size-replace) (9/16 to 3/4 wire rope>3/64 reduction nominal size-replace) • Number of broken wires (6 randomly broken wires in one rope lay) (3 broken wires in one strand) • Number of wire rope wraps left on the Running Drum at nominal use (≥3 required) - Lead (primary) sheave is centered on the running drum • Lubrication of wire rope (adequate?) • Kinks, bends – Flattened to > 50% diameter	
☐ ☐	☐ ☐	☐ ☐	Hemp/Fiber rope (Cathead/Split Spoon Hammer) • Minimum ¾;maximum 1inch rope diameter (Inspect for physical damage) • Rope to hammer is securely fastened	
☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	Safety Guards – • Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact? • Hot pipes and surfaces exposed to accidental contact? • High pressure lines • Nip/pinch points	

Yes	No	NA	Requirement	Comments
☐	☐	☐	Attachments • Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use? (Auger and drill rod pins and connectors)	
☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐	Operator Qualifications • Does the operator have proper licensing where applicable, (e.g., CDL)? • Does the operator, understand the equipment's operating instructions? • Is the operator experienced with this equipment? • Is the operator 21 years of age or more?	
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	PPE Required for Drill Rig Exclusion Zone • Hardhat • Safety glasses • Work gloves • Chemical resistant gloves_____ • Steel toed Work Boots • Chemical resistant Boot Covers • Apron • Coveralls Tyvek, Saranex, cotton)_____	
☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐	Other Hazards • Excessive Noise Levels? _____dBA • Chemical hazards (Drilling supplies - Sand, betonite, grout, fuel, etc.) - MSDSs available? • Will On-site fueling occur - Safety cans available? - Fire extinguisher (Type/Rating -_____)	

Approved for Use ☐ Yes ☐ No ☐ See Comments

_____ _____

Site Safety Officer Operator

ATTACHMENT V

SAFE WORK PERMITS

SAFE WORK PERMIT FOR

CLEARING AND GRUBBING
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Vegetative clearing and grubbing

II. Primary Hazards: chemical hazards; heavy equipment hazards; energized systems; noise; vehicular and equipment traffic; strain from heavy lifting; slips, trips and falls; cuts, abrasions and lacerations; loading trucks; and inclement weather

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☐

Modifications/Exceptions: _____

VI. Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
PAHs and Lead	PID with an 9.6 ev lamp	Any readings above Background for greater than 1 minute in duration	Use area wetting methods Suspend site activities and report to an unaffected area

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and dermal contact

(Note to FOL and/or SHSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing protection (plugs/muffs)	☒ Yes	☐ No
Safety glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☐ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☒ Yes	☐ No	Gloves (type – cotton/leather)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☐ No
Steel toe work shoes/boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☐ No
High visibility vest	☒ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First aid kit	☐ Yes	☐ No	Fire extinguisher	☐ Yes	☐ No
Safety shower/eyewash	☐ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: Tyvek coverall and boot covers if there is a potential for soiling work clothes or contacting potentially contaminated media (soils, shed debris, etc.). PVC or PE coated Tyvek if saturation of work clothes may occur

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Employ dust suppression (area wetting) methods. This will reduce dust emissions when handling dry materials which have a tendency to become airborne much more easily than wet or moist materials. Practice UXO/MEC avoidance techniques. Do not kick, pick up, or otherwise harass objects laying on the ground. Report all suspected MEC and/or unknown items to the UXO technician. Stay within pathways and work areas cleared by the UXO Tech. The UXO Tech. will visually inspect all solid sample material to leave the site to insure it is MEC free.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR

MOBILIZATION AND DEMOBILIZATION
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Mob and Demob activities at the Incinerator Disposal Site.

II. Primary Hazards: Chemical; lifting; cuts and lacerations; pinches and compressions; slips, trip and falls; vehicular and foot traffic; insect/animal bites and stings, poisonous plants; and inclement weather.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI. Chemicals of Concern	**Hazard Monitoring**	**Action Level(s)**	**Response Measures**
PAHs and Lead	PID with an 9.6 ev lamp	Any readings above background for greater than 1 minute in duration	Use area wetting methods Suspend site activities ands report to an unaffected area

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and dermal contact

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☐ No	Hearing protection (Plugs/Muffs)	☐ Yes	☐ No
Safety glasses	☐ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☐ Yes	☒ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – work)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☒ No
Steel toe work shoes or boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☒ No
High visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First aid kit	☐ Yes	☐ No	Fire extinguisher	☐ Yes	☐ No
Safety shower/Eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: _____

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: _____

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT FOR

SOIL BORING
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Temporary monitoring well installation using DPT including soil sampling at the Incinerator Disposal Site

II. Primary Hazards: Chemical contamination; transfer contamination; heavy equipment; noise; energized systems; lifting; slips, trips and falls; cuts and lacerations; vehicular and foot traffic; flying projectiles,; inclement weather; and animal and insect bites and encounters. Employ UXO avoidance procedures during intrusive activities (See TtNUS UXO SOP Attachment VI)

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
PAHs and Lead	PID with an 9.6 ev lamp	Any readings above Background for greater than 1 minute in duration	Use area wetting methods Suspend site activities and report to an unaffected area

Primary Route(s) of Exposure/Hazard: inhalation, ingestion and dermal contact

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing Protection (Plugs/Muffs)	☒ Yes	☐ No
Safety glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☐ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☐ No	Gloves (Type – nitrile)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☐ No
Steel toe work shoes/boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☐ No
High visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☐ Yes	☐ No
First aid kit	☐ Yes	☐ No	Fire extinguisher	☒ Yes	☐ No
Safety shower/eyewash	☐ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: If VOC readings do not return to background levels, contact PHSO for guidance. Driller and helper wear neoprene outer gloves and nitrile inner gloves and impermeable boot covers.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☐
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☐ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions Asbestos may be encountered during intrusive activities. Area wetting methods will be used to suppress dust clouds. If suspect asbestos, cease operations and notify PHSO, HSM, and TOM.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT FOR

DECONTAMINATION
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Decontamination of heavy and sampling equipment at the Incinerator Disposal Site

II. Primary Hazards: Chemical contamination; decontamination fluids; lifting; noise; flying projectiles; slips, trips and falls; and inclement weather

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
PAHs and Lead	PID with an 9.6 ev lamp	Any readings above Background for greater than 1 minute in duration	Use area wetting methods Suspend site activities and report to an unaffected area

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and dermal contact

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☒ No	Hearing protection (Plugs/Muffs)	☒ Yes	☐ No
Safety glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☒ Yes	☐ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☒ Yes	☐ No	Gloves (Type – nitrile)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☐ No	Work/rest regimen	☐ Yes	☒ No
Steel toe work shoes or boots	☒Yes	☐ No	Chemical resistant boot covers	☒ Yes	☐ No
High visibility vest	☐Yes	☒ No	Tape up/use insect repellent	☐ Yes	☐ No
First aid kit	☐Yes	☐ No	Fire extinguisher	☐ Yes	☐ No
Safety shower/eyewash	☐Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: For sampling equipment, decontamination can be reduced or eliminated by using disposable supplies and PPE (plastic trowels, gloves, tyvek, etc).

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: When using steam and high pressure cleaning equipment follow manufacturers instructions and safety guidelines and properly secure when not in use.

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT FOR
IDW MANAGEMENT
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Includes moving and handling IDW drums to storage areas

II. Primary Hazards: Chemical contamination; transfer of contamination; lifting; pinches and compressions; slips, trips and falls; and insect/animal bites and stings, poisonous plants

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____ TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____ TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☒

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
PAH'S and Lead	PID with an 9.6 ev lamp	Any readings above Background for greater than 1 minute in duration	Suspend site activities and report to an unaffected area

Primary Route(s) of Exposure/Hazard: Inhalation, ingestion and dermal contact

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☐ Yes	☐ No	Hearing protection (Plugs/Muffs)	☐ Yes	☐ No
Safety glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☐ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☐ Yes	☐ No	Barricades	☐ Yes	☒ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – cotton/leather work)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☒ No
Steel toe work shoes or boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☒ No
High visibility vest	☐ Yes	☒ No	Tape up/use insect repellent	☐ Yes	☐ No
First aid kit	☐ Yes	☐ No	Fire extinguisher	☐ Yes	☐ No
Safety shower/eyewash	☐ Yes	☐ No	Other	☐ Yes	☐ No

Modifications/Exceptions: When sampling drums wear nitrile gloves to protect from potential skin contact.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: When handling 55 gallon drums wear work gloves and use proper hand tools when opening and closing lids.

Permit Issued by: _____ Permit Accepted by: _____

SAFE WORK PERMIT
FOR GEOGRAPHIC SURVEYING
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Geographic surveying at the Incinerator Disposal Site

II. Primary Hazards: Lifting; slips, trips and falls; cuts or lacerations inclement weather; insect/animal bites or stings; poisonous plants.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☐

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
None expected during this task.	Not required	NA	NA

Primary Route(s) of Exposure/Hazard: None expected

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing protection (Plugs/Muffs)	☐ Yes	☒ No
Safety glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type – leather)	☐ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☐ No
Steel toe work shoes or boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☒ No
High visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☒ Yes	☐ No
First aid kit	☐ Yes	☐ No	Fire extinguisher	☐ Yes	☐ No
Safety shower/eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: If working in high brush or marshy areas wear snake chaps. In areas near water watch for alligators.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Wear commercially available insect repellant

Permit Issued by:_____ Permit Accepted by:_____

SAFE WORK PERMIT
MULTI MEDIA SAMPLING
NALF CABANISS
INCINERATOR DISPOSAL SITE

Permit No. _____ Date: _____ Time: From _____ to _____

I. Work limited to the following (description, area, equipment used): Multi-media sampling including surface, subsurface and sediment soils; groundwater and surface water. This tasks includes site analysis of soil and sediment with a battery operated energy dispersive x-ray fluorescence (XRF) analyzer.

II. Primary Hazards: Chemical; transfer of contamination; lifting; pinches and compressions; slips, trips and falls; ambient temperature extremes; cuts or lacerations inclement weather; insect/animal bites or stings; poisonous plants.

III. Field Crew: _____

IV. On-site Inspection conducted ☐ Yes ☐ No Initials of Inspector _____TtNUS
Equipment Inspection required ☐ Yes ☐ No Initials of Inspector _____TtNUS

V. Protective equipment required
Level D ☒ Level B ☐
Level C ☐ Level A ☐

Respiratory equipment required
Yes ☐ Specify on the reverse
No ☐

Modifications/Exceptions: _____

VI.

Chemicals of Concern	Hazard Monitoring	Action Level(s)	Response Measures
PAHs and Lead	PID with an 9.6 ev lamp	Any readings above Background for greater than 1 minute in duration	Use area wetting methods Suspend site activities ands report to an unaffected area

Primary Route(s) of Exposure/Hazard: None expected

(Note to FOL and/or SSO: Each item in Sections VII, VIII, and IX must be checked Yes, No, or NA)

VII. Additional Safety Equipment/Procedures

Hard-hat	☒ Yes	☐ No	Hearing protection (Plugs/Muffs)	☐ Yes	☒ No
Safety glasses	☒ Yes	☐ No	Safety belt/harness	☐ Yes	☒ No
Chemical/splash goggles	☐ Yes	☒ No	Radio/cellular phone	☐ Yes	☐ No
Splash shield	☐ Yes	☒ No	Barricades	☐ Yes	☐ No
Splash suits/coveralls	☐ Yes	☒ No	Gloves (Type –nitrile)	☒ Yes	☐ No
Impermeable apron	☐ Yes	☒ No	Work/rest regimen	☐ Yes	☐ No
Steel toe work shoes or boots	☒ Yes	☐ No	Chemical resistant boot covers	☐ Yes	☒ No
High visibility vest	☐ Yes	☐ No	Tape up/use insect repellent	☒ Yes	☐ No
First aid kit	☐ Yes	☐ No	Fire extinguisher	☐ Yes	☐ No
Safety shower/eyewash	☐ Yes	☒ No	Other	☐ Yes	☐ No

Modifications/Exceptions: If working in high brush or marshy areas wear snake chaps.

VIII. Site Preparation

	Yes	No	NA
Utility Locating and Excavation Clearance completed	☐	☐	☒
Vehicle and Foot Traffic Routes Established/Traffic Control Barricades/Signs in Place	☐	☐	☐
Physical Hazards Identified and Isolated (Splash and containment barriers)	☐	☐	☐
Emergency Equipment Staged (Spill control, fire extinguishers, first aid kits, etc).	☐	☐	☐

IX. Additional Permits required (Hot work, confined space entry, excavation etc.). ☐ Yes ☒ No
If yes, SSO to complete or contact Health Sciences, Pittsburgh Office (412)921-7090

X. Special instructions, precautions: Review Texas specific requirements for regulations pertaining to the use, detection and licensing of XRF instruments.

Permit Issued by: _____ Permit Accepted by: _____

ATTACHMENT VI

TtNUS UXO SOP

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1.0 GENERAL

This Standard Operating Procedure (SOP) was prepared in accordance with applicable U.S. Army Corps of Engineers procedures and policies governing field activities requiring Unexploded Ordnance (UXO) and Chemical Warfare Material (CWM) operations. All personnel conducting operations under this SOP must read and understand applicable parts of references listed in paragraph 9.1 below prior to commencing any work described within this SOP. Other documents supporting this SOP include project-specific Work Plans and Health and Safety Plans which are prepared for the purpose of accomplishing work that contain a UXO or CWM component.

2.0 PURPOSE

This SOP applies to all operations involving UXO and/or CWM support during field operations at various sites where Tetra Tech NUS (TtNUS) personnel are present. It provides procedural requirements for any activity involving UXO and CWM, as well as detailed procedures for the location, identification, documentation, and emergency response actions pertaining to UXO/CWM activities.

3.0 APPLICABILITY

This SOP applies to persons who may visit any site where TtNUS is performing work that involve some UXO or CWM component. Compliance the content of this SOP is mandatory for all TtNUS personnel, subcontractors, and visitors to any site where UXO/CWM activities are in progress.

4.0 RESPONSIBILITIES

Project Manager

Effective implementation of this SOP at the project level will be the ultimate responsibility of the assigned TtNUS Project Manager. The Project Manager is responsible for ensuring that all applicable rules and regulations are complied with, and that all necessary safety precautions are taken to conduct operations in accordance with this SOP. To fulfill this responsibility, the assigned Project Manager is required to ensure that appropriately-qualified technical staff are involved in all stages of project planning and field work, as well as for ensuring that appropriate resources are marshaled and used on his/her assigned projects. For projects involving UXO and/or CWM, this will involve ensuring that a suitably qualified and experienced UXO technician and a site Health and Safety Officers are part of the project team. In some cases, the assigned UXO Technician may also serve as the project site Health and Safety Officer.

It is also the responsibility of the Project Manager to ensure that all personnel conducting field activities in accordance with this SOP have proper training (including hazard control briefings) and, if required, the proper certifications for the job being performed.

UXO Technician

A suitably qualified and experienced UXO Technician will be included as part of the project team where these types of concern are known or suspected to exist. The UXO Technician will be primarily responsible for advising the Project Manager on all UXO/CWM matters, including on the measures that will be necessary to effectively implement and adhere to this SOP. Other specific duties will include:

- Providing technical expertise and input into project planning activities and documents such as the project-specific Work Plan and Health and Safety Plan
- Clearing worksite areas of UXO/CWM concerns prior to the initiation of any other onsite activities

- Participating in the development and conductance of site specific training sessions and daily tailgate meetings to communicate UXO/CWM matters to the field personnel
- Maintaining a sound familiarity with the contents of this SOP, the contents of the references listed in section 9.1, and keeping current with new information and technology pertinent to UXO/CWM matters

Site Health and Safety Officer
A suitably qualified and experienced health and safety professional will be assigned to all projects that involve fieldwork. Project-specific responsibilities will include:

- Effectively implementing the requirements and restrictions specified in the project-specific Health and Safety Plan
- Ensuring that all personnel participating in onsite activities have satisfied all appropriate medical and training qualifications prior to participating in any onsite intrusive activities.
- Conduct initial site-specific health and safety training for all personnel participating in onsite activities prior to their participation in any onsite intrusive activities.
- Conduct tail-gate safety briefings prior to the initiation of all tasks, but not less than daily.
- On certain projects, these duties may be assigned to the UXO Technician. This would be considered acceptable on field projects where the predominant concern is contact with UXO and/or CWM, and minimal health concerns or requirements (e.g., chemical exposures or monitoring) exist.

Corporate Health and Safety Manager
Perform periodic project audits and evaluations to determine the ongoing effectiveness of this SOP to address UXO/CWM concerns, and review and evaluate this SOP to determine any revisions that are appropriate.

5.0 LOCATION OF OPERATIONS

Activities where UXO and/or CWM concerns may exist may be encountered in support of various TtNUS contracts, with potential project sites located throughout the continental United States and abroad. Wherever the installation/site is located, it will be necessary to ensure that project planning activities include collecting available historical information that may be pertinent to these issues, as well as identifying and addressing contract/client-specific requirements and any location-specific requirements (e.g., State, local-level, or host-nation requirements). A detailed site description, discussion of known and/or suspected contamination sources, and results of previous studies will be provided to field personnel as part of their field mobilization and initial site-specific training activities.

The initial project evaluation must involve the performance of a preliminary risk assessment, including the investigation of probable contaminants, potential transport pathways, the identification of potential receptors, and a preliminary evaluation of human health and environmental concerns. Preliminary identification of applicable or relevant and appropriate requirements (ARARs) will also be made available to field personnel conducting activities at the installation.

6.0 PERSONNEL QUALIFICATIONS AND REQUIREMENTS

6.1 Personnel Qualifications: Qualifications of those personnel actively involved in UXO/CWM operations shall be as follows:

a. UXO personnel shall be graduates of the U.S. Naval Explosive Ordnance Disposal (EOD) School, Indian Head, Maryland.

b. The Senior UXO Supervisor (SUXOS) for the operation will have been awarded the Master EOD Badge and have served at least 15 years in military EOD assignments, of which more than 10 years were in a supervisory position.

c. UXO personnel are responsible for maintaining current status with training and medical surveillance requirements, as specified in the project-specifc Health and Safety Plans and OSHA 29 CFR 1010.120, paragraphs (e) and (f).

6.2 Personnel Requirements: During any activity where the possibility that UXO and or CWM may be encountered (no matter how remote), the following requirements will be met:

a. One UXO-qualified technician will be required to support each field team engaged in operations in areas that might contain UXO/CWM.

b. One UXO-qualified technician will be present at the site during all activities to provide UXO/CWM support in the event their services are required.

7.0 PERSONNEL LIMITS

The activities to be conducted under most contracts will not normally be conducted in areas requiring maximum personnel limitations except for intrusive UXO activities. Work will not be permitted unless at least two persons are present in the work area. The provisions of 29 CFR 1910.120 concerning personnel qualifications and requirements will be followed while working on-site. Any additional personnel limitation requirements specified by the client or the project work location (e.g., state, local ordnance, host nation, etc.) will also be identified and adhered to at all times.

7.1 Personnel Limits for UXO Operations:

a. UXO Avoidance Operations – Two UXO Technicians (one UXO Technician III and one UXO Technician II)

b. UXO Intrusive Operations - Three UXO Technicians (one UXO Technician III and two UXO Technician II)

8.0 MATERIAL LIMITS

The properties and configurations of specific explosive materials are not addressed in this SOP. That level of detail is required to be addressed in project-specific Work Plans and Health and Safety Plans. This SOP must be maintained onsite along with these project-specific documents to aid in appropriate communication and implementation activities. Bulk liquids to be used for decontamination of equipment will be maintained in 2-gallon containers or less. Material Safety Data Sheets (MSDSs) will be kept on file in the TtNUS Command Post for any chemical substances brought to the project site by TtNUS and TtNUS subcontractor personnel. This is addressed in greater detail in section 5. of the TtNUS Health and Safety Guidance Manual.

9.0 SAFETY REQUIREMENTS

9.1 Referenced Safety Requirements: The safety requirements that apply to the UXO/CWM operations covered under this SOP are:

a. OSHA 29 CFR 1910.120 and 1926.65 – Hazardous Waste Operations and Emergency Response (HAZWOPER). Available online at: http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS&p_toc_level=0&p_keyvalue=OSHA_Std_toc.html

b. US Army Corps of Engineers Engineering Regulation 385-1-92, *Safety and Occupational Health Document Requirements for Hazardous, Toxic and Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OE) Activities.*

c. US Army Corps of Engineers Engineering Regulation (ER) 385-1-96, *Safety and Health Requirements.* Available on line at: http://www.usace.army.mil/publications/eng-manuals/em385-1-1/toc.htm.

d. US Army Corps of Engineers Engineering Pamphlet (EP) 1110-1-18, *Ordnance and Explosive (OE) Response.*

e. US Army Corps of Engineers Engineering Pamphlet (EP) 75-1-2, *Unexploded Ordnance Support for Hazardous, Toxic and Radioactive Waste and Construction Activities.*

f. US Army Corps of Engineers Engineering Pamphlet (EP) 75-1-3, *Chemical Warfare Material Response.*

g. US Army Technical Manual 9-1300-206 (TM 9-1300-206), *Ammunition and Explosive Hazards.*

h. Technical Manual 60A-1-1-31, *Explosive Ordnance Disposal Procedures, General Information on EOD Disposal Procedures.*

9.2 Specific Safety Requirements:

a. All site operations will be suspended if any site worker encounters an item of suspected UXO/CWM. Site work will remain suspended until the item is inspected and cleared by the UXO Technician.

b. All site operations will be suspended if so ordered by an authorized client representative (i.e., Installation Range Control and/or Safety Office).

c. A minimum of two UXO-qualified technicians will be present during all UXO-related activities.

d. Standard work practices as outlined in project-specific Health and Safety Plans and/or Work Plans will be observed.

9.3 Inherent UXO/CWM Hazards: UXO/CWM operations have inherent safety and health risks associated with the various field activities conducted. All planned activities will be conducted in accordance with the requirements of the references listed in Section 9.1 above, as safety is the primary consideration in all UXO/CWM activities. Every effort should be made to determine all hazards associated with the site through a thorough research of archives, past site/range uses, and any other available information. Some of the hazards to consider are:

a. Propellant, Explosives, and Pyrotechnics (PEP)
b. Depleted Uranium (DU)
c. White Phosphorus (WP)
d. Corrosive chemicals (acids and bases) and decontamination agents
e. Toxic gases, liquids and solids
f. Corroded and damaged containers, munitions bodies, drums, etc.
g. Fuze conditions
h. Etiological agents

10.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Task-specific PPE will be identified in project-specific Health and Safety Plans. Typical PPE for project sites where the principle concern is for UXO/CWM will include the items listed below. Items marked with an asterisk (*) will be available and will be used as specified in the Health and Safety Plan and/or as determined by the TtNUS Site Health and Safety Officer.

a. Safety glasses

b. Safety shoes (and protective over boots or steel-toed rubber boots). NOTE: During geophysical survey operations, the UXO technicians will not wear steel-toed boots as they interfere with the magnetometer survey; however, around heavy equipment and activities where foot and overhead hazards may exist, steel-toed boots and hard hats will be worn.

c. Cotton clothing (with protective coveralls*)

d. Gloves (type to be specified for each project task in the Health and Safety Plan and/or by the site Health and Safety Officer)

e. Respiratory protection equipment* (29CFR1910.134)

f. Hearing protection*

g. Hard hats*

11.0 EMERGENCY RESPONSE AND CONTINGENCY PLANS

11. Emergency Contacts: The identification of (and means to communicate with) appropriate local emergency response agencies must be identified as part of project planning/mobilization activities, and these agencies must be contacted prior to the initiation of any onsite work. These initial communications must determine the capabilitities of these agencies to respond to foreseeable emergency situations, their willingness to respond, and their locations/driving directions/phone numbers. These details must be specified in the project-specific Health and Safety Plan and posted in the site Command Center/Field office.

At a minimum, the names and means of communication (phone number, radio frequency, etc.) of the following parties must be included in the project-specific Emergency Contacts procedure:

a. Local Emergency Fire Response that will respond (i.e., local Fire Department)

b. Emergency Medical Assistance (Hospital, Emergency Room, and ambulance service that will respond)

c. Installation Safety Office or other client safety/emergency response contact

d. Installation EOD Office/Detachment

e. Installation Environmental Office

The senior TtNUS managing employee onsite (Project Manager, Site Manager, Site Supervisor, Field Operations Leader) is responsible for initiating these calls in the event of an emergency where such support is needed. If the Project Manager is not onsite at the time of an emergency event, he/she must be added to the above list of contacts.

In the event of an emergency, all site personnel will be evacuated to a predetermined location away from the work place. Emergency Response Planning will be addressed in the project-specific Health and Safety Plan and will be in accordance with either 29 CFR 1910.38(a) or 1910.120(l). TtNUS will utilize the Installations Base Fire Protection and Emergency Services in emergencies or potential emergencies.

11.2 Contingency Plans: The following contingency plans will be implemented:

a. Pre-Planning – Upon arrival at the site/installation, the TtNUS Field Operations Leader (FOL) and/or the Site Safety Officer will meet with the Base or local Fire Protection Department, Base Security Personnel or local Police Department, and onsite and/or offsite Emergency services to notify them of the activities that are to be undertaken, when, and where. All site personnel will be required to follow established base/local emergency procedures and will rely on base/local services to handle emergency calls when needed.

b. Emergency Escape Procedures and Assignments – Upon notification of a site emergency that requires evacuation, all site personnel will proceed to predetermined locations based on emergency location and wind direction. An alternate assembly point will be designated in case personnel cannot reach these locations without danger to their lives and health. These primary and alternate escape routes and meeting places will be designated during the daily hazard control briefing. Personnel will be trained to remain at the assembly points until directed to either resume work or to leave the site.

c. Procedures to Account for Site Personnel – The site work force is typically small enough that accounting for personnel will not be a problem via visual head counting. On projects with larger field team sizes, roll calls will be taken using the daily sign in logs, logbook entries, or the tail-gate briefing sheets. Accounting for personnel will be the Field Operations Leader's responsibility.

d. Rescue and Medical Duties – TtNUS personnel will not be authorized to participate in emergency rescue operations. Typical first aid response equipment that is to be on hand at a project site includes suitable first aid kit, an emergency eye wash station, and Class ABC fire extinguishers.

e. Activation of Emergency Response Procedures - Should an emergency occur which requires the support of outside services, the appropriate contacts will be made by the senior TtNUS managing employee onsite (Project Manager, Site Manager, Site Supervisor, Field Operations Leader). A list of appropriate contacts will be posted at the Command Post. Cellular phones, land-line phones, or hand-held radios will be the primary means of communication.

f. Airborne Chemical Release Contingency Plan –

(1) Chemical Release Monitoring – every member of the site team will be responsible for observing and reporting any gross chemical releases or conditions that could lead to releases. Air monitoring will be performed as described in the project-specific Work Plans and Health and Safety Plans.

(2) Responses to Measured Airborne Chemical Releases – the readings on monitoring instrumentation will be compared to the action levels specified in the project-specific Work Plans and Health and Safety Plans. The primary purpose of appropriate real-time monitoring instruments will be monitor worker breathing zone areas for the protection of employee health. The project-specific Health and Safety Plan will specify actions that are to be taken in the event that monitoring instrument readings indicate that detected

concentrations may represent a health threat to onsite workers. Area and perimeter monitoring as well as sample screening activities may also be called for in the Work Plan or Health and Safety Plan, but these are *secondary* purposes for the use of these instruments.

Unless otherwise specified in a project-specific Health and Safety Plan, the following monitoring instrument action levels and response measures will be observed on UXO/CWA sites:

Parameter	Action Level
Total Organic Vapors	Any sustained level above background
Airborne particulates	Readings >2.5 mg/m^3
Flammable Vapors	10% of the Lower Explosive Limit (LEL)

If such levels are noted at site perimeters or adjacent to neighboring residential or commercial property, the TtNUS Field Operations Leader and/or the Site Safety Officer will notify the appropriate client or base contacts.

g. Liquid Release Monitoring – All field team members will be responsible for observing and reporting any liquid chemical releases or conditions that could lead to a release. If field operations on site result in a release of liquid chemicals in the absence of vapors, field personnel will attempt to contain the liquid by means of berms constructed with available equipment. If the work team cannot control the spill, they will leave the area for the assembly point quickly, without panic. The TtNUS Field Operations Leader and/or the Site Safety Officer will notify the appropriate client/base contact. This is not considered to be a significant probability during operations. However, in the unlikely instance that it should occur, field personnel may effect these types of defensive efforts, providing that such a response does not appear to present a chemical overexposure or other personal health or safety threat.

12.0 TYPICAL CLIENT/FACILITY SAFETY POINTS OF CONTACT

The following positions are typically encountered on UXO/CWA projects. Communication and coordination with these positions should be implemented and maintained throughout all project activities (from pre-field operations planning through to project close-out).

a. Installation Safety Management Office

b. Installation Ordnance Officer and/or EOD Officer

c. Installation Radiation Officer

d. Installation Environmental Office

13.0 TOOLS AND EQUIPMENT

Tools and equipment necessary to safely and effectively accomplish the objectives of a project will be detailed in the project-specific Work Plans and Health and Safety Plans. Items commonly required for UXO/CWM operations are presented below:

13.1 Personal Protective Equipment

a. Respiratory Protective Equipment (i.e., air purifying or air supplied devices)

b. Dermal (chemical resistant) protective equipment (e.g., coveralls, gloves, eye and face protection)

c. Physical safety PPE (hard hats, hearing protection, safety glasses, safety shoes, etc.)

13.2 Air Monitoring Equipment

a. Explosive/O_2 Meter (Combustible Gas Indicator)

b. Direct reading Organic Vapor Analyzer (PID or FID)

c. Direct reading particulate meter

d. Radiation Survey Meters and TLD Badges

13.3 Geophysical/Hydrology Survey Instrumentation

a. Magnetometers (Cesium Vapor, Schonstedt)

b. Electromagnetic Terrain Conductivity Meter (EM-31)

c. Time-Domain Electromagnetic All-Metals Detector (EM-61)

d. Water Level Indicator/Recorder

e. pH/Temperature/Conductivity Meter for water samples (Horiba, etc.

f. Survey Equipment (transit, tripod, level, etc.) as required

13.4 UXO Support Equipment

a. Schonstedt Magnetic Locators (GA-52Cx or equivalent passive instrument) will be used for UXO surface survey during UXO activities. The GA-52Cx detects the magnetic field of any ferromagnetic object.

b. Schonstedt MG-220 Magnetic Gradiometer (Down-Hole Magnetometer or equivalent will be used to conduct down hole UXO checks. The MG-220 detects the magnetic field of any ferromagnetic object as it is lowered into a borehole.

c. Marking tape, pin flags, stakes, utility spray paints, etc.

13.5 CWM Support Equipment

a. Chemical Agent Identification Kits (M18A2 Kit)

b. ICAMs (Individual Chemical Agent Monitor)

13.6 Decontamination Equipment

As required by the level of protection for each site. See Site Health and Safety Plan for specifics.

13.7 Hand Tools/ Miscellaneous Equipment

As may be required.

14.0 ENVIRONMENTAL CONCERNS

The field operations covered by this SOP will be performed in such a manner as to minimize the effects of pollution of air, water, or land and to control noise and dust emissions within reasonable limits.

Every effort will be made to:

a. Protect the land areas and to preserve them in their existing condition.

b. Protect water resources, including measures for run-off or run-off controls if applicable.

c. Implement sediment control measures, where warranted. These measures will also be implemented to control erosion.

Usually, field operations will generate solid and liquid waste (Investigative Derived Waste – IDW) requiring onsite handling and possible offsite disposal. The major types of waste to be generated, their environmental concerns, and their handling and disposition are summarized below:

a. Personal and equipment decontamination containers disposed offsite following a thorough decontamination. Liquid waste will be included with well purging and development fluids.

b. Personal Protective Equipment (PPE) will be double-bagged and will be the responsibility of TtNUS to dispose of according to applicable regulations. Disposal will normally be offsite.

It is not anticipated that any chemical releases will occur during the field activities.

The MSDSs for chemicals being brought onto the installation for use in field operations will be listed on a site-specific Chemical Inventory and maintained at the TtNUS Field Command Post. Copies of these documents are to be made available to client and offsite representatives who may be called upon to respond to an emergency event.

15.0 UXO/CWM PROCEDURES FOR FIELD OPERATIONS

15.1 General – field procedures for work on any installation can include any or all of the following tasks:

a. Initial entry into suspect areas

b. CWM operations

c. Surface and subsurface sampling

d. Monitoring well installation

e. Exploratory trenching

f. Geophysical surveys

g. Other miscellaneous operations

15.2 Initial Entry – initial entry into suspect areas require an UXO-qualified technician with a magnetometer (GA-52Cx) to screen a path into the area. The screened area is marked with lanes using either pin flags with plastic pins or marking tape. Suspect items on the surface and subsurface magnetic anomalies will be marked, usually with a different color tape or flag, and will be avoided by team members. The site where the work is to be conducted will be thoroughly screened for UXO/CWM contamination prior to any work commencing. All personnel will stay within the cleared areas and not venture out into areas not screened. If an area that has magnetic anomalies cannot be avoided, the UXO-qualified technician will hand excavate down to the anomaly to check to see if a hazard exists. Before excavation begins, the immediate area will be cleared of non-essential personnel outside of what could be a fragmentation zone (as determined by the UXO Technician). If the excavation reveals a hazard, the emergency notification procedures in paragraph 11.0 will apply.

15.3 CWM Operations - prior to conducting CWM operations, an Emergency Response Plan as required by 29CFR1910.120 and DA Pam 50-6 will be developed and implemented. Most of the information required to develop this plan should be obtained from the installation safety office; however, as a minimum, the following elements will be addressed:

a. Pre-emergency planning and procedures for reporting incidents to appropriate government agencies for potential chemical exposure, person injuries, fire/explosions, environmental spills and releases, and discovery of radioactive materials.
b. Personnel roles, lines of authority, communications.
c. Posted instructions and list of emergency contacts: physicians, nearby notified medical facility, fire and police departments, ambulance service, state/local/federal environmental agencies, Certified Industrial Hygienist (CIH), and installation commander.
d. Emergency recognition and prevention.
e. Site topography, layout and prevailing weather conditions.
f. Criteria and procedures for site evacuation (emergency alerting procedures/employee alarm system, emergency PPE and equipment, safe distance, place of refuge (assembly area), evacuation routes, site security and control).
g. Specific procedures for decontamination and medical treatment of injured personnel.
h. Route maps to nearest pre-notified medical facility.
i. Criteria for initiating community alert program, contacts and responsibilities.
j. Critique of emergency responses and follow-up.
k. Material Safety Data Sheets (MSDS) for each hazardous substance anticipated to be encountered on site would be made accessible to site personnel at all times.

15.4 Sampling – sampling will be conducted in accordance with established protocols and methodologies. Site-specific sampling requirements will be presented in the project-specific Work Plans and/or in other project-specific documents such as Field Sampling and Analysis Plans and Quality Assurance Plans.

Prior to initiating any sampling activities, an UXO-qualified technician will screen sites potentially contaminated with UXO/CWM. A magnetometer will be used to screen entry into a suspect area as in paragraph 15.2 above. Lanes will be marked and suspect items and subsurface anomalies will be identified and avoided. The immediate sampling area will be surface-screened prior to the introduction of the sampling team into the area.

Prior to any subsurface intrusive sampling, another check with a magnetometer needs to be accomplished. The GA-52Cx Magnetic Locator (magnetometer) can be used for collecting

subsurface samples not greater than 0.5 feet. If excavation of a borehole or hand auguring hole is to exceed this depth, a MG-220 Magnetic Gradiometer (down hole magnetometer) shall be utilized with readings taken at two feet depth intervals.

If an anomaly is detected, the location will be marked and avoided. If appropriate and acceptable, an alternate sampling location (in a cleared area) will be designated. If the sampling location cannot be relocated them the UXO-qualified technician will hand excavate down to the anomaly to determine if it is hazardous. If it is not hazardous, the object will be set aside and the sampling event will continue. If the object has been determined to be hazardous or suspect, the sampling team will move out of the area and the emergency procedures listed in paragraph 11.0 will be implemented.

15.5 Monitoring Well Installation – the area within a 50-foot radius of the borehole and the off- road access path will be screened with the GA-52Cx magnetometer and be cleared of all metal objects. Once this is accomplished, the areas around borehole sites will be marked using colored marking tape and/or pin flags. Heavy equipment such as front-end loaders, backhoes, and bulldozers will not be used to develop or establish drill sites. The following action will be followed:

a. The GA-52Cx magnetometer will be used directly over the borehole site to check for buried items down to 0.5 feet. After a surface check, the UXO-qualified technician will hand auger down to a depth of two feet and check down the hole using the MG-220 magnetometer.

b. Once the hand-auguring hole has been cleared, the drill rig will be positioned over the proposed borehole. Drilling will commence to a depth of four feet, the drill auger will be removed from the borehole, the drill crew chief and UXO personnel will make observations of the soil from the core barrel and the soil removed from the hole by hand auger (if needed). The drilling log and lithologic log will be maintained in accordance with standard practices, noting any metal objects that may be found.

c. The drilling derrick will be secured and drill rig moved to a position at least 20 feet from the borehole.

d. The borehole will be checked again with the MG-220 magnetometer.

e. If UXO or magnetic anomaly is present, the borehole will be abandoned and another location selected. The new borehole should be at least six feet from the original borehole. If a UXO or anomaly is not detected and the clearance is given, the drill rig shall be positioned back over the borehole, and drilling will proceed to the next depth (6 feet).

f. Repeat above steps at intervals of 2 feet, until a depth of ten feet is reached. At the ten-foot interval, a magnetometer reading shall be taken with the MG-220 set on the maximum sensitivity. The instrument will detect larger objects (approaching 100 lbs.) that could be expected to penetrate to depths of 10 feet or more.

g. After reaching the depth of ten feet, the above steps will be repeated at intervals of 4 feet, until the desired depth is reached.

15.6 Exploratory Trenching and Excavation – at times, exploratory trenching may be required to determine the lateral extent of a landfill, burial pit, or subsurface geophysical anomaly. Trenching and excavation to uncover a subsurface area will be conducted using a backhoe, an excavator, or sometimes a front-end loader. **Any trenching or excavation activities (regardless of depth) must be done in accordance with OSHA 29 Subpart P requirements, which must be considered and addressed in the project-specific Health and Safety Plan.**

On project sites where excavation activities are within the scope of work *and* a UXO/CWM concern exists, the following additional procedures will be utilized to conduct these operations:

a. The surface of the area to be trenched or excavated will first be swept with the GA-52Cx magnetometer. Anomalies will be hand excavated to determine if hazardous.

b. No more than 0.5 feet of surface soil will then be gingerly removed (scraped) from the area of concern.

c. The heavy equipment will be removed at least 20 feet away from the area, and the area will be checked with the MG-220 magnetometer. If the area is a trench, the entire length of the trench will be checked with the MG-220 and the excavation can continue two feet at a time. If the area is a wide-open area, it can once again be checked with the GA-52Cx, but only 0.5 feet of soil removal can be excavated at a time.

d. Anomalies will continue to be uncovered by hand excavation until the desired results are obtained and the trench/area is abandoned and refilled.

e. Excavation will continue another 2 feet if using the MG220 or 0.5 feet if using the GA-52Cx magnetometer. Once again after the proper depth of soil is excavated, the heavy equipment is removed from the area (>20 feet) and the area is rechecked with the magnetometer. If excavation depths reach 4 feet, suitable means of access/egress must be provided (e.g., ladders) and atmospheric monitoring must be performed prior to any entries.

f. The above procedures are followed until the desired depth is reached and/or the desired results are obtained.

Once the area or trench has been cleared, excavation can continue to the proper depth before the equipment is again moved away (at least 20 feet) and the area/trench.

15.7 Geophysical Surveys – there are several instruments that can be used to conduct geophysical surveys. The GA-52Cx (Schonstedt) and the MG-220 are magnetometers and are passive instruments. The Geonics Terrain Conductivity Meter (EM-31) is an active instrument and is commonly used to measure subsurface terrain conductivity. This information can be used geophysical surveys, as well as for locating voids, discontinuities in soil structures such as boundaries of disposal pits and buried conducting objects. An Ordnance Safety Analysis of the Geonics Model EM-61 Non-Contacting Terrain Conductivity Meter was conducted by the Naval Surface Warfare Center at the request of TtNUS in April 1993. The analysis concluded, in summary, that the "Geonics EM-61 poses no ordnance safety hazard when operated in the normal survey mode, where the device is held at hip height." However, the Geonics EM-61 should not be used with the boom on the ground if ordnance is present or suspected.

When using the magnetometer or the EM-61, a UXO-qualified technician will conduct a surface sweep of the area to be surveyed to ensure that no surface ordnance or other hazards exist. The magnetometer is a passive instrument; therefore, no special ordnance safety precautions are required.

Manufacture recommended procedures for the EM-61 must be followed to ensure safe operation during the geophysical survey. Standard survey protocols and quality assurance methods will also be required during survey operations.

15.8 Miscellaneous Operations – due to the potential of UXO/CWM materials being encountered during field activities, UXO support will be provided at all site locations. UXO support will be

provided for any and all field activities that are in areas suspected to contain UXO and/or CWM. These areas also include those areas covered with water and creeks, canals, etc.

Operations that involve the inspection, hazard classification, segregation, and final disposal of UXO and UXO-related scrap will not be covered in this SOP. The demilitarization of UXO and UXO-related scrap is not authorized unless specific work plans, SOPs, health and safety plans and other established procedures are written and approved addressing these operations.

16.0 HAZARD CONTROL BRIEF

A Health and Safety Hazard Control Briefing (i.e., tailgate meetings) will be conducted daily prior to the start of onsite activities. The briefing will be detailed and will cover the information in the Safe Work Permits for the anticipated tasks for the day, as well as applicable portions of this SOP. Additional briefings will be conducted as necessary for tasks that become necessary during the course of a workday, if they were not covered in the morning briefing. These briefings are in addition to (not in place of) the site-specific health and safety training that is required for all onsite personnel prior to their participation in any onsite, intrusive activities.

The following information will be given during the daily briefings:

a. Overview of task(s) to be performed and review of appropriate Safe Work Permits with task participants.

b. Overview of the day's objectives, as well as general site hazards

   - Unexploded Ordnance Hazards
   - Chemical Warfare Agents and Materials
   - Physical Hazards

c. Overview of Standard Work Practices pertinent to the day's planned activities

d. Review of any worker incidents or near-miss events, including a review of corrective/preventive measures to prevent recurrence

e. Overview of Emergency Response Actions, evacuation routes and assembly points

17.0 SECURITY

Field activities under various TtNUS contracts are typically unclassified and normal security measures apply in accordance with above references (paragraph 9.1 above). TtNUS personnel and their subcontractors will check in with the appropriate client/installation's security office and may be issued security badges for entry into certain work areas. This SOP will not cover special security requirements for projects involving UXO/CWM as most installations have established policies and procedures on reporting and securing recovered items that are UXO and/or CWM. The TtNUS Project Manager will incorporate all security procedures required by the installation into the site work plan.