12/10/2012 ENTERED

DEPARTMENT OF THE AIR FORCE
27TH SPECIAL OPERATIONS MISSION SUPPORT GROUP (AFSOC)
CANNON AIR FORCE BASE NEW MEXICO

DEC 2012

Colonel David C. Piech
Commander
110 E Sextant Avenue Suite 1098
Cannon AFB NM 88103

Mr. Daniel Comeau
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East Bldg 1
Santa Fe NM 87505-6063

Dear Mr. Comeau

Attached is the *Comprehensive Site Evaluation (CSE) Phase II Military Munitions Response Program (MMRP) Report.* If you have any questions regarding this submittal, please contact Mr. Ronald Lancaster, Chief, Asset Management Flight at (575) 784-1146 or Mr. Matthew Higginbotham, Restoration Program Manager at (575) 784-6031.

Sincerely

DAVID C. PIECH, Colonel, USAF
Commander

Attachment:
CSE Phase II MMRP Report

cc:
Environmental Protection Agency, Region VI, Ms. Wendy Jacques w/o Attachment

LIBRARY COPY

Prepared for:

US Air Force

Prepared by:

US Army Corps of Engineers®
Omaha District

Comprehensive Site Evaluation Phase II Report - Version 2.0

Military Munitions Response Program (MMRP)

Cannon Air Force Base, New Mexico

August 2012

VERSAR

Comeau, Dan, NMENV

From: Peters, Laura CIV USAF AFSOC 27 SOCES/CEIEC <Laura.Peters@cannon.af.mil>
Sent: Wednesday, October 09, 2013 12:42 PM
To: Comeau, Dan, NMENV
Subject: RE: Ver. 3.0, CSE Phase II Rpt. 1940s Skeet Range

Dan,
If you wish to keep certain pages of the latest version and attach them to the original final, then that is fine.

Laura Peters
Environmental Restoration Manager
575-784-0490

27 SOCES/CEIER
Bldg. 355
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Cannon AFB, NM 88103-5003

-----Original Message-----
From: Comeau, Dan, NMENV [mailto:Dan.Comeau@state.nm.us]
Sent: Wednesday, October 09, 2013 11:49 AM
To: Peters, Laura CIV USAF AFSOC 27 SOCES/CEIEC
Subject: Ver. 3.0, CSE Phase II Rpt. 1940s Skeet Range

Hi Laura-

I've looked the report over and do not have any comments about it except as follows:

* Version 2.0, lists Laughlin AFB on the first page of Fact Sheet 2 while Version 3.0 lists Sheppard AFB. Both Fact Sheets are obviously wrong in that regard. Version 3.0 also includes filled-in dates for when the Public Notice period began and ended along with an Affidavit of Legal Publication.

We've already approved the Ver. 2.0 report (letter dated 5/2/2013) with a couple minor modifications. In talking with Dave Cobrain this morning, he is of the opinion that we have the Ver. 3.0 report removed from our adm. record in the interest of heading off future potential HWB staff confusion over which document prevails as being the "Approved" document. I'm inclined to follow his suggestion (mostly) but would substitute the last two pages of the Version 3.0 report in the Version 2.0 report to address your possible concern about having a "complete" copy of events related to the former skeet range investigation.

Thanks,

Daniel Comeau
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Comprehensive Site Evaluation
Phase II Report
Version 2.0

Military Munitions Response Program

Cannon Air Force Base, New Mexico

Prepared for:

Headquarters, Air Force Special Operations Command

Prepared by:
U. S. Army Corps of Engineers, Omaha District (USACE)

With support from:
Versar, Inc.
12050 N. Pecos Street, Suite 300
Westminster, Colorado 80234

Under USACE-Omaha Contract:
W9128F-08-D-0027, Task Order 0006

August 2012

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1.0 INTRODUCTION

In support of the Military Munitions Response Program (MMRP) a Comprehensive Site Evaluation (CSE) Phase II was performed at Cannon Air Force Base (AFB). The goal of the U.S. Air Force (USAF) MMRP is to make Munitions Response Areas (MRAs) safe for reuse and to protect human health and the environment in the process. The MMRP addresses issues related to munitions and explosives of concern (MEC) and munitions constituents (MC) associated with MRAs, as well as related hazardous substances, pollutants, and potential contaminants of concern on other operational ranges. The MRA for Cannon AFB is presented on Figure 1-1.

1.1 Purpose

The USAF developed the CSE concept from existing data acquisition methods and data analysis, tracking, and reporting tools to serve as the initial site assessment [Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) Preliminary Assessment/Site Investigation (PA/SI)] for sites covered under the MMRP. The CSE is a holistic approach to munitions response and environmental restoration that assesses the unique challenges faced at MRAs, including explosives safety issues posed by MEC and associated releases of MC [e.g., hazardous substances; pollutants; contaminants; and petroleum, oil, and lubricants (POL)] to the environment. An MRA is defined as any area on a defense site that is known or suspected to contain MEC [including unexploded ordnance (UXO), discarded military munitions (DMM), and MC in high enough concentrations to pose an explosive hazard] or MC (e.g., former ranges or munitions burial areas). Based on information gathered during the CSE Phase II and depending on site-specific factors, each MRA may be designated as a single munitions response site (MRS), or it may be subdivided for the purposes of evaluation and response into multiple MRSs.

MRSs represent discrete locations within an MRA that, based on investigation or historical records, are known or suspected to contain MEC and/or MC and require a munitions response. Subdividing MRAs into multiple MRSs allows for more efficient characterization so that munitions responses specific to local conditions can be conducted.

The CSE process provides the historical, anecdotal, visual, analytical, and geophysical data that serves as the basis for USAF decision-making regarding follow-on munitions response actions. The CSE is conducted in two distinct phases: CSE Phase I generally will consist of historical records reviews (HRR) including aerial photographs, visual surveys, and interviews; CSE Phase II generally will consist of additional detailed visual surveys, environmental sampling, and geophysical surveys. The CSE Phase I and Phase II investigations differ from the traditional CERCLA PA and SI, however, with respect to data requirements. PA and SI activities primarily are focused on obtaining data to input into the Department of Defense (DoD) MRS Prioritization Protocol (MRSPP) and site-sequencing for cleanup. The CSE process utilizes an expanded array of analytical, tracking, and reporting tools to support decision-making, and therefore, has greater data requirements. Tools utilized as part of the CSE include:

- Conceptual site model (CSM) for project communication, hazard assessment, and data gap analysis;
- MRSPP to prioritize sites for further munitions response actions, based on relative risk;
- Hazard Ranking System (HRS) data elements;
- USAF Enterprise Environmental Safety and Occupational Health Management Information System (EESOH-MIS) Data Management Tool (DMT) for a range of program management functions, including data calls and audits; and
- Remedial Action Cost Engineering Requirements (RACER), MMRP Module for estimating the costs of future munitions response actions.

The objectives of this Cannon AFB CSE Phase II effort are to determine whether the single individual MRA within Cannon AFB warrants additional munitions response activities, definition as an MRS, or documentation for no further action (NFA) decisions.

1.2 Project Data Quality Objectives

The Data Quality Objectives (DQOs) for this investigation are based on data requirements specified in *Air Force Guide for Conducting the CSE Phase II at Air Force MRAs (Version 4.0)* (USAF, 2006) for completion of Phase II investigations. Collected data have been used to complete the EESOH-MIS and RACER DMT worksheets, presented in Appendices J and K.

1.3 Project Management

This CSE Phase II Report has been prepared by Versar, Inc. (Versar) for the Air Force Center for Engineering and the Environment (AFCEE) as well as the Air Force Special Operations Command (AFSOC) as part of the requirements of the U.S. Army Corps of Engineers (USACE), Omaha District Contract Number W9128F-08-D-0027, Task Order 0006. The USACE Project Manager is Mr. Glenn Marks, Project Management Professional (PMP).

1.4 Project Scope

One MRA was identified at Cannon AFB based on the *Modified CSE Phase I Report* (USACE, 2009). Data gaps (MC contamination, potential for off-site impacts, etc.) were identified for this MRA – the 1940s Skeet Range (SR). In addition, three components of the Cannon AFB Modified CSE Phase I were deferred to the CSE Phase II including the CSM, the MRSPP scoring elements, and the HRS scoring elements. The resulting Scope of Work (SOW), Proposed CSE Phase II Activities, and Proposed Path Forward for the MRA are summarized in Table 1-1.

Legend

MRA Boundary

Cannon AFB Boundary

Note: Imagery © 2011 Microsoft Corporation
Available Exclusivly by DigitalGlobe, Aquisition date: Oct- Dec 2010.

N

0 700 1,400 2,800 Feet

U.S. ARMY CORPS OF ENGINEERS

OMAHA DISTRICT

DESIGNED: D. Feiertag	DATE: 08/09/2011
DRAWN: A. Rector	DATE: 08/09/2011

VERSAR
6850 VERSAR CENTER
SPRINGFIELD, VIRGINIA 22151
(703)750-3000

Military Munitions Response Program

Former 1940's Skeet Range
- TS835 -

MRA Site Location

Cannon AFB, NM

PROJECT NO. -

FIGURE: 1-1

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Table 1-1: Data Requirements for Cannon AFB CSE Phase II Activities

MRA	Scope	Proposed CSE Phase II Activities	Potential Results and Proposed Path Forward
1940s SR (TS835)	Evaluate whether site constituents of concern, including lead and PAHs, are present above applicable screening or regulatory levels.	Perform a visual survey of the MRA to evaluate the location and features of the site. Conduct on-site XRF analysis of surface and subsurface soil to evaluate if lead is present above the 400 ppm screening level at the SR. If lead is present above this level, delineate the lateral and vertical extent of these elevated lead concentrations. Correlate the XRF analysis with off-site laboratory analysis. Where there is evidence of clay target debris, conduct off-site laboratory analysis of soil to evaluate if PAHs are present above their respective screening levels. If PAHs are present above these levels, delineate the lateral and vertical extent of the clay target fragments. In areas of the site where no clay targets are present, no PAH sampling will be conducted.	If lead or PAHs are present above screening levels, recommend appropriate response actions. If lead and PAHs are not present above screening levels, propose NFA. Data collected in the field will be used to support the site CSM, MRSPP, and HRS. In addition, data will be used to populate the EESOH-MIS and RACER databases.

AFB = Air Force Base
CSE = Comprehensive Site Evaluation
CSM = Conceptual Site Model
EESOH-MIS = Enterprise Environmental, Safety, and Occupational Health Management Information System
HRS = Hazard Ranking System
MRA = Munitions Response Area
MRSPP = Munitions Response Site Prioritization Protocol
NFA = No Further Action
PAH = polynuclear (or polycyclic) aromatic hydrocarbons
ppm = parts per million
RACER = Remedial Action Cost Engineering Requirements
SR = skeet range
XRF = X-ray fluorescence

1.5 Report Organization

This report is composed of 14 sections as follows:

- **Section 1.0 – Introduction:** This section presents the introduction, objectives, and organization of this report.
- **Section 2.0 – Installation Background:** This section describes the history of activities and the physical description for Cannon AFB.
- **Section 3.0 – Physical and Environmental Setting:** This section describes the physical characteristics of Cannon AFB.
- **Section 4.0 – Investigation Scope and Approach:** This section describes the scope of work completed during the CSE Phase II and the procedures followed.
- **Section 5.0 – Munitions Response Site Characteristics:** This section describes the Cannon AFB MRA and presents the results of the CSE Phase II field effort.
- **Section 6.0 – Evaluation of Known/Suspected Munitions and Explosives of Concern:** This section describes the sources, release mechanisms, and associated MC for MEC at Cannon AFB.
- **Section 7.0 – Evaluation of Hazardous Waste/Substances:** This section summarizes the sources of hazardous waste/substance contamination at Cannon AFB.
- **Section 8.0 – Conceptual Site Model:** This section describes the CSM that was developed for Cannon AFB and evaluates the media and transport mechanisms associated with the potential MEC/MC present.
- **Section 9.0 – Screening Level Human Health Risk Assessment:** This section presents a qualitative assessment of the analytical data collected during the CSE Phase II to evaluate potential risks to human health.
- **Section 10.0 – Screening Level Ecological Risk Assessment:** This section presents a qualitative assessment of the analytical data collected during the CSE Phase II to evaluate potential risks to ecological receptors.
- **Section 11.0 – Munitions Response Site Prioritization Protocol:** This section presents the Explosive Hazard Evaluation (EHE), Chemical Warfare Material Hazard Evaluation (CHE), and Health Hazard Evaluation (HHE) scores and overall MRS Priority ratings for the Cannon AFB MRA/MRS.
- **Section 12.0 – Perchlorate Reporting:** Perchlorate sampling was not conducted under the CSE Phase II at Cannon AFB; although Cannon AFB has previously analyzed drinking water, soil, and surface water for perchlorate. No perchlorate sources were identified at this MRA.
- **Section 13.0 – Summary and Conclusions**
- **Section 14.0 – Recommendations**

Tables and figures are embedded in the text where first referenced. The appendices are provided consistent with the standard CSE Phase II report format outline provided in the CSE Phase II Work Plan. Definitions are presented in Appendix A, acronyms are located in Appendix B and references are contained in Appendix C. Supporting documentation from the field work (e.g., photos and forms/notes) is contained in Appendices D and E. Appendix F contains the Ordnance Technical Data Sheets. Appendix G contains off-site laboratory analytical data (on CD), and Appendix H contains hardcopies of the Data Validation Reports. Appendix I contains the Background Study and Site-to-Background Comparisons. Appendices J, K, and L contain the MRSPP tables, and RACER and EESOH-MIS Data Input Worksheets. Documentation of public participation support is provided in Appendix M.

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2.0 INSTALLATION BACKGROUND

This section presents background information on Cannon AFB and the MRA, in addition to background information that supported the implementation of the CSE Phase II effort presented in this report.

2.1 Location and Setting

Cannon AFB is located in Curry County, New Mexico, about 8 miles west of the City of Clovis, 12 miles north of the City of Portales, and 190 miles east-southeast of the City of Albuquerque (Figure 2-1). It is situated in New Mexico's high plains, near the Texas Panhandle. US Route 60/84 runs east-west and passes through the north end of the Base. Curry Road 7/Route 467 runs east-west just south of the Base. Cannon AFB is bordered to the east by Curry Road P and to the west by Curry Road R.

The Base is situated on 3,789 acres (5.9 square miles) of federally-owned land. Buildings and administrative areas are generally found in the northern portion of the Base, while the southern portion is comprised mainly of access roads and the flight line. Whispering Winds Golf Club is located in the northern portion of the Base. Off-base facilities include the Melrose Air Force Range (formerly Melrose Bombing Range), about 24 miles west-southwest of the Base, and the Conchas Lake Recreation Annex, about 80 miles northwest of the Base. The Melrose Range is the primary training range for Cannon AFB. It is located on approximately 60,010 acres and is currently active.

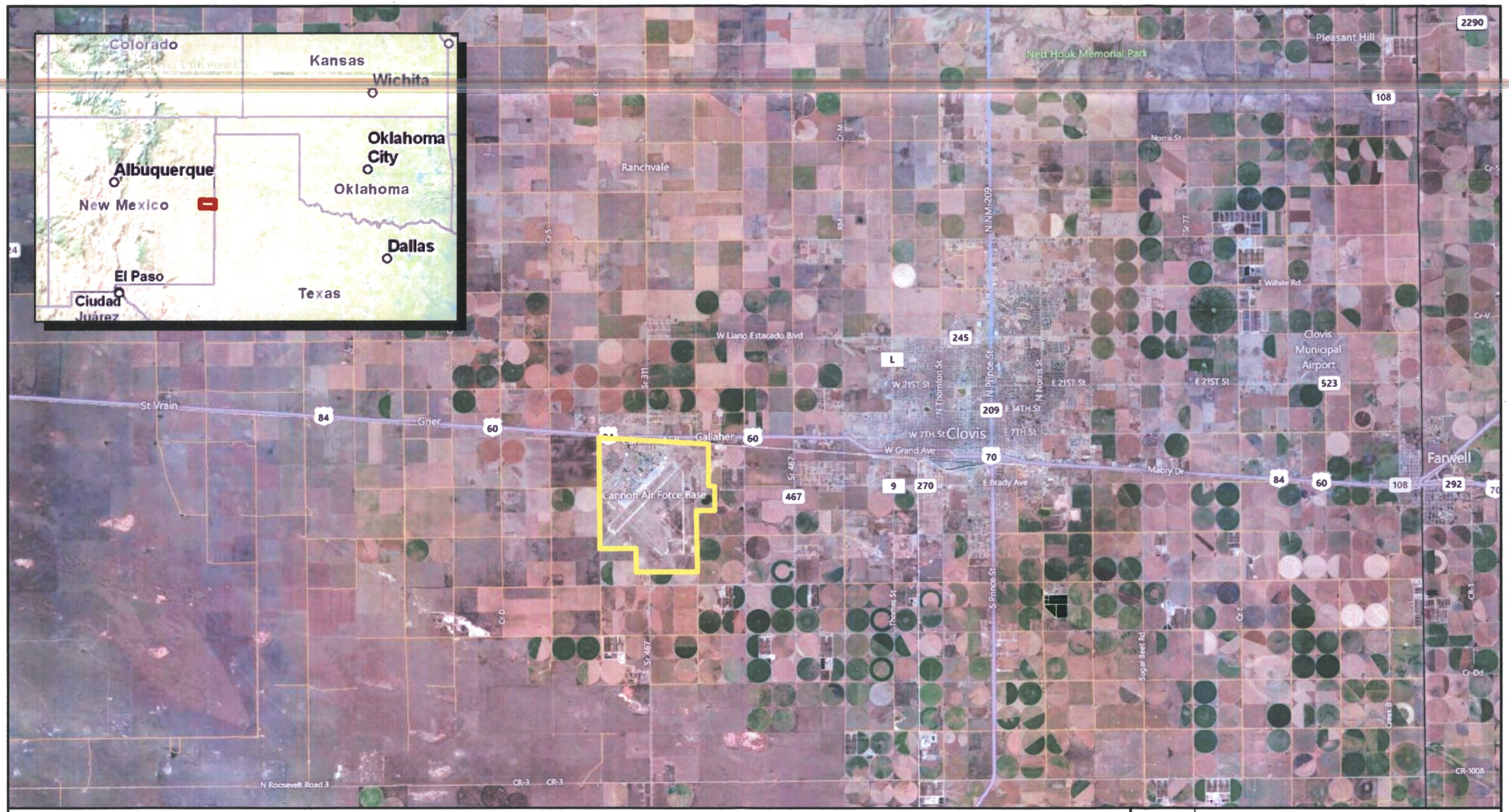
2.2 Installation Mission and Operational History

The history of Cannon AFB began in 1929 with the establishment of Portair Field (later Clovis Municipal Airport), a civilian passenger terminal for early commercial transcontinental flights. The Army Air Corps took control of the site in 1942, and it became known as Clovis Army Air Base (renamed Clovis Army Air Field in 1945, and later Clovis AFB). Through the end of World War II, the Base was used for flying, bombing, and gunnery classes. It was placed on reduced operational status in mid-1946 and flying activity decreased. The installation was deactivated in 1947. Up until that point, aircraft at Cannon AFB included B-17, B-24, and B-29 heavy bombers.

The Base was reassigned to the Tactical Air Command in mid-1951 and was reactivated later that year. Between 1951 and 1957, aircraft at the Base included the P-51 "Mustang" and F-86 "Sabre" fighter jets. The Base became a permanent installation in June 1957 and renamed Cannon AFB in honor of the late General John K. Cannon, a former commander of the Tactical Air Command. In 1959, the 312th Tactical Fighter Wing (TFW) was deactivated and replaced by the 27th TFW (which, by the mid-1970s, had become the principle USAF unit at Cannon AFB). In 1965, the Base's mission changed to that of a replacement training unit. Until recently, the function and operations of Cannon AFB has remained relatively unchanged.

In May 2005, the Secretary of Defense (SECDEF) recommended the closure of Cannon AFB to the Base Realignment and Closure Commission. The Commission's subsequent September 2005 final report to the President recommended that the Base remain open as an enclave until at least 31 December 2009 (or until a new mission was found) and that the 27th TFW be disestablished. The SECDEF designated Special Operations as the new mission at Cannon AFB on 19 June 2006, and the 27th SOW was activated under the control of AFSOC.

The AFSOC mission provides USAF Special Operations Forces (SOF) for worldwide deployment and assignment to regional unified commands. The AFSOC's core tasks have been grouped into four mission areas: forward presence and engagement, information operations, precision employment and strike, and SOF mobility. The 27th SOW is the host unit at Cannon AFB. It supports the USAF component of unified command, conducting sensitive special operations missions in response to SECDEF taskings.



Legend

Cannon AFB Boundary

Note: Imagery © 2011 Microsoft Corporation
Available Exclusivly by DigitalGlobe, Aquisition date: Oct- Dec 2010.

N

0 1 2 4 Miles

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DESIGNED: D. Feiertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 08/09/2011

VERSAR
6850 VERSAR CENTER
SPRINGFIELD, VIRGINIA 22151
(703)750-3000

Military Munitions Response Program

Cannon AFB Location Map

Cannon AFB, NM

PROJECT NO. - FIGURE: 2-1

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2.3 Summary of Munitions-Related Activities

Munitions-related activities have historically been conducted, and are currently being conducted, at Cannon AFB. Many of these were associated with the historical use of the base and adjacent range areas, beginning in 1942 with flying, bombing, and gunnery classes. Eighteen (18) potential MRAs were identified during completion of the off-site HRR and onsite records review for the Modified CSE Phase I at Cannon AFB. One additional potential MRA, the Munitions Debris Discovery Area, was identified in early 2009 at the time of the CSE Phase I field effort. Most of these potential MRAs are either active; involved indoor operation; or located off-site, such as at Formerly Used Defense Site (FUDS) properties; or previously achieved regulatory closure. Sites which have previously achieved closure under a separate regulatory program are not eligible for further investigation under the USAF MMRP. These MRAs were identified and discussed in detail in Section 2.3 of the Phase I Report.

Based on an evaluation of the site conditions and historical information for these sites, during the CSE Phase I field effort, only two (2) sites were further evaluated: the Former Chemical Warfare Area and the 1940s SR. After the CSE Phase I, the Former Chemical Warfare Area was not retained for further evaluation under the MMRP, as no evidence of MEC or CWM was observed and the site has been redeveloped as a parking lot. The 1940s SR was retained for further evaluation under the MMRP CSE Phase II as MRA TS835, as it was determined there is a potential for environmental impacts from MC to have occurred at this MRA. Table 2-1 summarizes the dates of operations and potential munitions used at the 1940s SR.

Table 2-1: Summary of Munitions Used at TS835 - Cannon AFB 1940s SR

Range or Facility	Dates of Operations	Known or Suspected Munitions Use
TS835 (1940s SR)	At least 1943 to at least 1946	Known = none identified Suspected = 12-, 16-, or 20-gauge shotgun with shells containing lead shot

2.3.1 Special Considerations

In addition to conventional ordnance contamination, the Modified CSE Phase I also examined Cannon AFB for the presence of special consideration MEC (i.e., Chemical Warfare Materiel [CWM] and depleted uranium [DU]). CWM was likely used at the Former Chemical Warfare Area situated across the Base to the west of TS835; however, no indications of special consideration MEC were discovered during the Phase I site visits, and the area has been completely renovated and paved over with a parking lot and several adjacent buildings. This area was the only other potential MRA site, in addition to TS835, evaluated further during the CSE Phase I field effort at Cannon AFB. Therefore, it has been determined that no CWM or DU is associated with TS835.

2.4 Identification of Munitions Response Areas

Of the 19 potential Cannon AFB sites associated with MEC-related activities, two (2) potential MRAs were further evaluated during the Modified CSE Phase I field effort at Cannon AFB: the Former Chemical Warfare Area and TS835. Because no evidence of MEC or CWM was observed and the site had been redeveloped as a parking lot, the Former Chemical Warfare Area was not retained for further evaluation under the CSE Phase II. The CSE Phase I Report recommended no further action (NFA) for this area (2.7 acres).

TS835 was retained for further evaluation under the MMRP CSE Phase II, based on visual identification of clay target fragments. The location of the former range is in the northeast portion of the Base, just north of the active ordnance area. The MRA footprint of this site occupies an area of 29.4 acres (Figure 1-1).

2.5 Identification of Munitions Response Subdivisions

MRA TS835 at Cannon AFB has not been subdivided into multiple MRSs to date. Therefore, the MRA was managed as single MRS for the CSE Phase II activities.

Legend

MRA Boundary

IRP Site LF-02

Note: Imagery © 2011 Microsoft Corporation
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N

0 100 200 400 Feet

U.S. ARMY CORPS OF ENGINEERS

OMAHA DISTRICT

DESIGNED: D. Felertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 08/09/2011

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Military Munitions Response Program

Former 1940's Skeet Range
- TS835 -

MRA Layout

Cannon AFB, NM

PROJECT NO. -

FIGURE: 2-2

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2.6 Previous Investigations

Previous investigations related to the potential MMRP MRA sites at Cannon AFB were limited to the Modified CSE Phase I, which identified 18 potential MRAs; an investigation of the Boresight Mound MRA, which led to regulatory closure; and a Cannon AFB Explosive Ordnance Disposal (EOD) response for the Munitions Debris Discovery Area MRA. These investigations are described below in Sections 2.6.1 through 2.6.3. Additional detail is presented in the *2009 Modified CSE Phase I, Cannon AFB, New Mexico* report (USACE, 2009). No previous environmental or munitions related investigations had been performed at the sole MRA identified for further investigation or action in the Modified CSE Phase I Report.

2.6.1 Comprehensive Site Evaluation Phase I

In support of the USAF MMRP, the CSE Phase I for Cannon AFB (USACE, 2009) was performed. The objectives of the CSE Phase I were to identify all potential MRAs on the installation, investigate these MRAs, and determine if additional munitions response actions were required or provide sufficient documentation to support NFA.

Under the CSE Phase I, information about Cannon AFB relating to the past military munitions activities and physical site conditions was compiled and evaluated. Information sources included archival records from Cannon AFB, interviews with Cannon AFB personnel, additional archival information collected from public sources, and observations made during field reconnaissance. This information was reviewed and used to evaluate the extent of MEC and/or potential for MC exposure at the site. No sampling was conducted under the CSE Phase I.

The CSE Phase I resulted in the collection, evaluation, and synthesis of a large amount of information regarding past military munitions-related activities at Cannon AFB, the current conditions on-site with respect to the presence of MEC, and the physical setting of the land. Consequently, only one MRA was recommended for further evaluation under the USAF MMRP CSE Phase II. A summary of the characteristics of the potential MRA, as investigated and determined during the Modified CSE Phase I, along with its recommendations for future military munitions response, is provided below.

TS835 is estimated to have been in use from at least 1943 to at least 1946, although the history of the range is not known. A 1944 map places the range, identified in a 1943 building index as Building T-2150, to the north of the Ordnance Storage Area, which is currently active as a Munitions Storage Area. The 1944 map appears to show a firing arc for a SR although it is oriented firing to the south towards the ordnance storage area. Because both the SR and ordnance storage area were active during the same time period, the direction of fire from the SR was most likely not toward the south. Review of a 1946 aerial photograph appears to show the firing direction to the north. A 1966 aerial photograph indicates the firing arc of the range based on the observable firing positions.

TS835 is 29.4 acres, measuring approximately 1,800 feet (ft) in length, 960 ft wide, and with a perimeter of approximately 4,700 ft. Figure 2-2 shows the approximate location of the MRA and the maximum theoretical shotfall zone for the ekeet range (radius from the firing point of up to approximately 900 feet). The MRA was re-oriented from the CSE Phase I report after a review of the report found a discrepancy between the reported orientation of TS835, and the orientation indicated by the position of the firing points visible in the 1966 aerial photograph. Based on the 1966 aerial photograph, the orientation of the range was rotated approximately 30° east (i.e., clockwise) for the Phase II investigation. Figure 2-2 shows the MRA in its adjusted position for the CSE Phase II. The area is located in the northeast portion of the Base, just north of the Munitions/Ordnance Storage Area, and extends beyond the installation boundary to the east onto the Rajen Dairy Property. The off-base portion of the area contains four buildings; the on-base portion of the area does not contain any structures. The MRA generally consists of an open field with a sparse vegetative cover of low grasses. During the CSE Phase I visual survey, clay target debris and several slabs of concrete were observed in the on-base portion of the MRA. Access to the on-base portion of the area is restricted to the general public but accessible to authorized personnel. The off-base portion of the area is located on private property, and would require right of entry approval by the landowner.

It was determined that this MRA should be retained for evaluation under the MMRP based on historical use and the potential for environmental impacts from MC. However, no known evidence of MC releases was identified during the CSE Phase I research that would indicate immediate action is warranted at this site. The Modified CSE Phase I report recommended sampling the potentially impacted media at locations where appreciable amounts of small arms and/or clay target debris are present and where the release or migration of metal and polynuclear aromatic hydrocarbon (PAH) constituents may be expected.

2.6.2 Boresight Mound/Firing-In Butt

As described in the Modified CSE Phase I report, a previous military munitions response investigation and action took place at the Boresight Mound at Cannon AFB. This area, also referred to as Firing-In Butt and designated DP-35 and Area of Concern F, is located east of the northeast-southwest runway. According to Environmental Restoration Program (ERP) documents, this range was in use from 1957 to 1971 to calibrate aircraft weapons. The site consisted of a large, earthen berm with limited amounts of expended small-caliber practice munitions and some construction material around the perimeter. This site was assessed in a 1998 SI (Woodward & Clyde, 1999). According to the 1999 SI report, the mound was irregularly shaped, approximately 15 ft high and consisted of fill material comprised of sandy soil with numerous rock fragments. A target support structure existed approximately 150 ft north of the berm. The target structure reportedly had projectiles imbedded in it at the time of the site inspection. The mound itself had small amounts of debris in it including telephone poles, small arms shell casings, metal pipes, projectiles from boresight operations, and several partially buried empty metal drums.

The 1998 SI under Resource Conservation and Recovery Act (RCRA) consisted of the collection of soil samples from a grid pattern on top of the mound, around the mound and around the target

structure. Soil samples were collected from 0-0.5, 1.5-2.0 and 3.5-4.0 ft below the surface of the mound. The soils collected around the target structure and around the mound were collected from 0-2.0 ft below the ground surface (bgs). These samples were analyzed for lead, antimony and arsenic. In total, 36 soil samples were collected and analyzed. The maximum level of lead detected was 151 milligrams per kilogram (mg/kg) and the maximum level of arsenic was 5 mg/kg. While these levels of arsenic and lead were above site-specific background levels, the results of the risk assessment showed acceptable levels of risk associated with these results. The SI report recommended NFA for the Boresight Mound. In 2000, the Air Force formally proposed NFA for the Boresight Mound under the IRP [Installation Restoration Program (URS, 2000)], as no evidence of serious contamination was identified in the 1998 PA/SI. The mound was subsequently removed although the exact date of removal was not available. In 2004, the New Mexico Environment Department (NMED) determined that the site qualified for NFA approval and it is currently closed. As this site achieved regulatory closure as part of a separate program, it will not be investigated further under the USAF MMRP.

2.6.3 Munitions Debris Discovery Area

This is a small area just south of South Playa Lake, as reported in the Modified CSE Phase I report for Cannon AFB. This area was being worked on to discourage bird nesting as part of the installation Bird Aircraft Strike Hazard (BASH) program. In February 2009, Cannon AFB EOD responded to a discovery of practice bombs in the area of South Playa Lake. The practice bombs were identified by EOD as BDU-8B practice bombs and reportedly did not contain any explosive charge. EOD removed the items, performed a sweep of the area, and did not identify any additional munitions debris. EOD has not been called to this area before or since this discovery. The South Playa is a RCRA site that is actively being addressed under RCRA as SWMU-28. Because the area has been cleared by EOD, this site was not addressed under the CSE Phase I or II, and will not be further addressed under the USAF MMRP.

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3.0 PHYSICAL AND ENVIRONMENTAL SETTING

3.1 Climate

The climate at Cannon AFB is mainly hot and dry. Monthly mean high temperatures range from 51 degrees Fahrenheit (°F) in January to 93°F in July. Monthly mean low temperatures range from 23°F in January to 64°F in July. Average annual precipitation is approximately 18 inches. Annual mean snowfall is approximately 12 inches. Table 3-1 reflects the average annual climate for nearby Clovis, NM (http://www.weatherbase.com/).

Table 3-1: Cannon AFB Climatological Data

Table 3-1: Cannon AFB Climatological Data		
Month	**Average Temperature (°F)**	**Average Precipitation (inches)**
January	38	0.4
February	42	0.4
March	48	0.6
April	57	1.2
May	66	2.3
June	75	2.5
July	77	2.7
August	76	2.8
September	69	2.1
October	59	1.9
November	47	0.5
December	39	0.6
Annual Average or Total	**58 (average)**	**17.9 (total)**

3.2 Topography

Cannon AFB is located in the Southern High Plains section of the Great Plains Region. The section is a plateau, bordered to the north by the Canadian River (approximately 60 miles north of the Base), to the east and west by escarpments rising up to 300 ft, and to the south by the Edwards Plateau in western Texas. Elevations at Cannon AFB range from 4,260 ft above mean sea level (amsl) in the southern portion of the Base to 4,330 ft above amsl in the northwest portion (CH2M Hill, 1983). The Base slopes slightly downward toward the southeast.

3.3 Hydrology

Hydrologic characteristics at Cannon AFB were noted in the *IRP Records Search for Cannon AFB, New Mexico* (CH2M Hill, 1983) and further determined as part of the modified CSE Phase I (USACE, 2009). Cannon AFB is situated near the headwaters of the Brazos River. However, due to low precipitation, high evapotranspiration, and gently-sloping terrain, little if any water ever reaches the river (CH2M Hill, 1983). Surface water streams are non-existent in the vicinity of the Base. Running Water Draw, the nearest drainage feature, is located about 10 miles north of the Base and is dry most of the time. Drainage in the vicinity of the Base is poorly developed due to low annual rainfall and lack of relief (CH2M Hill, 1983). The only significant surface water features at the Base are several playas and ponds, located in the northern, eastern, and southern portions of the Base (USACE, 2009)

3.4 Soil and Vegetation Types

Soil and vegetation characteristics surrounding Cannon AFB were determined as part of the Modified CSE Phase I (USACE, 2009). The majority of the Base contains Amarillo fine sandy loam. This soil is well-drained, and the depth to the underlying water table is about 250 ft (CH2M Hill, 1983).

The vegetation on Cannon AFB is typical of semiarid short grass prairies and is limited by water availability (CH2M Hill, 1983). The prairie grasslands are utilized by a variety of birds and mammals – several species of larks, hawks, waterfowl, rabbits, squirrels, and mice are found in the area. Two communities of black-tailed prairie dogs have been found on Base, one near the active munitions storage area and one near the runways (CH2M Hill, 1983). The black-tailed prairie dog is a Federal Endangered Species Act candidate animal. According to the CSE Phase I Report, the black-tailed prairie dog is not found at MRA TS835. There are no other known threatened or endangered species at Cannon AFB.

3.5 Geology and Hydrogeology

The geology beneath Cannon AFB mainly consists of a thick, 200 to 400 ft layer of unconsolidated sediments deposited over Triassic sandstone. The sandstone forms the base of the High Plains aquifer (regionally called the Ogallala aquifer), which is situated within the overlying gravel, sand, silt, and clay sediments (Black and Veatch, 2008). The unconfined aquifer beneath Cannon AFB is the sole source of water supply for the Base. Groundwater flow is typically east to southeast, and water table slope is approximately 7 to 15 ft per mile (Black and Veatch, 2008).

4.0 INVESTIGATION SCOPE AND APPROACH

The following sections discuss the CSE Phase II investigation and scope at Cannon AFB. The visual survey and soil sampling activities were conducted in accordance with the procedures outlined in the *CSE Phase II Work Plan – Version 2.0 for Cannon AFB* (USACE, 2010). CSE Phase II field activities were conducted at Cannon AFB from 15 March through 18 March 2011.

4.1 Site Reconnaissance

A visual survey was performed within and immediately adjacent to the MRA footprint at TS835 at Cannon AFB. The purpose of a visual survey is to identify visual evidence of MEC or other debris including clay target fragments that may have been associated with the former range, and to record findings for further investigation. Identification of clay target fragments, for example, was used to determine soil sample locations for PAH analysis.

The goal of the visual survey was to cover the entire MRA (100 percent) to the extent practical. However, because the off-base portion of the MRA is down range of the firing point and no samples near the fence line dividing the two properties were above the NMED Soil Screening Level (SSL) or USEPA Residential Regional Screening Level (RSL) for lead, the off-base portion of the MRA footprint was not surveyed. Additionally, the overlapping landfill (LF-02) portion of the MRA was not assessed as part of this CSE Phase II as determined with Cannon AFB, AFCEE, and USACE personnel. Visual transects for TS835 are presented on Figure 4-1. The visual survey results are discussed in Section 5.6.1.

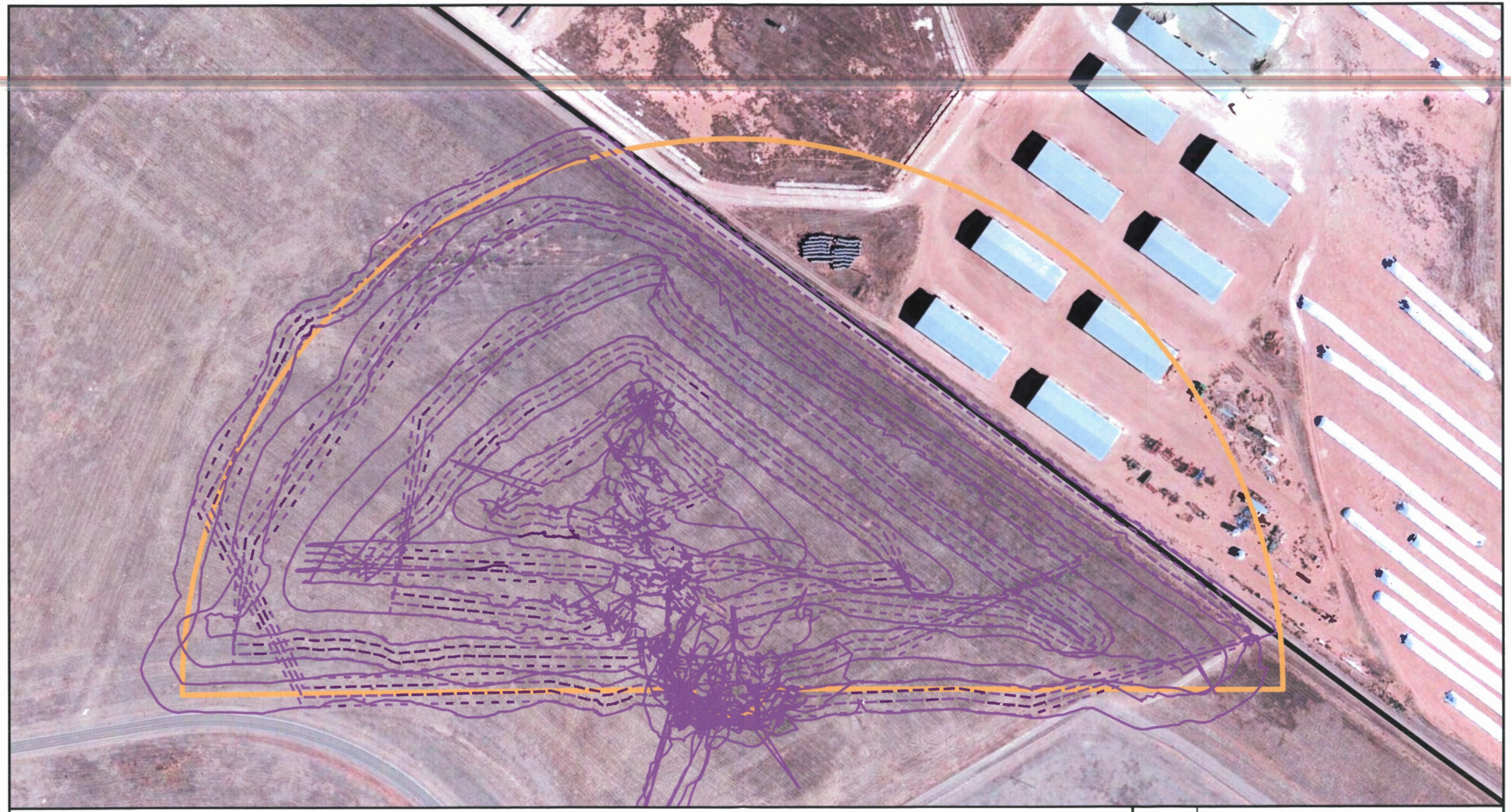
One team composed of four people was used to perform the visual survey at TS835. Spacing of the survey transects was determined in the field based on vegetation density, topography, and general ability to accurately survey 100 percent of the footprint of the MRA (Photo 4-1). For TS835 at Cannon AFB, a set spacing of 15 ft between surveyors was determined to be adequate, given the medium vegetative cover.

Photo 4-1: Visual Survey Using Rope to Space Transects at 15ft

Two handheld Trimble GeoXH Global Positioning System (GPS) units were used to provide visual transects and collect data during the visual survey at MRA TS835 at Cannon AFB. Prior to the visual survey, a site map with MRA boundaries was uploaded into the GPS units to ensure 100 percent coverage. Each GPS unit was held on either end of the survey line and placed in "Track" mode to record the path of the visual survey. Two other survey team personnel were positioned evenly-spaced between the two members holding the GPS units. Spacing was maintained by use of a marked rope, and the interpolated tracks of the two survey members are marked on Figure 4-1. Location and description data for visually identified MC as well as site features including firing points and topographic anomalies were recorded in the GPS as a waypoint. Descriptive information and photographs were collected for each waypoint, as appropriate, and recorded in a GPS and site logbook. GPS data was uploaded to a field laptop each evening to update site maps and provide for data gap analysis.

4.2 Geophysical Survey

Geophysical surveys were not required as part of the CSE Phase II field activities for TS835 at Cannon AFB based on its historic use as small arms firing range (USACE, 2009).



Legend

- Visual Survey Track (GPS)
- Visual Survey Track (Interpolated)
- MRA Boundary

Note: Imagery © 2011 Microsoft Corporation
Available Exclusivly by DigitalGlobe, Aquisition date: Oct- Dec 2010.

N

0 100 200 400 Feet

U.S. ARMY CORPS OF ENGINEERS

OMAHA DISTRICT

DESIGNED: D. Feiertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 08/09/2011

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Military Munitions Response Program

Former 1940's Skeet Range
- TS835 -
Visual Survey Tracks

Cannon AFB, NM

PROJECT NO. - | FIGURE: 4-1

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4.3 Environmental Media Sampling and Analysis

Surface and subsurface soil samples were collected from TS835 for field analysis and laboratory analysis as part of the CSE Phase II investigation at Cannon AFB. The purpose of soil sampling at the MRA is to determine the nature and extent of MC associated with its historic use as a firing range.

The primary MC associated with TS835 include lead and PAH compounds. The source of lead at the former firing range is from ammunition, primarily shotgun ammunition, and is generally found within the maximum shot-fall zone of former SRs. While lead is the primary constituent in shot used at former SRs, a small percentage of antimony, copper, zinc, and/or arsenic were included in the composition for use as hardeners or other amendments. The source of PAH compounds are the clay targets generally used at SRs, and can be detected in soil immediately below visually identified clay fragments. The clay targets were manufactured with a mineral powder held together with an asphalt-like petroleum pitch binder that contains PAH compounds.

Soil samples were collected from pre-determined locations as well as locations determined based on field observations. No samples were collected within IRP site LF-02, as determined with Cannon AFB, AFCEE, and USACE personnel. In addition, because elevated lead concentrations were not detected in on-base samples, no samples were collected in the off-base area of the MRA (which is further downrange of the firing point than the on-base area). Samples collected for lead-only analysis were analyzed using a field portable X-ray fluorescence (XRF) unit, from which a subset of samples were also submitted to an off-site analytical laboratory for analysis to provide correlation to the XRF analytical results. Soil samples collected for PAH analysis were located in areas of visible clay target debris.

4.3.1 X-Ray Fluorescence

A field portable X-ray Fluorescence (XRF) unit was used to determine the horizontal and vertical extent of lead in soils at TS835. The purpose of using an XRF is to provide real-time lead concentration measurements in soil, and to use the field data to support site decisions. A screening level of 400 parts per million (ppm) was used to evaluate site conditions, and sample locations exceeding the screening level were considered for additional XRF delineation.

Ex-situ XRF soil samples were collected using a stainless steel slide hammer equipped with a dedicated, disposable 2-inch x 6-inch polybutyrate sample liner. The liner, housed inside a stainless steel cup assembly, was driven to the desired depth (Photo 4-2). The sample was then removed from the borehole and plastic liner, placed in a resealable plastic bag, labeled accordingly, and preserved in a cooler on ice for XRF analysis. The dedicated polybutyrate liner was discarded between each sample, and components of the slide hammer were decontaminated prior to collecting the next sample. Decontamination procedures included a dry decontamination process, in which the cutting shoe portion of the slide hammer was wiped with disposable paper toweling and/or a dry wire brush to remove adhered soil particles. Following receipt of lead results, investigation-derived waste (IDW), including decontamination waste and nitrile gloves,

was disposed of in a Base-approved dumpster. IDW soil from samples was returned to the site since ll samples were below the screening level of 400 ppm.

Photo 4-2: Collecting Soil Samples Using Slide Hammer

Soil samples collected for lead analysis at the locations shown in Figure 5-4, according to a pre-determined grid pattern in non-paved areas. Grid nodes at the SR were spaced radially from the firing point approximately 160 ft apart. Surface soils were collected at each grid node from 0 to 6 inches bgs. Subsurface samples (6 to 12 inches bgs and 12 to 18 inches bgs) were to be collected if the screening level of 400 ppm of lead was exceeded. A total of forty one (41) XRF samples were collected from TS835 according to the procedures outlined in the Work Plan (USACE, 2010). Samples were subsequently analyzed with the XRF per USACE-Omaha Small Arms Range Characterization of Lead Using XRF (USACE, 2008) procedures and the CSE Phase II Work Plan (USACE, 2010). These procedures are described in detail in the following paragraphs.

Preparation and analysis of the XRF soil sample was performed in accordance with the procedures described in Appendix G of the Work Plan in order to collect data of sufficient quantity and quality to determine the horizontal and vertical extent of lead concentrations present in soil above appropriate screening levels. Sample preparation included visual inspection and manual removal of gravels and other debris; soil moisture analysis and/or subsequent soil drying was not required for any of the Cannon AFB MRA XRF samples, as all soil was considered 'dry' during sample collection. The soil was then homogenized to provide a representative soil sample for XRF analysis.

The XRF was placed on top of the prepared soil in the plastic bag and analysis initiated. Duration of the XRF sampling run consisted of three individual runs at 30 seconds each, as this duration has a low standard deviation (error) and reliable accuracy. Three separate readings were taken from three distinct locations on the sample bag and recorded in an XRF data logbook as well as being stored electronically in the XRF data logger. The mean of the three readings

was calculated and the relative standard deviation (RSD) determined to ensure results had less than a 20 percent deviation. Additional readings were collected if the mean value exceeded 50 ppm and the RSD exceeded 20 percent pursuant to USACE guidance (USACE, 2008).

An Innov-X Delta series XRF monitor was used to perform the ex-situ lead concentration measurements at TS835. This model of XRF monitor uses an X-ray tube that is energized by a battery in the unit to generate the X-rays used in determining metal concentrations in the soil sample. Consequently, no radiological source is necessary in this model of XRF monitor. All data were stored and maintained on the unit in its original binary format in addition to being recorded by operators in the XRF logbook.

Of the 41 soil samples collected for XRF analysis at Cannon AFB, twelve (12) samples listed in Table 5-4 and shown on Figure 5-5 were selected for laboratory analysis by U.S. Environmental Protection Agency (USEPA) SW846 Method SW6010B to develop a correlation between the field XRF results and the off-site laboratory results. The laboratory samples were selected based on the relative high, medium, and low concentrations of lead as determined by the XRF. Additional details on lead correlation samples are presented in Section 4.5.2, and further discussion of XRF results is contained in Section 5.6.3 – Media Sampling Results.

4.3.2 Laboratory Analytical

In addition to laboratory lead correlation samples, analytical soil samples were collected for PAH analysis in areas of clay target debris as shown in Figures 5-2 and listed in Table 5-2. Additional soil samples were collected outside of the footprint of the MRA and analyzed for PAHs for use as background data as shown in Figure 4-2 and listed in Table 5-2. The number and types of analytical samples collected at Cannon AFB as part of the CSE Phase II investigation are presented in Table 4-1.

Table 4-1: Numbers and Type of Samples Collected and Analyzed for Cannon AFB CSE Phase II Activities

Parameter (Method)[1]	Media	# Samples Analyzed
1940s SR MRA		
Lead (XRF)	Surface and subsurface soil	41
Lead (ICP-AES)	Surface and subsurface soil - Correlation	12
PAHs (GC/MS)	Surface and subsurface soil	25
Background		
PAHs (GC/MS)	Surface soil	10
QC Evaluation		
Lead (XRF)	Surface soil - Field duplicate	2
Lead (ICP-AES)	Surface soil - Field duplicate	2
Lead (ICP-AES)	Surface soil – MS/MSD pair	1
PAHs (GC/MS)	Surface soil - Field duplicate	3
PAHs (GC/MS)	Surface soil – MS/MSD pair	2

[1]Analytical methods are detailed in Section 4.3.2

AES = atomic emission spectrometry
AFB = Air Force Base
CSE = Comprehensive Site Evaluation
SR = Skeet Range
GC/MS = gas chromatography/mass spectrometry
ICP = inductively coupled plasma
MRA = Munitions Response Area
MS/MSD = matrix spike/matrix spike duplicate
PAH = polynuclear aromatic hydrocarbons
XRF = X-ray fluorescence

Initial PAH sample locations at 1940s SR were determined based on the results of the visual survey, in areas where clay target debris was identified. Relative low and medium density areas of clay target debris were mapped using handheld GPS units and recorded in the site logbook (Appendix E). Medium and low density clay target debris was easily identifiable near the former locations of the low house and high house, identified from the Visual Survey Results and indicated on Figures 5-1 and 5-2, at the SR (Photo 4-3 and Photo 4-4). Once the density of clay target debris was identified, a representative number of surface soil samples (from 0 to 0.5 ft bgs) were collected to represent the concentrations of the different densities. Subsurface soil samples were collected from 0.5 to 1 ft bgs for vertical delineation. One subsurface soil sample was collected from 1.5 to 2 ft bgs due to small pieces of debris found in the sample at the 0.5 to 1 ft interval. A total of twenty five (25) soil samples were collected for PAH analysis by USEPA Method 8270C-selected ion monitoring (SIM) from the SR.

Photo 4-3: Representative Low Density Clay Target Debris

Photo 4-4: Representative Medium Density Clay Target Debris

All soil samples collected for PAH laboratory analysis were placed into new, aluminum pans for processing. Soil samples collected for lead analysis were placed in resealable plastic bags for XRF analysis and preserved on ice until the final off-site laboratory samples for lead analysis were selected. Each sample was processed before on-site field or off-site laboratory analysis by removing any debris, including vegetative matter, rocks, and target fragments. The target fragments found were photographed and described on a sample collection sheet (including the amount), which are included in Appendices D and E, respectively. No shot fragments were observed in any of the samples. Samples for off-site laboratory analysis were collected from the processed material and placed into new, clean, sample containers provided by the laboratory. The sample locations were given a sequential numerical designation, beginning with the prefix SR, and their location recorded with the GPS unit. The boreholes were backfilled at the end of the field investigation with residual soil.

Soil samples submitted for lead analysis were analyzed by USEPA SW846 Method SW6010B, which uses a technique involving inductively coupled plasma- (ICP) atomic emission spectrometry (AES) to determine trace elements (metals) in solution. The soil was digested under USEPA SW846 Method SW3051A using an acid to extract metals into a solution for analysis of metals by ICP-AES. All results were converted to a dry-weight basis using information from analysis of percent solids, which is determined using procedures from method American Society for Testing and Materials (ASTM) D2216-90, to report soil concentrations on a mass per unit weight basis (i.e. mg/kg).

Soil samples collected for PAHs were analyzed by USEPA SW846 Method SW8270C-SIM. USEPA SW846 Method SW8270C-SIM uses a technique involving analysis by gas chromatography/mass spectrometry (GC/MS) to determine semi-volatile organic compounds (SVOCs) in solution. The soil was extracted by USEPA SW846 Method SW3545 using an automated solvent extraction device for analysis by GC/MS. All results were converted to a dry-weight basis using information from analysis of percent solids, which is determined using procedures from method ASTM D2216-90, to report soil concentrations on a mass per unit weight basis (i.e., mg/kg).

4.3.3 Environmental Background Sampling

Background data for comparison of metals at Cannon AFB was previously compiled in Technical Memorandum No. ES01: Statistical Methodology for Evaluating Arsenic Concentrations in Soils at Cannon AFB, NM (Brown and Caldwell, 2008). The background value for lead in soil is included in Table 4-2 located in Section 4.4.

Background sampling of surface soil was conducted during the Phase II to characterize the anthropogenic background concentrations of PAHs in soil. The samples were collected in an on-base area believed to be uninfluenced by munitions activity at Cannon AFB, but otherwise as similar in setting as possible to that of the MRA. The MRA is an open field with no current use. Four off-installation buildings occur on private property within the downrange edge of the MRA. This area of the MRA was not assessed during the CSE Phase II because this area is located at

the very edge of the downrange portion of the MRA. No other buildings are located in the MRA (USACE, 2009).

The ten (10) background locations that were sampled are shown on Figure 4-2. The PAH background sampling area was selected based on similar geology, vegetative cover, access, and human impact (i.e., this is an unused field) to that of the MRA, and determined with input from the Base, NMED, AFCEE, and USACE. This area is approximately 500 ft south of the southern extent of MRA TS835. The PAH background samples were collected from 0 to 0.5 ft bgs, to be consistent with the proposed sample interval for the MRA samples, and submitted to an off-site laboratory for PAH analysis. Sampling locations were recorded in the field using a hand-held GPS unit and uploaded into the Cannon AFB Geographic Information System (GIS). The background sample locations were backfilled at the end of the field investigation with the residual soil.

10 of eighteen (18) PAH compounds had a sufficient number of detected values to statistically determine an anthropogenic background concentration; the eight (8) remaining PAH compounds were non-detect or the number of detections was too limited for statistical analysis. For PAH compounds with greater than two detections, final background concentrations for PAHs were computed as a 95 percent upper tolerance limit (UTL) with 95 percent coverage of the sample set to develop comparison values for each PAH analyte. Validated PAH data was entered into ProUCL 4.0® software to derive values. For PAH compounds with two detections or less, the greater of the limit of detection (LOD) concentrations for non-detect values were used as a conservative estimate for a background concentration. Background sample results were compared to field sample results to determine whether a release has occurred, and are presented in Table 4-2 located in Section 4.4. Background determination is further discussed in Section 5.6.4 and Appendix I.

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Legend

- Background PAH Samples
- MRA Boundary
- IRP Site LF-02

Note: Imagery © 2011 Microsoft Corporation
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0 155 310 620 Feet

U.S. ARMY CORPS OF ENGINEERS

OMAHA DISTRICT

DESIGNED: D. Felertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 08/09/2011

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Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
Background Sample Locations
Cannon AFB, NM

PROJECT NO. - FIGURE: 4-2

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4.4 Screening Levels

In this section, screening levels for environmental media investigated for the CSE Phase II (surface and subsurface soil) are identified. All analytical data were compared to regulatory screening levels, and to the background data that were obtained under the CSE Phase II, as shown in Table 4-2, to determine whether releases have occurred at concentrations exceeding levels of potential concern, as described in the following paragraphs. The regulatory screening levels were presented in the Work Plan and are listed in Table 4-2; the background data were collected and assessed under this CSE Phase II effort.

The PAH analytical results were compared to the background data set obtained under the CSE Phase II (Section 5.6.4.1). Lead results were compared to the background data values listed in Technical Memorandum No. ES01: Statistical Methodology for Evaluating Arsenic Concentrations in Soils at Cannon AFB, NM (Brown and Caldwell, 2008). The background values were used for site-to-background comparisons to identify constituents of concern at the sites and/or evaluate the nature and extent of site-related contamination, as presented in Table 4-2. A more detailed presentation and assessment of the background data set is presented in Appendix I.

In addition to the assessment of metals and PAH concentrations against the background data set, the CSE Phase II data were compared with applicable primary and secondary soil screening values, including the NMED Soil Screening Levels (SSLs) (NMED, 2009) and the USEPA Human Health Medium-Specific RSLs (USEPA, 2011). The NMED SSLs are derived using default exposure parameter values and chemical- and State of New Mexico-specific physical parameters. These default SSL values are assumed to be appropriately conservative and likely protective for the majority of site conditions relevant to soil exposures within New Mexico. The USEPA RSLs are defined as chemical-specific concentrations for individual contaminants in soil that may warrant further investigation or cleanup. The RSLs address exposures to soil due to direct contact via ingestion, dermal absorption, and inhalation.

Detected concentrations of lead and individual PAHs were compared to primary NMED and secondary USEPA screening values for soil presented in Table 4-2. As shown on Table 4-2, the current residential SSL/RSL for lead is 400 mg/kg and the industrial SSL/RSL is 800 mg/kg. To represent the most conservative assessment, residential values were used to evaluate unrestricted use. Table 4-2 also includes residential and industrial PAH SSLs/RSLs for comparison. These screening levels do not constitute regulation or guidance but are considered for identification of chemicals of potential concern.

Ecological exposure to MC in soil at the site is considered only marginally viable as discussed in the Work Plan. The probability of appreciable biotic impact from past munitions-related activities is low. Consequently, ecological risk assessments were not completed for the site and no ecological screening values are presented. In addition, because of the depth to groundwater (approximately 250 ft bgs) compared to the expected shallow impacts from munitions-related activities, no soil screening values for protection of groundwater are presented.

Table 4-2: Soil Screening Levels

Analyte	Cannon AFB Background (mg/kg)	NMED SSLs/USEPA RSLs[1] (mg/kg)	
		Residential	Industrial
Metals[2]			
Lead	5.6 – 7.4	400/400	800/800
PAHs[4]			
Acenaphthene[3]	0.0029[a]	3,440/3,400	36,700/33,000
Acenaphthylene	0.0029[a]	None	None
Anthracene	0.0029[a]	17,200/17,000	183,000/170,000
Benzo(a)anthracene	0.009998	6.21/0.15	23.4/2.1
Benzo(a)pyrene	0.00953	0.621/0.015	2.34/0.21
Benzo(b)fluoranthene	0.00929	6.21/0.15	23.4/2.1
Benzo(g,h,i)perylene	0.009904	None	None
Benzo(k)fluoranthene	0.0102	62.1/1.5	234/21
Chrysene	0.0104	621/15	2,340/210
Dibenz(a,h)anthracene	0.0029[a]	0.621/0.015	2.34/0.21
Fluoranthene	0.0226	2,290/2,300	24,400/22,000
Fluorene[3]	0.0029[a]	2,290/2,300	24,400/22,000
Indeno(1,2,3-cd)pyrene	0.008843	6.21/0.15	23.4/2.1
1-Methylnaphthalene[3]	0.0029[a]	None/22	None/99
2-Methylnaphthalene[3]	0.0029[a]	None/310	None/4,100
Naphthalene[3]	0.0029[a]	45/3.6	252/18
Phenanthrene	0.0133	1,830/None	20,500/None
Pyrene	0.0183	1,720/1,700	18,300/17,000

[1] The first value is the primary NMED SSL (2009); the second value is the secondary USEPA RSL for soil (2011).
[2] Background value for lead based on surface soil samples (4) listed in Technical Memorandum No. ES01: Statistical Methodology for Evaluating Arsenic Concentrations in Soils at Cannon AFB, NM (Brown and Caldwell, 2008); the highest detection in subsurface samples (37) was 10 mg/kg.
[3] Background values for non-detect PAHs based on highest limit of detection
[4] Background value for PAHs based on 95 percent UTL (unless otherwise noted) – source: ProUCL® (Appendix I).
[a] Fewer than 2 detected values; background value based on highest LOD (see Section 5.6.4.1).

AFB = Air Force Base
mg/kg = milligrams per kilogram
NMED = New Mexico Environment Department
RSL = Regional Screening Level
SSL = Soil Screening Level
USEPA = U.S. Environmental Protection Agency
< = less than

4.5 Data Quality

Quality assurance (QA) is defined as the overall system for assuring the reliability of data produced. The system integrates quality planning, assessment, and improvement efforts from various groups in an organization to provide and maintain an effective system for collection and analysis of environmental samples and related activities. The program encompasses the generation of valid and complete data through its subsequent review, validation, and documentation. This section summarizes the QA/quality control (QC) procedures and presents the results of the QC assessment (Appendix H) for the analytical data acquired during the March 2011 field effort at Cannon AFB. All procedures were conducted in accordance with the *Cannon AFB CSE Phase II Work Plan – Version 2.0* (USACE, 2010).

A Quality Assurance Project Plan (QAPP) was developed as part of the CSE Phase II Work Plan. The QAPP was implemented through the integration of well-defined QC elements for activities associated with the task assignment. The QC criteria defined for sampling and analysis activities were developed in accordance with specifications contained in the *USACE EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans* (USACE, 2001), the *USEPA Guidance on Systematic Planning Using the Data Quality Objectives Process USEPA QA/G-4 (USEPA, 2006), and the DoD Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.1* (DoD 2009a).

Documentation required for this project was reviewed and deficiencies, if any, were identified. Project documentation included the following:

- Field Logbooks/Forms: Hardback logbooks with numbered pages were used to log daily activities and data collected during the course of field activities. Soil Sampling Log forms were completed for each sample location. Daily QC Report Forms were also completed for each day of field work.
- Chain-of-Custody (COC): Samples were collected and relinquished under stringent COC protocols as specified in the project QAPP. A review of COC forms indicates that all sample collection, identification, and project information was correctly supplied.
- Laboratory Data: Documents provided for or generated by the Versar Team in support of laboratory analysis. These are described in detail in the following subsections.

Sampling activities were performed in compliance with standard operating procedures (SOP), and each individual performing sampling was aware of the requisite protocols for collection of environmental samples. Each sampler was experienced in soil characterization and sampling techniques for the media collected. Team members were provided with copies of the associated Work Plan which included the QAPP and Accident Prevention Plan (APP) and Site Safety and Health Plan (SSHP).

4.5.1 Data Quality Objectives

DQOs were developed concurrently with the Work Plan to ensure: 1) reliability of field sampling and chemical/field analyses; 2) collection of sufficient data; 3) the quality of data generated was acceptable for its intended use; and 4) valid assumptions could be inferred from the data. The DQO process for the CSE Phase II is detailed in the QAPP presented in Section 9.0 and summarized in Tables 9-1 through 9-3 of the CSE Phase II Work Plan for Cannon AFB (USACE, 2011).

Attainment of DQOs for the analytical data was assessed through evaluation of all data collected using the data quality indicators listed in Table 4-3. Data quality was assessed through an evaluation of sampling collection and field measurement data, as well as the off-site analytical laboratory results.

All field samples were collected and analyzed by XRF as described in the Work Plan. XRF analytical QC checks were performed in accordance with USACE-Omaha Guidance on Small Arms Range Characterization of Lead Using XRF (USACE, 2008) and the QAPP. XRF QC requirements included analysis of instrument blanks (e.g., quartz sand with no detectable lead), calibration checks [standard reference material (SRM)], and replicate analyses. Daily QC included the analysis of blanks, replicates, and check samples. All blanks were non-detect for lead. The SRMs used [National Institute of Standards and Technology (NIST) 2781, NIST 2702, and NIST 2709a] had known concentrations of 202.1 mg/kg ± 1.1 mg/kg, 132.8 mg/kg ± 1.1 mg/kg, and 17.3 mg/kg ± 0.1 mg/kg, respectively. The SRM daily calibration checks were within 20 percent of the certified value as required. The QC results were documented in the XRF logbook (Appendix E).

The off-site laboratory QC checks (e.g., method and instrument blanks, instrument calibrations, laboratory control samples) were evaluated during the data review process. The QC results are discussed in detail in the data review reports located in Appendix H.

Table 4-3: Data Quality Indicators

Data Quality Indicator	Definition	Goal	Sampling Assessment	Analytical Assessment
Precision	Quantitative measure of the variability of a group of measurements in comparison to the average value (RPD or %D)	Low RPD	Duplicate samples	MS/MSD, lab sample duplicate, field sample duplicate
Accuracy & Bias	Bias in a measurement system (%R)	Low bias	Blank contamination	Analysis spike results (LCS, MS/MSD, surrogates)
Representativeness	Degree to which the measured results accurately reflect the medium being sampled	100%	Holding times, blanks, associated documentation	Inferred from accuracy, precision, and completeness evaluation
Completeness	Percentage of measurements which are judged to be usable (%R)	>90%	Records review	Data review
Comparability	Qualitative parameter expressing the confidence with which one data set can be compared with another	High	Work plans, quality documents	Analytical methods
Sensitivity	Quantitative measure of the level of detection and quantitation	High	Review of analytical method or procedures and instrumentation	Analysis of LODs and RLs per analyte, analytical method, and matrix

LCS = lab control sample
LOD = limit of detection
MS/MSD = matrix spike/matrix spike duplicate
RL = reporting limit
RPD = relative percent difference
%D = percent difference
%R = % Recovery

4.5.2 Lead Correlation Sampling

A total of 12 soil samples were selected for lead analysis, based on XRF results, to be used for the development of a correlation coefficient. The samples, which exhibited a range of XRF results, were sent to Microbac Analytical Laboratories for ICP analysis. Nine of the 12 samples yielded XRF results less than 20 ppm, and 3 samples were above 20 ppm. The highest XRF result at TS835 was 26 ppm. Lead correlation results are discussed in Section 5.6.3.2.2.

4.5.3 Analytical Methodology

The off-site analytical laboratory services for the sampling effort were provided by Microbac Analytical Laboratories located in Marietta, Ohio, a DoD Environmental Laboratory Accreditation Program (ELAP) and a National Environmental Laboratory Approval Program (NELAP)-accredited laboratory. The laboratory analyzed the soil samples using Test Methods for Evaluating Solid Waste Physical/Chemical Methods [SW846 (USEPA, 1986], as well as laboratory SOPs for this project. The analytical scope included analysis for the expected MCs of potential concern, identified based on the history of the range. Analytical methods applied to the Cannon CSE Phase II included SW846 Method 6010B (lead) and SW846 Method 8270C (PAHs). The entire laboratory report is included as Appendix G.

Further discussion of analytical methodology may be found in the *Comprehensive Site Evaluation Phase II Work Plan – Version 2.0* for Cannon AFB, NM (USACE, 2010).

4.5.4 Data Review

All analytical data reports were provided to Versar by the laboratory with full raw data packages and Environmental Restoration Program Information Management System (ERPIMS)-formatted electronic data files. Target analytes detected below the reporting limit (RL) and above the limit of detection (LOD) were reported by the laboratory as estimated values.

Data obtained from the laboratory were reviewed by the Versar Project QC Supervisor to determine whether the project-specific DQOs, as defined in the associated Work Plan were met. Data review included verification, validation, and usability reviews of all on-site field and off-site laboratory data. Appropriate data qualifiers were applied by Versar during the data review process. The data review reports are provided in Appendix H. The data validation portion of the data review process is described in more detail in the following section.

4.5.5 Data Validation

Data validation is a method-specific assessment that substantiates whether analytical requirements have been met and that data qualifiers have been applied appropriately and consistently. The objectives of the data validation review step are to: 1) quantitatively reproduce a subset of the analytical results while confirming that the specified analytical procedures were followed as written, and 2) ensure that data qualifiers have been applied

appropriately and consistently based on the data quality indicators used to assess the measurement quality objectives for the project.

The standard level of data validation is 10 percent of the number of normal field samples and associated field QC samples [e.g., field sample duplicates and replicates, matrix spike/matrix spike duplicate (MS/MSD) samples, and field blanks] collected and analyzed for a given analytical method and matrix. The necessary level of data validation may be streamlined or increased based on the results of the data verification review, previous findings for analyses performed by the laboratory, and other technical and project considerations. Data validation was performed on at least one sample per laboratory report/sample group. The actual level of data validation is documented in each report contained in Appendix H; overall for this project, it met the standard level of 10 percent.

Versar validated the data according to the general requirements for chemical measurements and using the specific analytical method criteria listed in the DoD QSM, as described in the Work Plan/QAPP. Analytical results were assessed for accuracy and precision to determine the limitations and quality of data. Final data review flags were applied to analytical results as a result of data verification and data validation and upon completion of the data review process.

Sample results that have not been qualified (other than for non-detection of analytes) indicate the data meet all acceptance criteria. All results are considered usable unless specifically qualified as rejected "R" during the validation process. None of the Cannon AFB data were qualified as rejected. Samples qualified "J" are considered acceptable as estimated with an explanation provided in data review reports, presented in Appendix H.

4.6 Data Management

Data management began in the planning stages of this project, to ensure electronic, hard copy, and GIS data would support the successful implementation and completion of this project. This required coordination with the laboratory, on-site XRF analysis staff and other personnel. The primary types of project data that were generated included visual survey, sample collection, GIS, analytical results including on-site field and off-site laboratory measurements, and data review and usability assessment reports. As described below, all project information and sample data were fully documented.

4.6.1 Electronic Data

The electronic project files are stored within a specified project directory on Versar's secure private network. Access to these files is restricted to only those personnel with key responsibilities to the project and who have been granted authority by the Versar Project Manager. These electronic files are backed-up daily, weekly, monthly, and yearly.

Sample results produced on-site using XRF instrumentation for lead, and sample results produced off-site using ICP-AES and GC/MS instrumentation for lead and PAHs respectively

were processed through the Environmental Resource Program Tools (ERPTools), which is a relational database tool that is used for the submission/delivery of electronic data in the ERPIMS format to the Air Force.

4.6.2 Hardcopy Data

Hard copy data generated during the project, including field notebooks, field forms, reports, correspondence, figures, and analytical data, are stored in the Cannon AFB project files located at the Versar office in Westminster, Colorado. Access to the office is limited to Versar personnel though a door security system. Hard copy documentation is contained in Appendices B,E,G and H

4.6.3 Geographic Information System Data

The GIS data layer files are stored on a separate directory within the Versar's secure private network. Access to these files is restricted to only those personnel with key responsibilities to the project and who have been granted explicit access rights by the Versar Project Manager. These electronic files also are backed-up daily, weekly, monthly, and yearly.

The conversion of raw data into the database and mapping software was performed at Versar's Colorado and Virginia offices. CSE Phase II data was stored and managed using GIS software. Field data collected during sampling was entered manually into the database and checked by another member of the field team. The output from the database was checked by the Versar Team QC Specialist to determine if it was consistent with the raw data.

5.0 MUNITIONS RESPONSE SITE CHARACTERISTICS

One MRA at Cannon AFB was evaluated under the CSE Phase II, based on potential sources of MC from munitions-related activities at TS835. This section presents the characteristics for this site, including a description, history of MEC activities, current land use, access controls, restrictions, field investigation results, identification of potential receptors, and natural resources.

5.1 Site Description

MRA TS835 is 29.4 acres, and located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area (Figure 1-1). The range was oriented to the northeast. The MRA extends beyond the installation boundary to the east onto the Rajen Dairy property. The off-base portion of the area contains four buildings; the on-base portion of the area does not contain any structures. The area generally consists of an open field with a sparse vegetative cover of low grasses. The only remnants of the range observed on-base include clay target debris and several slabs of concrete. The topography is relatively flat, sloping gently to the southeast. The soil type at the MRA was generally fine sandy loam. The coordinates of the approximate center of the MRA are 34.398436 degrees latitude, -103.299443 degrees longitude. The site is 1,800 ft by 960 ft with a perimeter of 4,700 ft.

5.2 History of Munitions Related Activities

Based on the CSE Phase I review of historical documents and aerial photos, TS835 was likely active from at least 1943 to at least 1946. During operation, munitions use was suspected to be 12-, 16-, or 20-gauge shotgun with shells containing lead shot (Table 2-1). Clay targets contained various PAH compounds, as described in Section 4.3. Typical Army Air Force/AFB SRs were used for training and/or recreational target shooting. No further documentation has been provided regarding the history of munitions-related activities in this area.

5.3 Current Land Use

The on-base portion of TS835 is an open field with no wetlands. To the north, including a portion of the north edge of the MRA, is IRP Site LF-02 (SWMU82). This unlined, inactive cut-and-fill landfill was active from 1946 through 1947, then from 1952 through 1959, and is reportedly covered by 4 to 4.5 ft of cover material consisting of sandy clay (Figure 2-2; A. T. Kearney, 1987). The off-base portion of the MRA is a private property owned by Rajen Dairy. It has a few buildings and is mainly used for storage..

5.4 Access Controls

No fencing or other controls are associated with most of MRA TS835, although access to Cannon AFB requires admittance through the security gate (the perimeter of the installation is fenced). The TS835 area is accessible to anyone with access to Cannon AFB or the adjacent Rajen Dairy property. Access to the on-base portion of the area is restricted to the general public

but accessible to authorized personnel. The eastern edge of the MRA is located on private property, which can be accessed by Rajen Dairy personnel or their visitors.

5.5 Restrictions

There are no restrictions for TS835 with regard to its former use as a firing range.

5.6 Field Investigation Results

This section presents the results of the site reconnaissance, and the sampling and analysis conducted in March 2011.

5.6.1 Site Reconnaissance Observations

The visual survey for TS835 was conducted on 15 March 2010 according to the procedures outlined in Section 5.3.2.1 of the *CSE Phase II Work Plan – Version 2.0* (USACE, 2010), resulting in 100 percent visual coverage of the MRA excluding the off-base area. Items of cultural debris and evidence of previous range use were documented in the field logbook as points of interest (POI) and are discussed below.

During the visual survey, a shotgun casing, two Remington plastic shotgun shells, and another plastic shotgun shell were found. In addition, an apparent modern .50-caliber projectile was found near the southeast corner of the SR fan. These items can be seen in Figure 5-1.

Several areas of clay target debris were identified at varying densities near the firing points of the range and extending about 300 ft downrange as presented in Figure 5-2. The MRA boundary indicated in the Figure shows the theoretical maximum shotfall zone for the skeet range (radius from the firing point of up to approximately 900 feet). Clay targets were easily identifiable by their black color and rounded, molded features, in addition to yellow paint (See Photo 4-3 and Photo 4-4). The extent of clay target debris was mapped according to density, with fragments impacting a total of 2.45 acres. Areas representing low density included clay target debris below ground to a depth of approximately 6 inches bgs; pieces of debris were found in 1 sample (SR045) from 6 to 12 inches bgs; a subsurface sample was collected from this location from 12-12.5 inches; this subsurface sample did not contain target debris. Areas representing medium density included clay target debris below ground to a depth of approximately 6 inches bgs; no pieces of debris were found from 6 to 12 inches bgs in these samples. A total of 25 samples were collected from representative soils at 12 locations within the clay target debris area for potential PAH analysis. The results are presented in Section 5.6.3.2.

Four (4) concrete shooting pads (about 3 by 3 ft) and a larger high-house concrete foundation (about 5 by 8 ft) were observed within TS835 (Figure 5-1). These appeared to be in-place and matched the CSE Phase II assumed orientation of the range. Another overturned pad was also found. These locations were recorded with the GPS, and noted in the field logbook (Appendix E). Additional areas of concrete debris and pea gravel were found. A 1.5-inch diameter metal

pipe, bent into a 3-sided shape about 3 ft wide and 4 ft long was found near concrete, and may have been a marker for a firing point.

Construction type debris observed included wood debris, a metal fence post, and fragments of potential asbestos containing tiles. A monitoring well, with an unlabeled 4-inch diameter protective casing inset into a 3 ft diameter concrete pad with four bollards, was also identified.

In accordance with the methodology described in the Final CSE Phase II Work Plan, because visual survey results did not indicate munitions related impact (i.e., clay target debris or other visual evidence) at or approaching the fence line at the eastern boundary of the Base, and because the ground surface on the Rajen Dairy property had been visibly altered (i.e., there were hay storage structures and well-used dirt roads), a visual survey was not conducted on the off-base portion of MRA TS835.

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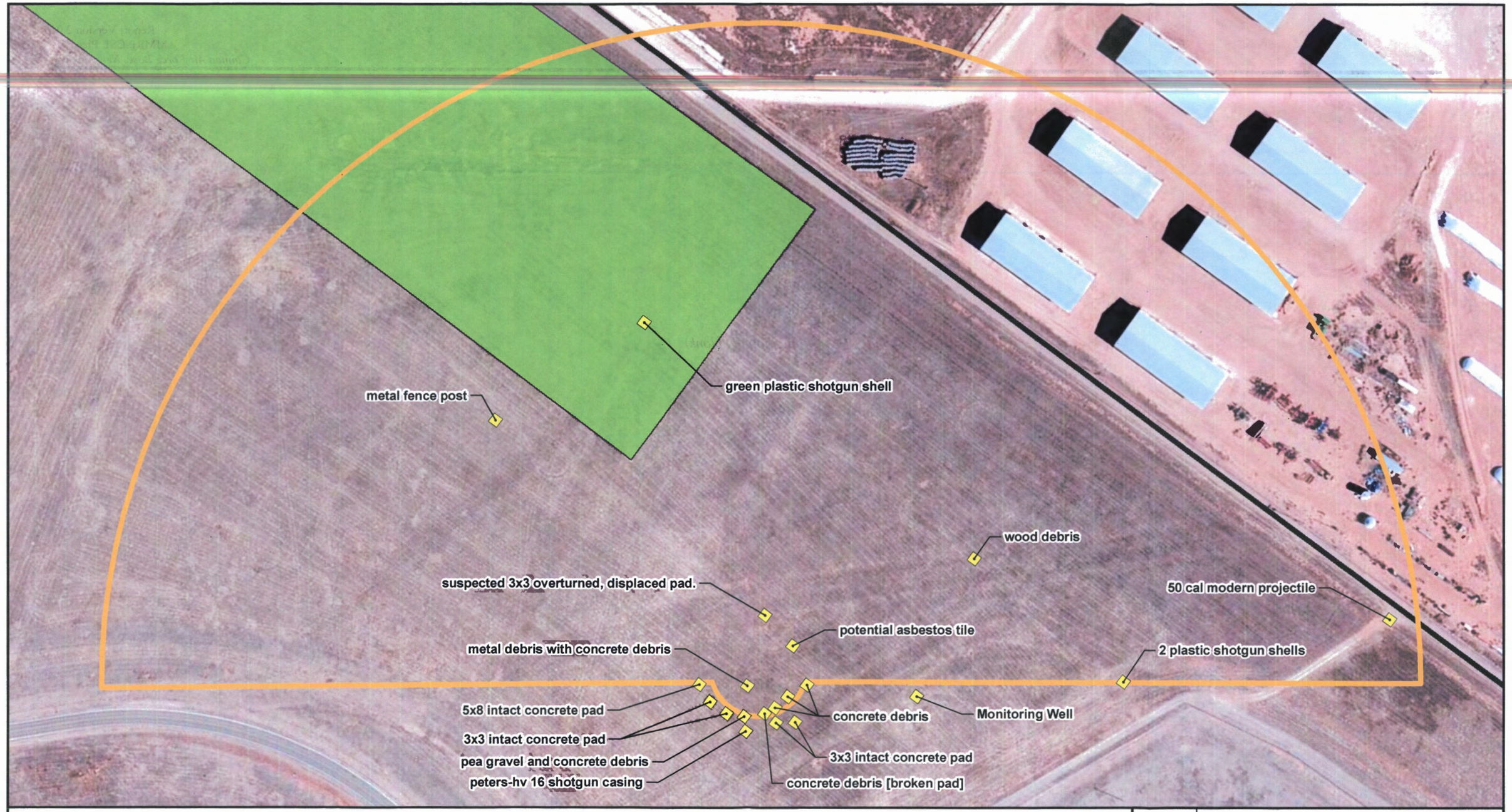

Legend

- Point of Interest
- MRA Boundary
- IRP Site LF-02

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N

0 75 150 300 Feet

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DRAWN: A. Ryder	DATE: 08/09/2011

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Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
- Visual Survey Results -
Construction and Cultural Debris Locations
Cannon AFB, NM

PROJECT NO. - FIGURE: 5-1

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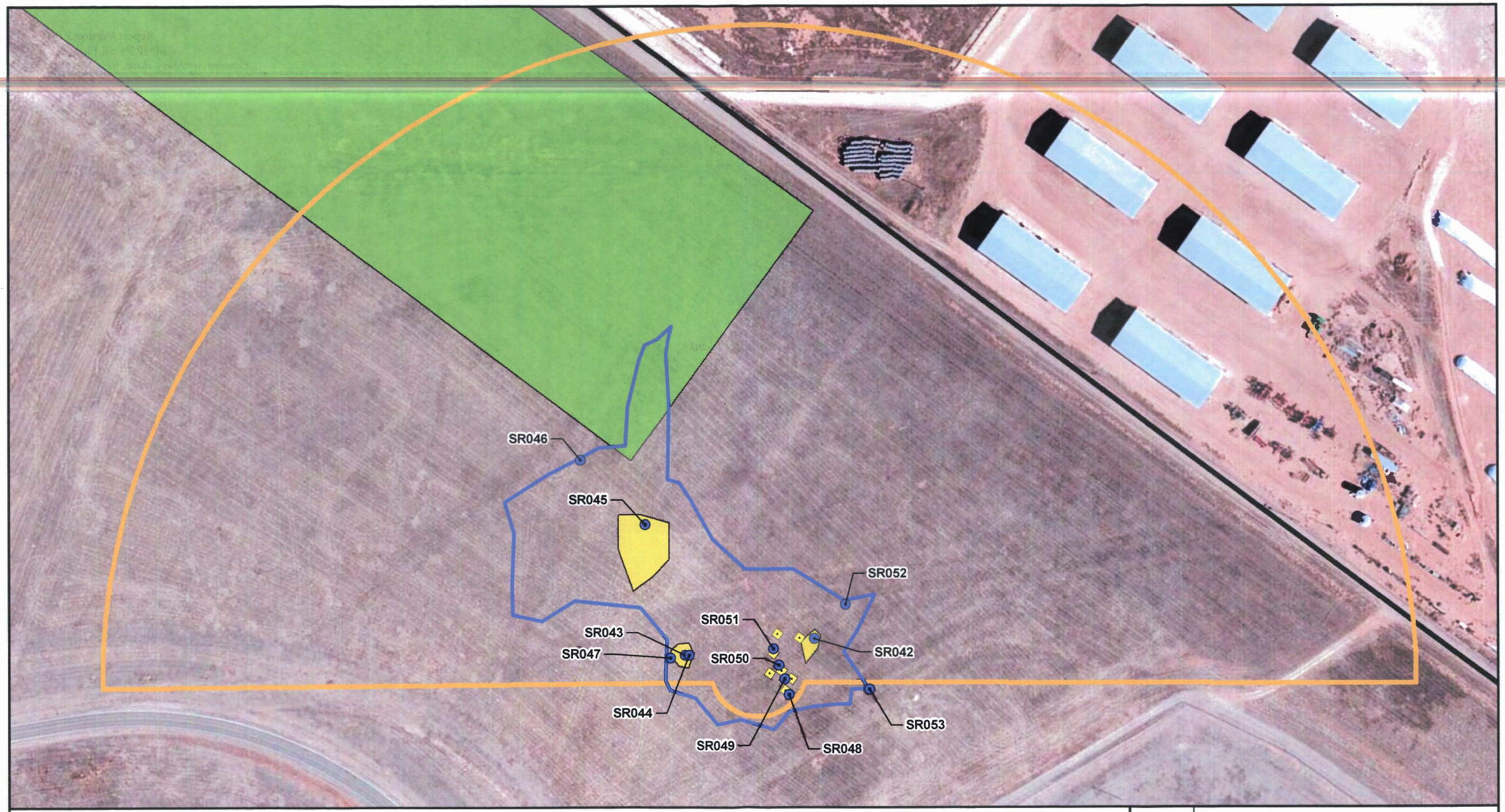

Legend

- PAH Samples
- Points of Medium Density Skeet Debris
- Total Extent of visible Skeet Debris
- Area of Low Density Skeet Debris
- MRA Boundary

0 100 200 400 Feet

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Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
Clay Target Debris
and PAH Sample Locations
Cannon AFB, NM

PROJECT NO. - FIGURE: 5-2

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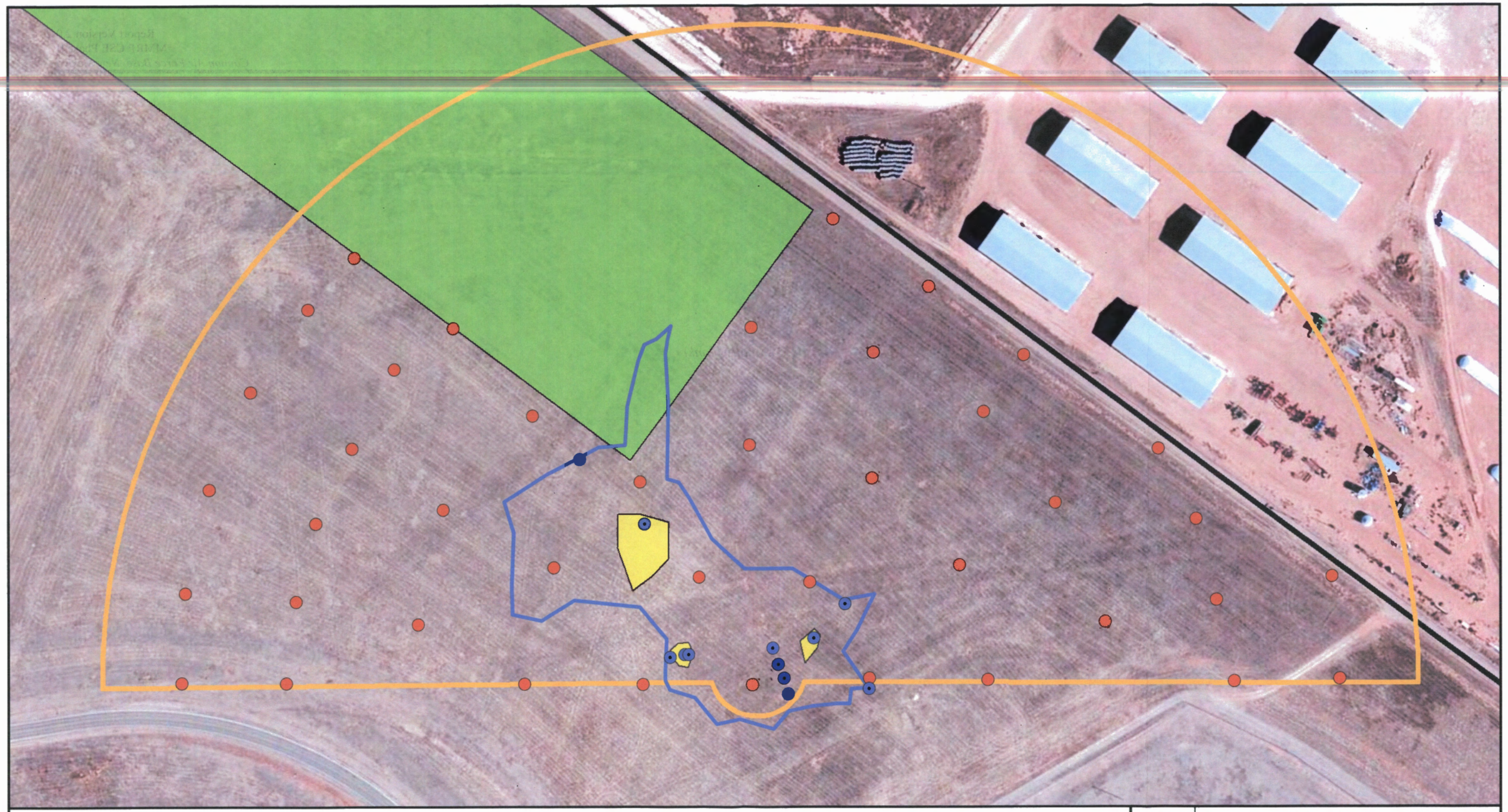

Legend

- PAH Samples
- Lead XRF Samples
- Total Extent of visible Skeet Debris
- Area of Low Density Skeet Debris
- MRA Boundary

0 100 200 400 Feet

N

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Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
Soil Sample Locations
Cannon AFB, NM

PROJECT NO. - FIGURE: 5-3

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5.6.2 Geophysical Survey Results

A geophysical survey was not performed for TS835 as it was not warranted to achieve the DQOs for this MRA.

5.6.3 Media Sampling Results

5.6.3.1 X-Ray Fluorescence Results

Sampling and on-site analysis of soil for lead contamination using a XRF was performed with the objective of identifying and delineating areas within the footprint of TS835 where lead was above the screening levels. The XRF sample locations and results for the MRA are presented in Figure 5-3 and Figure 5-4 respectively.

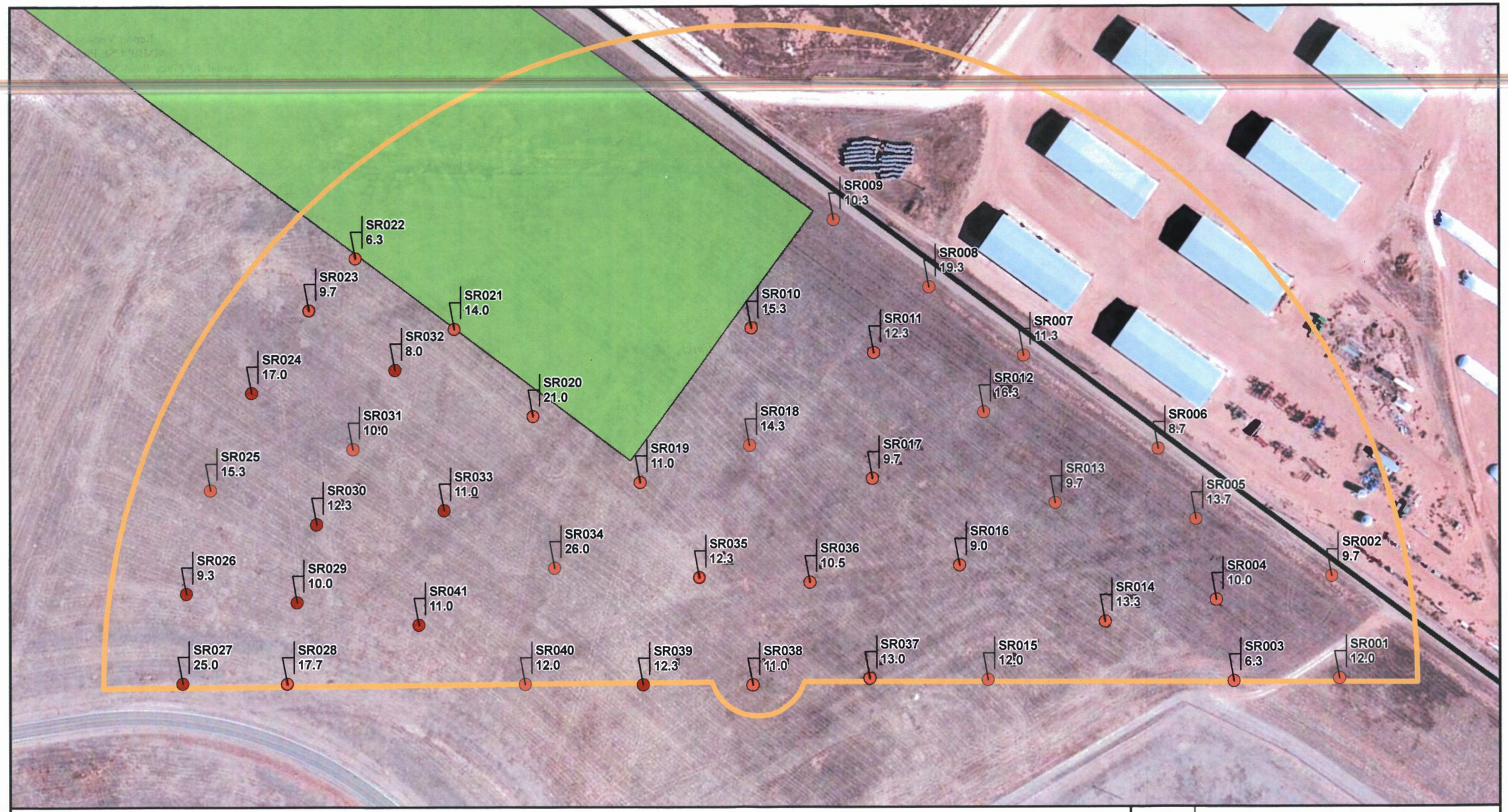
A total of 41 investigative samples were collected from TS835 and analyzed for lead by XRF. Because lead was not detected at elevated concentrations in the surface soil samples, no subsurface soil samples were collected. The soil lead results for the range are presented in Table 5-1. Lead was significantly below the primary NMED SSL and secondary USEPA RSL of 400 mg/kg for unrestricted/ residential land use in all samples collected from the MRA. All lead results were less than 50 ppm; the highest concentration of lead detected in any sample yielded an XRF concentration of 26 ppm. Results from samples submitted for off-site lead analysis to correlate to the XRF results are discussed in Section 5.6.3.2.2.

In accordance with the methodology described in the Final CSE Phase II Work Plan, because XRF results indicated that lead concentrations were well below screening levels at or approaching the fence line at the eastern boundary of the Base, no XRF samples were collected on the off-base portion of MRA TS835.

Table 5-1: XRF Results for 1940s SR, Surface Soil Samples (0 to 6 inches bgs)

Sample ID	Lead (ppm)	Sample ID	Lead (ppm)
SR001	12	SR022	6.3
SR002	9.7	SR023	9.7
SR003	6.3	SR024	17
SR004	10	SR025	15.3
SR005	13.7	SR026	9.3
SR006	8.7	SR027	25
SR007	11.3	SR028	17.7
SR008	19.3	SR029	10
SR009	10.3	SR030	12.3
SR010	15.3	SR031	10
SR011	12.3	SR032	8
SR012	16.3	SR033	11
SR013	9.7	SR034	26
SR014	13.3	SR035	12.3
SR015	12	SR036	10.5
SR016	9	SR037	13
SR017	9.7	SR038	11
SR018	14.3	SR039	12.3
SR019	11	SR040	12
SR020	21	SR041	11
SR021	14		

bgs = below ground surface
ID = identification
ppm = parts per million
SR = Skeet Range
XRF = X-ray fluorescence



Legend

XRF Sample Locations

MRA Boundary

15.0 - Lead XRF Results (ppm)*
* ppm- Parts Per Million

0 100 200 400 Feet

N

Note: Imagery © 2011 Microsoft Corporation
Available Exclusivly by DigitalGlobe, Aquisition date: Oct- Dec 2010.

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DESIGNED: D. Feiertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 08/09/2011

VERSAR
6850 VERSAR CENTER
SPRINGFIELD, VIRGINIA 22151
(703)750-3000

Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
XRF Sample Locations
and Results
Cannon AFB, NM

PROJECT NO. - FIGURE: 5-4

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5.6.3.2 Laboratory Analytical Results

5.6.3.2.1 Polynuclear Aromatic Hydrocarbons Results

The PAH laboratory analytical results for the soil samples collected in March 2011 were compared to the primary NMED SSLs and the secondary USEPA RSLs for residential use presented in Table 4-2. The laboratory sample results for PAHs are compared to the NMED SSLs in Table 5-2 and to the USEPA RSLs in Table 5-3. In summary, 8 of 25 soil samples collected from TS835 at Cannon AFB and analyzed for PAHs yielded concentrations greater than the NMED SSLs, and 20 of the 25 samples yielded concentrations greater than the USEPA RSLs. Analytes detected at concentrations greater than the NMED SSLs and also greater than the USEPA RSLs include:

- Benzo(a)pyrene;
- Dibenz(a,h)anthracene; and
- Indeno(1,2,3-c,d)pyrene.

Analytes detected at concentrations greater than the USEPA RSLs include:

- Benzo(a)anthracene;
- Benzo(b)fluoranthene; and
- Benzo(k)fluoranthene.

As previously mentioned, low and medium densities of clay target debris were identified and mapped at TS835 prior to sample collection (Figures 5-2 and 5-3). Surface samples (0 to 0.5 ft bgs) and subsurface samples (0.5 to 1 ft bgs) were collected at every location, with a deeper interval (1 to 1.5 ft bgs) collected from a low density area with clay target debris in the 0.5 to 1 ft bgs sample. PAH compounds were detected at concentrations greater than the screening at all intervals.

In accordance with the Final CSE Phase II Work Plan, the observed target fragments, in addition to other debris (e.g., vegetative matter and rocks), were removed from the soil before it was containerized. PAH concentrations above SSLs/RSLs in surface soil in the target fragment area suggested the PAH concentrations may be associated with release of the target fragments to the environment. It should be noted that there are other potential sources of PAH contamination in this immediate area, including exhaust from vehicles; grass is maintained regularly using gas powered mowers.

Some PAH compounds were not detected at concentrations greater than SSLs/RSLs in the subsurface samples (0.5 to 1 ft bgs), and PAH concentrations detected in the background samples were less than in the surface soil samples at 1940s SR. The presence or absence of the clay target fragments on the ground surface during the March 2011 visual survey was used to define the extent of munitions-related PAH contamination.

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TABLE 5-2

PAH Results vs. NMED SSLs
TS835

Sample ID	Max Depth (in)	PARAMETER / NMED SSL (ug/kg) / Result (ug/kg)	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		DIBENZ(a,h)ANTHRACENE		FLUORANTHENE		FLUORENE		INDENO(1,2,3-c,d)PYRENE		NAPHTHALENE		PHENANTHRENE		PYRENE	
			None		None		3440000		None		17200000		6210		621		6210		None		62100		621000		621		2290000		2290000		6210		45000		1830000		1720000	
			Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
SR042A	6		ND	U	28.3		749		ND	U	90.9		1640		5850		2900		5930		3630		1940		1660		776		41		5000		17.9	J	207		1080	
SR042B	12		ND	U	ND	U	27.9		ND	U	4.88	J	87.7		308		148		292		186		107		82.7		44.9		ND	U	268		ND	U	11.5		59.6	
SR043A	6		20.2	J	61.4	J	1450	J	15.5	J	168	J	2980	J	10200	J	4440	J	9420	J	6940	J	3490	J	3700	J	1450	J	80.9	J	8430	J	31.9	J	396	J	1920	J
SR043B	12		ND	U	ND	U	ND	U	ND	U	ND	U	4.14		15.3		8.38		16.4		11.5		5.19		5.72		2.48	J	ND	U	14.6		ND	U	ND	U	3.06	
SR044A	6		ND	U	ND	U	46.4		ND	U	8.14	J	183		657		331		682		447		234		182		96.4		ND	U	591		ND	U	24.4		129	
SR044B	12		ND	U	ND	U	1.71	J	ND	U	ND	U	6.18		23.3		12.6		24.9		18.7		8.01		8.79		3.56		ND	U	22.4		ND	U	ND	U	4.45	
SR045A	6		ND	U	8.49	J	47.1		ND	U	190		1840		2270		2170		1650		1930		2080		482		3080		23.9		1440		28		823		2230	
SR045B	12		6.91	J	9.16	J	39.3		ND	U	293		1710		1530		1580		940		1430		1860		377		3390		36.4		909		24.5		1290		2300	
SR045C	18		ND	U	ND	U	14.4		ND	U	25.9		482		602		591		431		528		564		163		562		ND	U	373		10.2	J	117		525	
SR046A	6		ND	U	ND	U	10.7	J	ND	U	18		486		661		656		520		542		581		130		628		ND	U	436		6.48	J	89.9		579	
SR046B	12		ND	U	ND	U	2.37	J	ND	U	4.31		46		55.6		47.3		36.9		53.1		60.2		14.6		65.8		ND	U	34.4		2.75		19.2		57	
SR047A	6		ND	U	ND	U	10.7		ND	U	3.3	J	58.3		190		110		203		130		75.6		53.2		44.8		ND	U	174		ND	U	12.1		49.5	
SR047B	12		ND	U	ND	U	16		ND	U	ND	U	65.6		240		116		240		151		81.7		86		33.2		ND	U	214		ND	U	7.52	J	45.5	
SR048A	6		ND	U	ND	U	8.39	J	ND	U	ND	U	40	J	144	J	69.5	J	148	J	102	J	50.2	J	37.9	J	21.5	J	ND	U	126	J	ND	U	5.83	J	27.8	J
SR048B	12		ND	U	ND	U	ND	U	ND	U	ND	U	3.51		10.9		5.61		11		8.65		4.25		3		ND	U	ND	U	10.1		ND	U	ND	U	3.22	
SR049A	6		ND	U	ND	U	133		ND	U	21.7	J	464		1630		749		1540		1170		562		431		221		ND	U	1370		ND	U	60.6		315	
SR049B	12		ND	U	ND	U	ND	U	ND	U	ND	U	2.55	J	7.93		4.45		8.42		5.93		2.85		2.31	J	ND	U	ND	U	7.51		ND	U	ND	U	1.55	J
SR050A	6		ND	U	2.68	J	59.9		ND	U	9.51		193		689		332		701		474		235		192		94.7		3.43	J	614		ND	U	22.7		128	
SR050B	12		ND	U	ND	U	22.4		ND	U	ND	U	87.4		323		169		310		224		106		86.4		40.8		ND	U	282		ND	U	8.87	J	ND	U
SR051A	6		ND	U	ND	U	27.7		ND	U	4.48	J	105		396		192		410		275		132		109		53.3		ND	U	357		ND	U	12.2		71.4	
SR051B	12		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
SR052A	6		ND	U	ND	U	ND	U	ND	U	ND	U	11		31.4		18.6		33.8		24.1		15		8.59		12.5		ND	U	28.6		ND	U	4.92	J	13.1	
SR052B	12		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	1.47	J	ND	U	1.51	J	ND	U	ND	U	ND	U	ND	U	ND	U	1.33	J	ND	U	ND	U	ND	U
SR053A	6		ND	U	ND	U	ND	U	ND	U	ND	U	2.82	J	4.05	J	4.47	J	4.03	J	3.94	J	4.05	J	ND	U	6.24		ND	U	3.69	J	ND	U	2.53	J	4.88	J
SR053B	12		ND	U	ND	U	10.3	J	ND	U	ND	U	35		126		64.8		126		89.4		40.9		33.1		17.9		ND	U	112		ND	U	ND	U	23.9	
BKG001A	6		ND	U	ND	U	ND	U	ND	U	ND	U	5.93		6.54		7.25		5.67		6.58		7.69		2.68	J	15.5		ND	U	5.2		ND	U	8.19		12.3	
BKG002A	6		ND	U	ND	U	ND	U	ND	U	ND	U	6.12		7.87		8.75		7.03		8.24		8.82		ND	U	18.5		ND	U	6.34		ND	U	7.01		13.6	
BKG003A	6		ND	U	ND	U	ND	U	ND	U	ND	U	4.42	J	5.35		6.69		4.66	J	4.89	J	6.41		ND	U	13.2		ND	U	4.25	J	ND	U	5.33		9.91	
BKG004A	6		ND	U	ND	U	ND	U	ND	U	ND	U	3.07	J	3.65	J	4.12	J	3.25	J	3.66	J	4.23	J	ND	U	7.9		ND	U	3.07	J	ND	U	3.61	J	6.12	
BKG005A	6		ND	U	ND	U	ND	U	ND	U	ND	U	2.74	J	3.27	J	3.78	J	2.88	J	3.48	J	3.76	J	ND	U	6.98		ND	U	2.73	J	ND	U	3.06	J	5.5	
BKG006A	6		ND	U	ND	U	ND	U	ND	U	ND	U	8.33		9.53		9.29		7.75		10.2		10.4		ND	U	22.6		ND	U	7.04		ND	U	10.9		18.3	
BKG007A	6		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	3.2	J	3.74	J	ND	U	3.31	J	3.61	J	ND	U	6.7	J	ND	U	ND	U	ND	U	ND	U	5.35	J
BKG008A	6		ND	U	ND	U	ND	U	ND	U	ND	U	3.4	J	4.01	J	4.27	J	3.13	J	4.04	J	4.53	J	ND	U	8.07		ND	U	3.17	J	ND	U	3.17	J	6.59	
BKG009A	6		ND	U	ND	U	ND	U	ND	U	ND	U	3.36	J	4.21	J	5.05	J	3.25	J	4.46	J	4.83	J	ND	U	8.96		ND	U	3.34	J	ND	U	4.13	J	6.71	
BKG010A	6		ND	U	ND	U	ND	U	ND	U	ND	U	4.6	J	5.34		6.03		4.28	J	5.73		6.55		ND	U	13.4		ND	U	4.16	J	ND	U	6.89		10.5	

Notes:
Bold results indicate value exceeds NMED SSL
ND = not detected above limit of detection
NMED SSL = New Mexico Environmental Department Soil Screening Level
ug/kg = micrograms per kilogram
TS835 = Former 1940s Skeet Range
SR = Skeet Range sample
BKG = background sample
Qual = data qualifier
J = estimated value
U = not detected above method detection limit
all results and RSLs reported as ug/kg unless otherwise stated

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TABLE 5-3

PAH Results vs. EPA RSLs
TS835

Sample ID	Max Depth (in)	PARAMETER	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		DIBENZ(a,h)ANTHRACENE		FLUORANTHENE		FLUORENE		INDENO(1,2,3-c,d)PYRENE		NAPHTHALENE		PHENANTHRENE		PYRENE	
		EPA RSL (ug/kg)	22000		310000		3400000		None		17000000		150		15		150		None		1500		15000		15		2300000		2300000		150		3800		None		1700000	
		Result (ug/kg)	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
SR042A	6		ND	U	28.3		749		ND	U	90.9		1640		5850		2900		5930		3630		1940		1660		776		41		5000		17.9	J	207		1080	
SR042B	12		ND	U	ND	U	27.9		ND	U	4.88	J	87.7		308		148		292		186		107		82.7		44.9		ND	U	268		ND	U	11.5		59.6	
SR043A	6		20.2	J	61.4	J	1450	J	15.5	J	168	J	2980	J	10200	J	4440	J	9420	J	6940	J	3490	J	3700	J	1450	J	80.9	J	8430	J	31.9	J	396	J	1920	J
SR043B	12		ND	U	ND	U	ND	U	ND	U	ND	U	4.14		15.3		8.38		16.4		11.5		5.19		5.72		2.48	J	ND	U	14.6		ND	U	ND	U	3.06	
SR044A	6		ND	U	ND	U	46.4		ND	U	8.14	J	183		657		331		682		447		234		182		96.4		ND	U	591		ND	U	24.4		129	
SR044B	12		ND	U	ND	U	1.71	J	ND	U	ND	U	6.18		23.3		12.6		24.9		18.7		8.01		8.79		3.56		ND	U	22.4		ND	U	ND	U	4.45	
SR045A	6		ND	U	8.49	J	47.1		ND	U	190		1840		2270		2170		1650		1930		2080		482		3080		23.9		1440		28		823		2230	
SR045B	12		6.91	J	9.16	J	39.3		ND	U	293		1710		1530		1580		940		1430		1860		377		3390		36.4		909		24.5		1290		2300	
SR045C	18		ND	U	ND	U	14.4		ND	U	25.9		482		602		591		431		528		564		163		562		ND	U	373		10.2	J	117		525	
SR046A	6		ND	U	ND	U	10.7	J	ND	U	18		486		661		656		520		542		581		130		628		ND	U	436		6.48	J	89.9		579	
SR046B	12		ND	U	ND	U	2.37	J	ND	U	4.31		46		55.6		47.3		36.9		53.1		60.2		14.6		65.8		ND	U	34.4		2.75		19.2		57	
SR047A	6		ND	U	ND	U	10.7		ND	U	3.3	J	58.3		190		110		203		130		75.6		53.2		44.8		ND	U	174		ND	U	12.1		49.5	
SR047B	12		ND	U	ND	U	16		ND	U	ND	U	65.6		240		116		240		151		81.7		86		33.2		ND	U	214		ND	U	7.52	J	45.5	
SR048A	6		ND	U	ND	U	8.39	J	ND	U	ND	U	40	J	144	J	69.5	J	148	J	102	J	50.2	J	37.9	J	21.5	J	ND	U	126	J	ND	U	5.83	J	27.8	J
SR048B	12		ND	U	ND	U	ND	U	ND	U	ND	U	3.51		10.9		5.61		11		8.65		4.25		3		ND	U	ND	U	10.1		ND	U	ND	U	3.22	
SR049A	6		ND	U	ND	U	133		ND	U	21.7	J	464		1630		749		1540		1170		562		431		221		ND	U	1370		ND	U	60.6		315	
SR049B	12		ND	U	ND	U	ND	U	ND	U	ND	U	2.55	J	7.93		4.45		8.42		5.93		2.85		2.31	J	ND	U	ND	U	7.51		ND	U	ND	U	1.55	J
SR050A	6		ND	U	2.68	J	59.9		ND	U	9.51		193		689		332		701		474		235		192		94.7		3.43	J	614		ND	U	22.7		128	
SR050B	12		ND	U	ND	U	22.4		ND	U	ND	U	87.4		323		169		310		224		106		86.4		40.8		ND	U	282		ND	U	8.87	J	ND	U
SR051A	6		ND	U	ND	U	27.7		ND	U	4.48	J	105		396		192		410		275		132		109		53.3		ND	U	357		ND	U	12.2		71.4	
SR051B	12		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	ND	U
SR052A	6		ND	U	ND	U	ND	U	ND	U	ND	U	11		31.4		18.6		33.8		24.1		15		8.59		12.5		ND	U	28.6		ND	U	4.92	J	13.1	
SR052B	12		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	1.47	J	ND	U	1.51	J	ND	U	ND	U	ND	U	ND	U	ND	U	1.33	J	ND	U	ND	U	ND	U
SR053A	6		ND	U	ND	U	ND	U	ND	U	ND	U	2.82	J	4.05	J	4.47	J	4.03	J	3.94	J	4.05	J	ND	U	6.24		ND	U	3.69	J	ND	U	2.53	J	4.88	J
SR053B	12		ND	U	ND	U	10.3	J	ND	U	ND	U	35		126		64.8		126		89.4		40.9		33.1		17.9		ND	U	112		ND	U	ND	U	23.9	
BKG001A	6		ND	U	ND	U	ND	U	ND	U	ND	U	5.93		6.54		7.25		5.67		6.58		7.69		2.68	J	15.5		ND	U	5.2		ND	U	8.19		12.3	
BKG002A	6		ND	U	ND	U	ND	U	ND	U	ND	U	6.12		7.87		8.75		7.03		8.24		8.82		ND	U	18.5		ND	U	6.34		ND	U	7.01		13.6	
BKG003A	6		ND	U	ND	U	ND	U	ND	U	ND	U	4.42	J	5.35		6.69		4.66	J	4.89	J	6.41		ND	U	13.2		ND	U	4.25	J	ND	U	5.33		9.91	
BKG004A	6		ND	U	ND	U	ND	U	ND	U	ND	U	3.07	J	3.65	J	4.12	J	3.25	J	3.66	J	4.23	J	ND	U	7.9		ND	U	3.07	J	ND	U	3.61	J	6.12	
BKG005A	6		ND	U	ND	U	ND	U	ND	U	ND	U	2.74	J	3.27	J	3.78	J	2.88	J	3.48	J	3.76	J	ND	U	6.98		ND	UJ	2.73	J	ND	U	3.06	J	5.5	
BKG006A	6		ND	U	ND	U	ND	U	ND	U	ND	U	8.33		9.53		9.29		7.75		10.2		10.4		ND	U	22.6		ND	U	7.04		ND	U	10.9		18.3	
BKG007A	6		ND	U	ND	U	ND	U	ND	U	ND	U	ND	U	3.2	J	3.74	J	ND	U	3.31	J	3.61	J	ND	U	6.7	J	ND	U	ND	U	ND	U	ND	U	5.35	J
BKG008A	6		ND	U	ND	U	ND	U	ND	U	ND	U	3.4	J	4.01	J	4.27	J	3.13	J	4.04	J	4.53	J	ND	U	8.07		ND	U	3.17	J	ND	U	3.17	J	6.59	
BKG009A	6		ND	U	ND	U	ND	U	ND	U	ND	U	3.36	J	4.21	J	5.05	J	3.25	J	4.46	J	4.83	J	ND	U	8.96		ND	U	3.34	J	ND	U	4.13	J	6.71	
BKG010A	6		ND	U	ND	U	ND	U	ND	U	ND	U	4.6	J	5.34		6.03		4.28	J	5.73		6.55		ND	U	13.4		ND	U	4.16	J	ND	U	6.89		10.5	

Notes:
Bold results indicate value exceeds EPA RSL
ND = not detected above limit of detection
EPA RSL = US Environmental Protection Agency Residential Screening Level
ug/kg = micrograms per kilogram
TS835 = Former 1940s Skeet Range
SR = Skeet Range sample
BKG = background sample
Qual = data qualifier
J = estimated value
U = not detected above method detection limit
all results and RSLs reported as ug/kg unless otherwise stated

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5.6.3.2.2 Lead Correlation Results

As previously mentioned, a total of 12 soil samples were selected for off-site lead analysis, based on XRF results, to develop a correlation between the field XRF results and the off-site laboratory results. The locations of the soil samples selected for off-site analysis are shown on Figure 5-5. The XRF and laboratory analysis results were plotted and evaluated for correlation for the specific site and sampling effort using a linear regression process to measure slope. The data used in the correlation plot are presented in Table 5-4. A graphical plot of the regression line and lead data is presented in Figure 5-6. The calculated positive correlation coefficient of 0.93 indicates that the XRF results may be considered definitive in accordance with USEPA SW846 Method 6200, and the correlation analyses can be used to verify the quality of the XRF data.

XRF analyses provide a measure of the amount of lead in a soil sample on an "as received" basis irrespective of the mass or weight of sample analyzed. The measured concentration is expressed as the number of lead-specific energy counts in a unit of time counted, which is represented in the proportional measure ppm. Laboratory-based ICP-AES analyses under USEPA SW846 Method SW6010B provide a measure of the amount of lead in a soil sample on a "dry-weight" basis, which takes into account the moisture content of the soil, for a specific mass or weight of sample analyzed. The measured concentration is expressed as the mass or weight of lead in a specific weight of dry soil and is represented in the unit weight measure mg/kg. As measures of lead in soil concentration, the proportional measure (i.e., ppm) is equivalent to the unit weight measure (i.e., mg/kg). For comparability, lead results in this report are typically presented as a unit weight measure (i.e., mg/kg) for both on-site XRF and off-site laboratory ICP-AES analyses.

Table 5-4: Lead Correlation Sample Results for Cannon AFB

Sample ID	Sample Depth (inches bgs)	Lead Concentration		RPD[1] (%)
		XRF ppm (Field)	ICP mg/kg (Lab)	
SR034A	0 - 6	26	22.7	13.6
SR027A	0 - 6	25	21.2	16.5
SR020A	0 - 6	21	17.9	15.9
SR008A	0 - 6	19.3	22.1	13.5
SR024A	0 - 6	17	20.6	19.1
SR010A	0 - 6	15.3	14.3	6.8
SR037A	0 - 6	13	11.4	13.1
SR001A	0 - 6	12	10.4	14.3
SR004A	0 - 6	10	8.02	22.0
SR016A	0 - 6	9	8.35	7.5
SR032A	0 - 6	8	10.6	28.0
SR003A	0 - 6	6.33	6.53	3.1

[1] –RPD is calculated for each individual result set using the absolute value of the difference between the XRF result and laboratory analytical result divided by the average of the two results multiplied by 100 percent.
AFB = Air Force Base
bgs = below ground surface
ICP = inductively coupled plasma
mg/kg = milligrams per kilogram
ppm = parts per million
RPD = relative percent difference
XRF = X-ray fluorescence

Legend

Lead Correlation Sample Locations

MRA Boundary

0 100 200 400 Feet

Note: Imagery © 2011 Microsoft Corporation
Available Exclusivly by DigitalGlobe, Aquisition date: Oct- Dec 2010.

U.S. ARMY CORPS OF ENGINEERS

OMAHA DISTRICT

DESIGNED: D. Feiertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 08/09/2011

VERSAR
6850 VERSAR CENTER
SPRINGFIELD, VIRGINIA 22151
(703)750-3000

Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
Lead Correlation
Soil Sample Locations
Cannon AFB, NM

PROJECT NO. - FIGURE: 5-5

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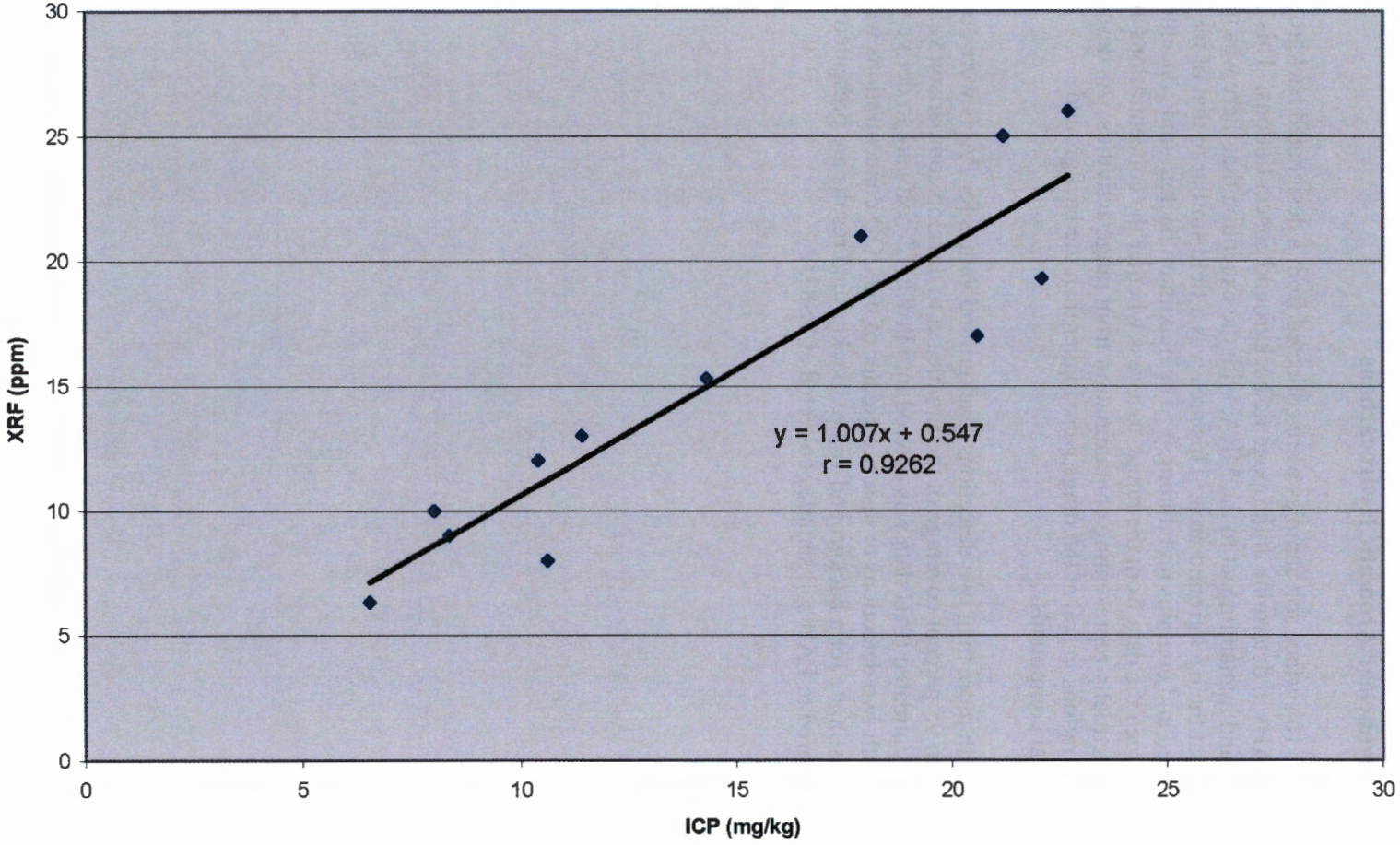
Figure 5-6: Cannon AFB Lead Samples – XRF vs. ICP



5.6.4 Background Determination

5.6.4.1 Polynuclear Aromatic Hydrocarbons

Under the CSE Phase II, 10 surface soil samples were collected from a designated background area and analyzed for PAHs to determine anthropogenic background concentrations. This area was similar in soil type and human impact to the MRA, with the exception that there was no historical munitions use at the background area. This area was a field similar to that of the MRA (i.e., it is currently unused and contains no buildings). The maximum background concentrations were initially used to screen the data from the range, to assess whether the concentrations at the range were elevated, potentially representing contamination from range activities. As described below, the PAH concentrations in soil at the range were higher than the background concentrations for several compounds.

For PAH compounds with more than two detections, background values for PAHs were applied to a 95 percent UTL with 95 percent coverage of the sample set to develop comparison values for each PAH analyte. Validated PAH data was entered into ProUCL® software to derive values. For PAH compounds with two detections or less, the greater of the LOD concentrations were used as a conservative estimate for a background value. Background results are presented in Table 5-5 and are compared to PAH soil samples collected at TS835.

Table 5-5: PAH Anthropogenic Background Comparison to TS835 at Cannon AFB

PAH	Background[1] Value (mg/kg)	Range Surface Soil		Range Subsurface Soil	
		# Samples above Background[2]	Max (mg/kg)	# Samples above Background[2]	Max (mg/kg)
1-Methylnaphthalene	0.0029[a]	1	0.0202	1	0.00691
2-Methylnaphthalene	0.0029[a]	3	0.0614	1	0.00916
Acenaphthene	0.0029[a]	10	1.45	6	0.0393
Acenaphthylene	0.0029[a]	1	0.0155	0	ND
Anthracene	0.0029[a]	9	0.19	4	0.293
Benzo(a)anthracene	0.0095	11	2.98	7	1.710
Benzo(a)pyrene	0.0095	12	10.2	10	1.53
Benzo(b)fluoranthene	0.0093	11	4.44	8	1.58
Benzo(g,h,i)perylene	0.0094	12	9.42	10	0.94
Benzo(k)fluoranthene	0.0102	11	6.94	9	1.43
Chrysene	0.0104	11	3.49	7	1.86
Dibenz(a,h)anthracene	0.0029[a]	11	3.7	11	0.377
Fluoranthene	0.0226	9	3.08	7	3.39
Fluorene	0.0029[a]	4	0.0809	1	0.0364
Indeno(1,2,3-cd)pyrene	0.0084	11	8.43	10	0.909
Naphthalene	0.0029[a]	4	0.0319	2	0.245
Phenanthrene	0.0129	7	0.823	3	1.29
Pyrene	0.0183	10	2.23	6	2.3

[1]Background value determination detailed in Section 5.6.4.
[2]Non-detect values assumed to be less than background concentration.
[a]Fewer than 2 detected values; background value based on highest LOD (see Section 5.6.4.1).

AFB = Air Force Base
mg/kg = milligrams per kilogram
ND = not detected
PAH = polynuclear (or polycyclic) aromatic hydrocarbons

5.6.4.2 Metals

Background metals data for soil contained in the Technical Memorandum No. ES01: Statistical Methodology for Evaluating Arsenic Concentrations in Soils at Cannon AFB, NM (Brown and Caldwell, 2008) was used to evaluate lead concentrations at 1940s SR. The soil sample data

from the MRA was compared to the background levels to determine whether the concentrations at the range were elevated due to range activities. Background values are presented in Table 5-6.

Of the 41 lead samples analyzed by XRF at TS835, two (2) samples yielded results between the background concentration of 5.6-7.4 mg/kg. All other samples (39 samples) yielded results above the background concentration. The highest value, SR034 at 26.0 ppm, was located approximately 300 ft northwest of the firing point. Although all but two (2) lead samples exceed the background value of 5.6-7.4 mg/kg, all samples collected and analyzed for lead at TS835 were well below the RSL of 400 mg/kg.

It should be noted that the detection limit (DL) of the XRF was near the background value for lead in soil. Of the 39 lead results above the Cannon AFB background range of 5.6 to 7.4 mg/kg, 37 detected results were less than 20 ppm.

Table 5-6: Metals Background Comparison for Cannon AFB

Analyte - Method	Background[1] (mg/kg)	Range Surface Soil	
		# Samples above Background/ Total	Max (mg/kg)
Lead	5.6-7.4	39/41[2]	26.0

[1] Background values for metals based on Technical Memorandum No. ES01: Statistical Methodology for Evaluating Arsenic Concentrations in Soils at Cannon AFB, NM (Brown and Caldwell, 2008).
[2] The approximate detection limit for the XRF was above the background value for lead (20 ppm); no samples yielded ND XRF concentrations for any of the analyses.
AFB = Air Force Base
mg/kg = milligrams per kilogram
ND = not detected above the detection limit
ppm = parts per million
XRF = X-ray fluorescence

5.7 Identification of Potential Receptors

TS835 is located amidst the active airfield, operational buildings, and recreational areas, in the area of maintained grasses. Current human receptors at SR could be base personnel, including those working in the vicinity performing grounds maintenance.

5.7.1 Nearby Population

Cannon AFB is located approximately 8 miles west of the city of Clovis, in Curry County, New Mexico.It had a population estimate of 32,863 people in 2009 (U.S. Census, 2011). In 2009, the population density of Curry County was 32 persons per square mile (U.S. Census, 2011).

5.7.2 Buildings Near/Within Munitions Response Area

No Cannon AFB operational buildings are located within the footprint of the MRA. The off-base portion of the MRA extending onto the Rajen Dairy Property contains four buildings. Numerous buildings are located within a one-mile radius of the MRA. There are more than 26 buildings within a 2-mile radius of TS835 (these numbers are a classification designation within the EHE module).

5.7.3 Utilities Near/Within Munitions Response Area

It is expected that there are underground utilities near or in MRA TS835, however, all utilities were buried greater than 1.5ft deep (the maximum sampling depth).

5.8 Natural Resources

5.8.1 Wetlands

No wetlands have been identified at or near MRA TS835 (CH2M Hill, 1983).

5.8.2 Rare, Threatened, or Endangered Species

There is one endangered species candidate, the black-tailed prairie dog, in the vicinity of Cannon AFB. The black-tailed prairie dog is not found at MRA TS835. There are no other known, threatened, endangered, or special status species identified near the SR at Cannon AFB, NM (USACE, 2009).

5.8.3 Cultural Resources

There are no archaeological sites or historic sites documented for MRA TS835 at Cannon AFB, NM (USACE, 2009).

6.0 EVALUATION OF KNOWN/SUSPECTED MEC

6.1 Munitions and Explosives of Concern Technical Data

Only evidence of small arms use was found at TS835 at Cannon AFB. As no historical or physical evidence of MEC present at these MRAs, no MEC technical data are provided.

6.2 Primary Sources and Release Mechanisms

As discussed above, there is no historical or physical evidence of MEC present at the Cannon AFB MRA. Therefore, no primary sources of MEC are identified for Cannon AFB.

6.3 Munitions and Explosives of Concern Locations (Secondary Sources)

As there is no historical or physical evidence of MEC present at the Cannon AFB MRA, secondary sources of MEC are not applicable to this installation.

6.4 Munitions and Explosives of Concern Penetration Estimates

As there is no historical or physical evidence of MEC present at the Cannon AFB MRA, penetration estimates are not applicable.

6.5 Special Consideration Munitions and Explosives of Concern

In addition to conventional ordnance contamination, the HRRs also examined the site for the presence of special consideration MEC (e.g., CWM, DU). Based upon evidence collected from archives research, no special consideration MEC was used at the Cannon AFB MRA.

6.6 Known/Suspected Munitions Constituents

The MCs associated with munitions used at TS835 include lead from ammunition and PAHs from clay targets. None of the MCs known or suspected to be present at Cannon AFB are considered to be an explosive concern, and therefore, do not fall under the definition of MEC.

6.7 Explosive Safety Submission Information

There are no known explosive hazards associated with the MRA at Cannon AFB. Therefore, an Explosive Safety Submission (ESS) is not required although an NFA-ESS document will be prepared if no other action is deemed appropriate for (portions of) TS835.

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7.0 EVALUATION OF HAZARDOUS WASTE/SUBSTANCES

7.1 Hazardous Waste Activities

There are approximately 56 active or closed IRP, CRP (Compliance Restoration Program), or compliance associated sites at Cannon AFB. One of these sites (LF-02) overlaps with the MRA being investigated under this CSE Phase II investigation. The locations of the current sites are shown on Figure 7-1.

7.2 Hazardous Waste Characteristics

The overlapping area of the landfill (LF-02) within the MRA was not sampled during this CSE Phase II investigation as it is a closed IRP site. Soil analysis results from LF-02 in 1985 showed lead levels below the current USEPA residential RSL of 400 ppm (A.T. Kearny, 1987). There is no apparent overlap between sampling for MC in soils during the MMRP investigation at 1940s SR or the contaminants found under the IRP investigations at any of the other IRP sites, as discussed in the previous section.

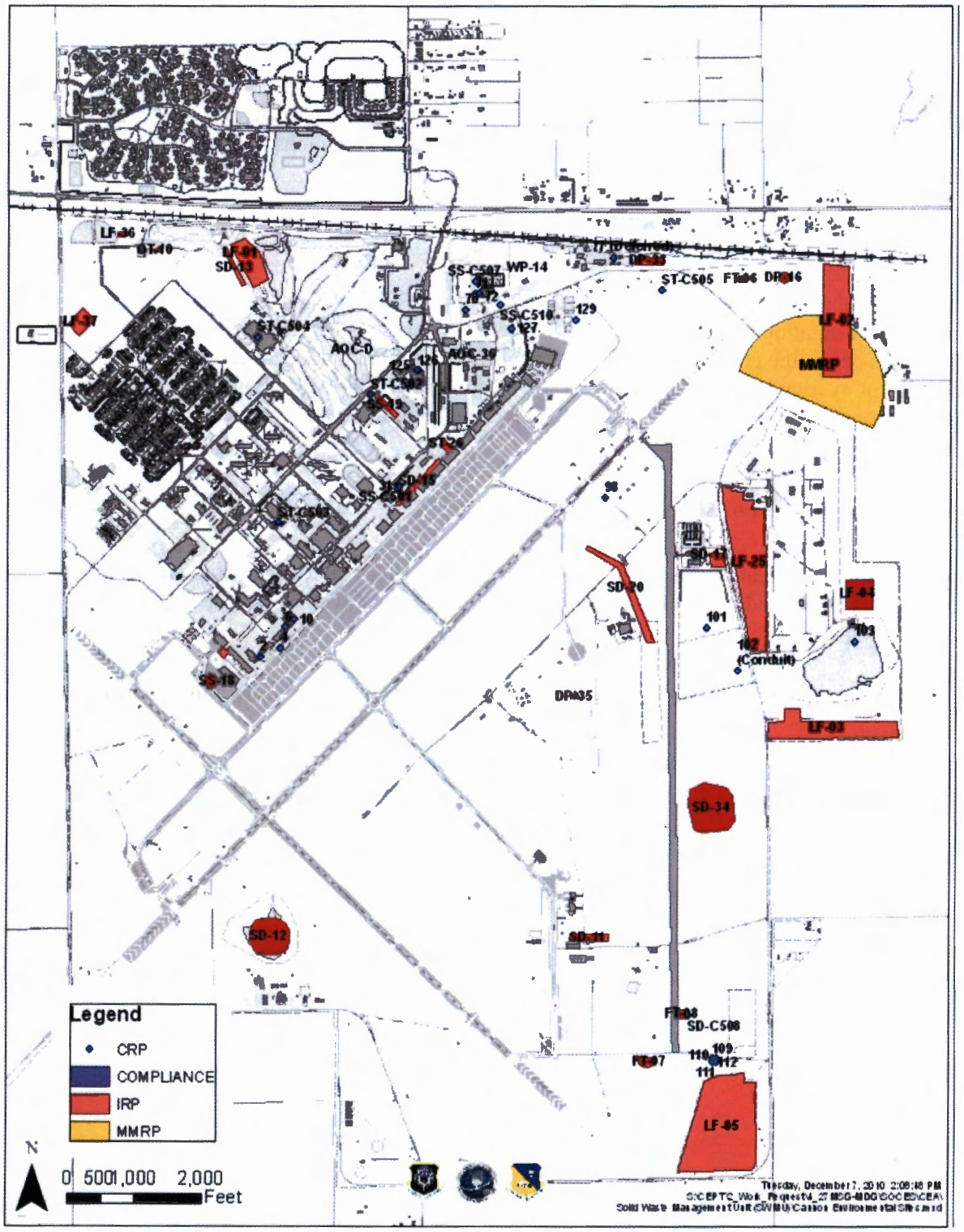
7.3 Identification of Source Areas

Based on soil analytical results from LF-02 (AT Kearny, 1987) there are no known continuing source areas associated with MRA TS835 at Cannon AFB that overlap with the MMRP investigation at TS835.

7.4 Characterization of Potential Contaminants of Concern Known/Suspected Releases

The CSE Phase II investigation did not identify any previously unidentified contaminants of potential concern (COPC) or known or suspected releases at Cannon AFB.

Figure 7-1: Current IRP Site Locations



8.0 CONCEPTUAL SITE MODEL

The CSM was developed to address potential MEC and/or MC environmental contamination. The CSM is a description of the site and its environment based on existing knowledge. It describes contamination sources and possible receptors, and the interactions that link them. The CSM is intended to assist in planning, interpreting data, and communicating, and evolves through an iterative process of further data collection or action. The following CSM information for Cannon AFB was refined through the CSE Phase II process.

8.1 Munitions and Explosives of Concern

Sources are those areas where MEC has entered (or may enter) the physical system. There were no validated sources of MEC at the Cannon AFB MRA, as described in Section 6.0. Munitions-related activities that are known to have occurred at Cannon AFB were associated with small arms use. None of the MC known or suspected to be present at the Cannon AFB MRA are considered to be an explosive concern, and therefore, do not fall under the definition of MEC.

Since there is no historical or physical evidence of MEC associated with the Cannon AFB MRA and no evidence of MEC was observed during the CSE Phase II investigation, the MEC exposure pathways are considered incomplete.

8.1.1 Munitions and Explosives of Concern Exposure Pathway Analysis

The information presented in the Interim CSM was used to identify all actual, potentially complete, or incomplete source-receptor interactions for the site, for both current and reasonably anticipated future land uses. An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. As there is no evidence of MEC use at the Cannon AFB MRA, there are no MEC exposure pathways.

8.1.2 Transport Processes

As there is no evidence of MEC at the Cannon AFB MRA, an evaluation of transport process is not applicable.

8.1.3 Exposure Media and Accessibility

As there is no evidence of MEC at the Cannon AFB MRA, an evaluation of exposure media and accessibility is not applicable.

8.1.4 Munitions and Explosives of Concern Exposure Receptors

The receptors that were considered for Cannon AFB were: authorized installation personnel, authorized contractors and visitors, trespassers, and biota. However, as previously stated, there is no historical or physical evidence of MEC at the Cannon AFB MRA; therefore, the potential pathways associated with the above listed receptors are considered incomplete with respect to MEC.

8.1.5 Munitions and Explosives of Concern Exposure Conclusions

There is no historical or physical evidence of explosive MEC associated with TS835. Therefore, exposure to MEC is not applicable for this MRA. The only military munitions use identified at this MRA are associated with small arms. Once fired, these may result in release of MC.

8.2 Munitions Constituents, Hazardous Substances, Pollutants and Contaminants, and Other Constituents

An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. At the Cannon AFB MRA, only terrestrial exposures are expected potentially to occur. The sources of MC at TS835 are the munitions-related activities associated with the SR as summarized in Section 5.2. Lead, detected above background concentrations at certain locations within the SR, is associated with shot and primer. PAHs detected in the surface and subsurface soil at the SR are from clay target fragments, which are composed of a mineral powder held together with an asphalt-like petroleum pitch binder that contains PAH compounds. MC may have been released directly to soil during the initial deposition activity or through weathering of munitions-related debris (e.g., lead shot or clay target fragments).

Prior to the CSE Phase II work, the Interim CSM was used to identify all actual, potentially complete, or incomplete source-receptor interactions for the site, for both current and reasonably anticipated future land uses, to design the sampling approach. Each MC pathway includes a source, an exposure medium, an exposure route, and a receptor. The MC pathways may also include a release mechanism and a transport medium if the point of exposure is not at the same location as the source. Environmental contaminants, such as MC, often undergo various processes (e.g., migration) such that media other than the source area can become contaminated. A combination of naturally-occurring and human activities increases the risk of exposure to MC. Natural occurrences, such as soil erosion due to high winds or water action, can loosen and displace soils, causing MC located on or beneath the ground surface at the MRAs to be moved or exposed. At the time of the MC release into the environment, the medium receiving the item was soil. The CSM for MC exposure at Cannon AFB is presented in Figure 8-1.

The fate and transport of the MC are dependent on a wide variety of factors. Contaminant fate refers to the expected final state that an element, compound, or group of compounds will achieve following release to the environment. Contaminant transport refers to the mechanisms and rates of migration of contaminants away from the source area. Migration pathways often include air,

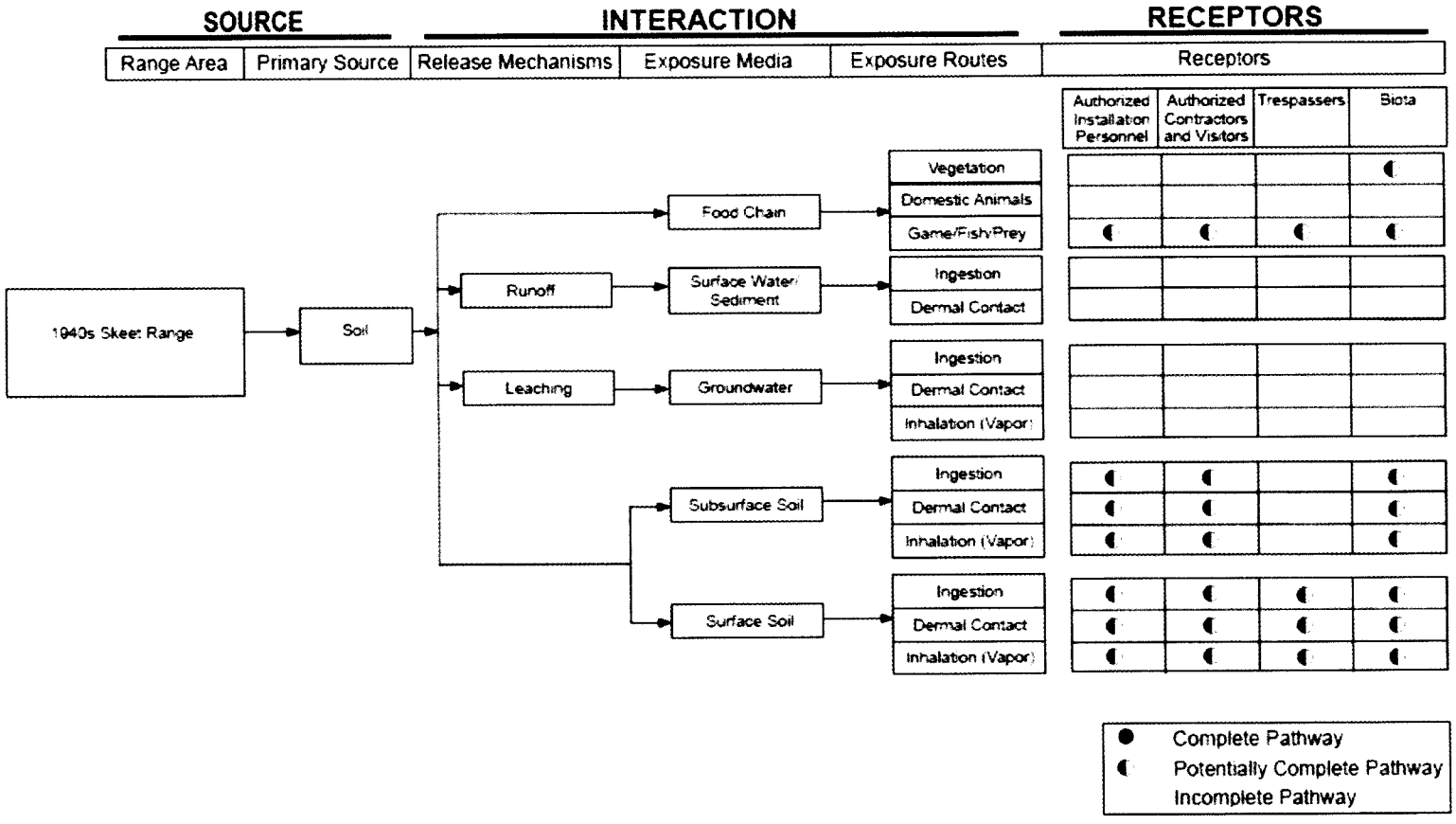
water, soil, and the interfaces between the phases of the contaminant (i.e., solid, liquid, or gas). The fate and transport of contaminants occurs in only one of the three potential environmental media: terrestrial (i.e., not aquatic or atmospheric).

The fate and transport of potential contaminants at Cannon AFB are strongly influenced by physical and chemical properties, as well as by environmental factors such as soil characteristics. For example, according to the Henry's Law Constants, a measure of the volatility of a compound is related to other physical properties of the compound, the most important of which are vapor pressure and water solubility. Compounds exhibiting high vapor pressures and low water solubilities tend to have high volatilization rates (and therefore, high Henry's Law Constants). The organic carbon partition coefficient (K_{oc}) value is a measure of the tendency of a chemical to be sorbed to the organic fraction of soil. The higher the value, the greater the sorption potential of the compound will be. The octanol water partition coefficient (K_{ow}) value is an indication of whether a compound will dissolve in a solvent (i.e., n-octanol) or water. The properties of the primary compounds of interest at Cannon AFB (metals and PAHs) are as follows:

Metals: Since most metals are indigenous to the earth, they are usually found at varying concentrations in most environmental media. In soil, metal contaminants are dissolved in the soil solution; adsorbed or ion-exchanged in inorganic soil constituents; complexed with soluble soil organic matter; and precipitated as pure or mixed solids. Metals in the soil solution are subject to movement with water particles and may be transported through the vadose zone to groundwater, and then either volatilized or consumed by plants and aquatic organisms. Unlike organic constituents, metals cannot be degraded; however, the mobility and toxicity of some metals can be altered due to changes in oxidation states. The solubility of lead is strongly influenced by negative log hydrogen ion concentration (pH). Under natural pH conditions, lead is relatively insoluble. Lead has a high affinity to be sorbed to surfaces on clay and iron and manganese oxide particles. The net effect is for lead to be primarily bound to the solid state. Lead is nonvolatile, but can become airborne via dust.

PAHs: PAH compounds tend to associate with the soil phase, because they have a strong affinity for organic matter (K_{ow} range from 10^4 to 10^7). This tendency is even greater when soil organic matter concentrations are large. Very little of the PAHs dissolves directly in water, but where water contains dissolved or particulate organic matter, there is a competition for association of the PAH between the aqueous organic matter and solid phase organic matter. Limited transport of PAHs in soil may occur if there is a high organic content in the soil pore water. PAHs are nonvolatile, but can become airborne via dust.

Figure 8-1: MC Exposure Pathway Analysis – 1940s SR (TS835)



8.2.1 Soil Pathway Exposure Analysis

8.2.1.1 Soil Exposure Receptors

Potential soil receptors that are typically evaluated include both human and ecological receptors. Human soil receptors at the Cannon AFB MRA that were considered for this evaluation include authorized installation personnel and Rajen Dairy property personnel (including current and future residents), authorized contractors and visitors, and trespassers. No ecological receptors were identified in the CSE Phase I or Phase II. The potential for human and ecological receptor exposure to the MC-impacted soil is negligible, because the on-base PAH-impacted site (1940s SR) is characterized by maintained (i.e., mowed) grassy areas and the Rajen Dairy property appears to be used primarily for equipment storage. Based on the CSE Phase I, it does not appear that dairy cattle are grazed or fed in that area. Clay target debris or pieces are not bioavailable to ecological receptors. Consequently, the exposure and migration of the contaminants is limited. No sensitive ecological populations, habitat, or natural resources are at or adjacent to the site. Consequently, a biological assessment for impact from past munitions-related activities is not warranted.

8.2.1.2 Soil Exposure Conclusions

Because the soil exposure pathway for human receptors was potentially complete, surface and subsurface soil sampling was performed for the Cannon AFB MRA during the CSE Phase II. This evaluation found that low levels of lead are present in soil at TS835, at concentrations significantly less than the NMED residential SSL and USEPA residential RSL of 400 mg/kg. Where clay target fragments were present, PAHs were found at concentrations greater than NMED residential SSLs and USEPA residential RSLs and at concentrations greater than background levels for various compounds at concentrations potentially harmful to human receptors. As previously described, the ecological exposure pathway at this MRA is limited.

8.2.2 Surface Water/Sediment Migration Pathway Analysis

8.2.2.1 Surface Water Receptors

There is no significant surface water in the vicinity of TS835 at Cannon AFB. Therefore, no surface water or sediment sampling were conducted for the CSE Phase II, and the results of the CSE Phase II soil investigation confirmed there was no impact from historic SR activities that would have the potential to impact surface water. Therefore, the surface water pathway is considered to be incomplete human, ecological, and all other receptors.

8.2.2.2 Surface Water Conclusions

There is no significant surface water in the vicinity of TS835, and MC concentrations at this MRA were low. Since virtually all areas are covered with vegetation that minimizes the potential for erosion, the impact of transported contaminated topsoil to surface water is

negligible. Therefore, it is unlikely any current or future receptor would be exposed to MC via a surface water exposure pathway. As such, surface water is considered an incomplete exposure route.

8.2.3 Groundwater Migration Pathway Analysis

8.2.3.1 Groundwater Receptors

Human and ecological receptors are not likely to come into contact with the groundwater medium at Cannon AFB. The Modified CSE Phase I (USACE, 2009) found that there is a there are no wetlands in the vicinity of the MRA, and the depth to groundwater is approximately 250 ft (CH2M Hill, 1983).

8.2.3.2 Groundwater Conclusions

No groundwater sampling was conducted for the CSE Phase II, because no significant impact to groundwater was expected. The results of the CSE Phase II soil investigation confirmed the MCs are not expected to impact groundwater. Groundwater occurs approximately 250 ft bgs at Cannon AFB. The physical properties of the MC (i.e., metals and PAHs) associated with the munitions activities at the MRA, in addition to the depth of water and the low concentrations, indicates MC transport to groundwater is unlikely. The potential MCs associated with the MRA generally have limited mobility in soil, due to their tendency to bind to organic matter. As a result, the groundwater pathway for MCs is considered to be incomplete.

9.0 SCREENING LEVEL HUMAN HEALTH RISK ASSESSMENT

9.1 General Approach

A screening-level Human Health Risk Assessment (HHRA) was performed for TS835 at Cannon AFB. As discussed in Section 8.0, a CSM was developed to address MC environmental contamination. The CSM describes sources of contamination, possible receptors, and possible exposure pathways. Potential current and future human exposure pathways were reviewed to determine whether the pathways associated with this MRA were complete. The pathways and receptors are summarized in Section 9.2.

To evaluate potential human health risks, the measured concentrations in environmental media (surface and subsurface soil) were compared with human health screening concentrations (USEPA RSLs). The sampling data and screening results for the environmental media investigated for the CSE Phase II have been previously presented in Section 5.6.3. Results and conclusions of the HHRA are discussed below. No surface water, sediment, or groundwater data were collected; therefore, no additional assessment of risk for these media is presented.

9.2 Pathways and Receptors

Cannon AFB employs over 600 civilian and over 4,000 military employees (Cannon AFB, 2011). Cannon AFB is located near the city of Clovis, NM, which had an estimated 2009 population of 32,863 (U.S. Census, 2011). Residential and commercial properties and agricultural fields are located around the base. Access to Cannon AFB requires admittance through a security gate, and there is a fence around the perimeter of the installation. Once inside Cannon AFB, there are no restrictions to entering the MRA boundaries. The portion of the MRA on Rajen Dairy property is private land with no security restrictions.

MRA TS835 is located near the northeast corner of the Base and is now divided into two main sections: the northeast half of the MRA is off-base private property owned by the Rajen Dairy; the remainder is an on-base open unused field. As previously mentioned, the range was in use from the early 1940s to the early 1950s. There are no current indications of the former use of this area as a range other than clay target debris identified during the visual survey (Section 5.6.1).

The pathway analysis for MC is discussed in Section 8.2 and illustrated in the CSM in Figure 8-1. As shown in Figure 8-1, potential receptors include authorized Cannon AFB, authorized contractors and visitors, possible trespassers and anyone with access to the Rajen Dairy property. Installation or other authorized personnel may access the area to perform grounds maintenance. Potential exposure routes to surface and subsurface soil include incidental ingestion, dermal contact, and inhalation of dust.

9.3 Soil

9.3.1 Lead

As shown in Table 5-1 through Table 5-3, 41 surface soil samples (0 to 0.5 ft bgs) were collected from TS835. All soil samples were analyzed for lead by XRF. As shown in Table 5-4, 12 surface soil samples (0 to 0.5 ft bgs) were collected and analyzed for lead by ICP. Results from the ICP analysis were used to develop a correlation with the XRF results. A positive direct correlation was established between the ICP and XRF analyses. Lead concentrations did not exceed the USEPA residential RSL in any of the samples.

9.3.2 Polynuclear Aromatic Hydrocarbons

As shown in Table 5-2 and Table 5-3, 12 surface soil samples were collected from 0 to 0.5 ft bgs, 12 subsurface soil samples were collected from 0.5 to 1 ft bgs, and 1 subsurface soil sample was collected from 1 to 1.5 ft bgs at TS835 and analyzed for PAH compounds by Method 8270C-SIM. Sample locations were selected based on low and medium density clay target fragments, as identified during the visual survey. Benzo(a)pyrene was found at concentrations exceeding the USEPA residential RSL in 11 surface and 9 subsurface soil samples. At least one additional PAH compound, including benzo(a)anthracene; benzo(b)fluoranthene; dibenz(a,h)anthracene; dibenz(a,h)anthracene; and indeno(1,2,3-c,d)pyrene, had detections above the USEPA residential and industrial standard in surface and subsurface samples as well.

As shown in Figure 5-2, the horizontal extent of visually-identified clay target fragments were recorded with the site GPS. Vertical and horizontal delineation of MC has not been confirmed with laboratory analyses as part of the CSE Phase II; soil samples were collected solely based on the visual confirmation of clay target debris.

9.4 Human Health Risk Assessment Conclusions and Recommendations

Concentrations of lead in soil do not exceed the USEPA residential RSLs at TS835. Based on results of human health screening, no further evaluation of lead in soil is recommended at this location.

Concentrations of PAHs in remaining soil at TS835 exceed the USEPA residential RSLs at concentrations potentially harmful to human health. The total impacted area totals 2.45 acres, all of which falls within the SR boundary.

An Engineering Evaluation (EE)/Cost Analysis (CA) with subsequent non-time-critical removal action (RA) is recommended at TS835 to remove clay target fragments and PAH-impacted soils to levels below residential standards. Additional details are presented in Section 13.0 – Summary and Conclusions.

10.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

10.1 General Approach

A screening-level ecological risk assessment (SLERA) based on comparison to ecological risk screening levels was not performed for TS835 at Cannon AFB, as determined in the Work Plan. No ecological receptors were identified in the CSE Phase I, and none were identified based on the CSE Phase II work. As discussed in Section 8.0, a CSM was developed to address MC environmental contamination, and the ecological pathway was determined to be limited. Additional information on the habitat is described below.

10.2 Habitat and Receptors

Most of the vegetation at the site is grass typical of semiarid short grass prairies (CH2M Hill, 1983). The black-tailed prairie dog is a Federal Endangered Species Act candidate animal that has been found at the Base, however, according to the CSE Phase I, no black-tailed prairie dogs were found to be present at TS835 (USACE, 2009). Most biota would not likely find suitable habitat in the grassy areas with limited cover. The current land use of TS835 is an unused field on the on-base portion of the MRA and private property mainly used for storage on the off-base portion of the MRA. Therefore, no ecological receptors are considered for the SR.

10.3 Soil

The results of the CSE Phase II investigation confirm ecological exposure to contaminated soil or MD is limited. Lead in soil was below USEPA RSL levels at the MRA,and clay target debris is not bio-available to ecological receptors.

As previously mentioned no threatened or endangered species are known to occupy TS835.

10.4 Surface Water

Surface water was found in Section 8.2.2 to be an incomplete exposure pathway and therefore is not further evaluated.

10.5 Groundwater

Groundwater was found in Section 8.2.3 to be an incomplete exposure pathway and therefore is not further evaluated.

10.6 Additional Ecological Issues

There are no additional ecological issues to consider for TS835.

10.7 Screening Level Ecological Risk Assessment Conclusions and Recommendations

A SLERA for MRA TS835 at Cannon AFB is not warranted because of the limited exposure pathway. Clay target debris or pieces are not bio-available to ecological receptors. No further ecological evaluation is recommended for this site.

11.0 MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

DoD proposed the MRSPP [32 Code of Federal Regulations (CFR) Part 179] to assign a relative risk priority to each defense site in the MMRP Inventory for response activities. These response activities are to be based on the overall conditions at each location and taking into consideration various factors related to explosive safety and environmental hazards (68 Federal Register 50900). The application of the MRSPP applies to all locations:

- That are or were owned, leased to, or otherwise possessed or used by DoD;
- That are known to or are suspected of containing MEC or MC; and
- That are included in the MMRP Inventory (DoD 2009b).

In assigning a relative priority for response activities, DoD generally considers MRSs posing the greatest hazard as being the highest priority. In the USAF program, the MRS priority will be one factor in determining the sequence in which munitions response actions are funded.

The MRSPP tables for Cannon AFB are presented as Appendix J. Following EESOH-MIS nomenclature rules, the 1940s SR MRA is identified as TS835. This is the designation used in the MRSPP tables. Separate MRSPP scores were issued for each of the three MRSs that MRA TS835 was divided into [see Sections 14.2 and 14.3]: MRS TS835 (area showing elevated PAH concentrations), MRS TS835a (on-base area showing no elevated COC concentrations), and MRS TS835b (off-base area). A summary of the results is presented in Section 13.4.

11.1 Explosive Hazard Evaluation Module

The EHE module assesses the presence of known or suspected explosive hazards. The EHE module is composed of three factors, each of which has two to four data elements that are intended to assess the specific conditions at an MRS. These factors are as follows:

1. **Explosive Hazard**, which has the data elements *Munitions Type and Source of Hazard.*
2. **Accessibility**, which has the data elements *Location of Munitions*, *Ease of Access*, and *Status of Property.*
3. **Receptors**, which has the data elements *Population Density*, *Population Near Hazard*, *Types of Activities/Structures*, and *Ecological and/or Cultural Resources.*

Based on site-specific information, each data element is assigned a numeric value, and the sum of these values is the EHE module score. The EHE module score results in an MRS receiving a rating.

There is no historical or physical evidence of explosive MEC associated with TS835 at Cannon AFB. Therefore, all three MRSs at this MRA received a module rating of "G," which is the lowest priority rating.

11.2 Chemical Warfare Materiel Hazard Evaluation Module

The CHE module provides an evaluation of the chemical hazards associated with the physiological effects of CWM. The CHE module is used only when CWM in the form of MEC or MC, are known or suspected of being present at an MRA. Like the EHE module, the CHE module has three factors, each of which has two to four data elements that are intended to assess the conditions at an MRA. These factors are as follows:

1. **CWM Hazard**, which has the data elements, *CWM Configuration and Sources of CWM.*
2. **Accessibility**, which focuses on the potential for receptors to encounter the CWM known or suspected to be present on an MRA. This factor consists of three data elements: *Location of CWM, Ease of Access,* and *Status of Property.*
3. **Receptor**, which focuses on the human and ecological populations that may be impacted by the presence of CWM. It has the data elements: *Population Density, Population Near Hazard, Types of Activities/Structures,* and *Ecological and/or Cultural Resources.*

Similar to the EHE module, each data element is assigned a numeric value, and the sum of these values (i.e., the CHE module score) is used to determine the CHE rating. There is no history of CWM use at the Cannon AFB MRA, nor did the CSE Phase II identify any evidence of CWM. Therefore the CHE module does not apply to TS835. All three MRS at this MRA received the alternative module rating of "No Known or Suspected CWM Hazard."

11.3 Health Hazard Evaluation Module

The HHE module provides a consistent DoD-wide approach for evaluating the relative risk to human health and the environment posed by contaminants (i.e., MCs) present at an MRA. The module has three factors that are as follows:

1. **Contamination Hazard Factor (CHF)**, which indicates contaminants present. This factor contributes a level of *High (H)*, *Middle (M)*, or *Low (L)* based on *Significant*, *Moderate*, or *Minimal* contaminants present, respectively.
2. **Receptor Factor (RF)**, which indicates the receptors. This factor contributes a level of *H*, *M*, or *L* based on *Identified*, *Potential*, or *Limited* receptors, respectively.
3. **Migration Pathway Factor (MPF)**, which indicates environmental migration pathways, and contributes a level of *H*, *M*, or *L* based on *Evident*, *Potential*, or *Confined* pathways, respectively.

The HHE builds on the Relative Risk Site Evaluation (RRSE) framework that is used in the IRP. The CHF, RF, and MPF are based on a quantitative evaluation of MCs and/or CERCLA hazardous substances, and a qualitative evaluation of pathways and human and ecological receptors in groundwater, surface water, sediment, and surface soils. The HHE does not address subsurface soils. However, as the depth appropriate for evaluation in the MRSPP per DoD

guidance is 0 to 2 ft, and the soil samples collected from Cannon AFB were 0 to 0.5 ft, 0.5 to 1 ft, and 1.0 to 1.5 ft, all soil results obtained from Cannon AFB were used in the HHE module. In addition, the HHE does not consider air as a pathway, because the risk through this medium from DoD MMRP sites with soil contamination generally is minimal.

The H, M, and L levels for the CHF, RF, and MPF are combined in a matrix to obtain composite three-letter combination levels that integrate considerations of all three factors. The three-letter combination levels are organized by frequency, and the resulting frequencies result in an HHE rating. The ratings for each of the HHE modules of the MRSPP are compiled in Appendix J and summarized in Table 11-1.

Table 11-1: Summary of HHE Data Element Scores

Specific Data Element	TS835	TS835a	TS835b
Contaminant Hazard Factor	H	L	NA
Receptor Factor	M	L	NA
Migration Pathway Factor	M	L	NA
HHE Combination Level	**HMM**	**LLL**	**NA**
Total HHE Module Rating[1]	**C**	**G**	**No Known or Suspected Hazard**

[1] A through G represents a rating where A is the highest priority rating and G is the lowest priority rating.
HHE = Health Hazard Evaluation
H/M/L = high/medium/low
NA = not applicable

11.4 Munitions Response Site Prioritization Protocol Score

Each MRA or discrete MRS is assigned a MRS Priority ranging from 1 to 8. Priority 1 indicates the highest potential hazard and Priority 8 indicates the lowest potential hazard. Only a site with a CW hazard can receive a MRS Priority of 1. The MRS Priority is determined by selecting the highest rating from amongst the EHE, CHE, and HHE modules. For example, if the EHE rating is 2, the CHE rating is 5, and the HHE rating is 4; the MRS Priority assigned would be 2. The MRS Priority will be used to determine the future funding sequence of MRAs and/or MRSs for further munitions response action. The MRS Priority for the Cannon AFB MRA is presented in Table 11-2.

Table 11-2: Priority Rating for Cannon AFB MRSs

Specific Data Element	TS835	TS835a	TS835b
EHE Module Rating	8	8	8
CHE Module Rating	NA[1]	NA[1]	NA[1]
HHE Module Rating	4	8	NA[1]
Priority[2]	**4**	**8**	**8**
Total HHE Module Rating[3]	**C**	**G**	**No Known or Suspected Hazard[4]**

[1] - not applicable because the Rating/Priority is "No Known or Suspected Hazard"
[2] - no priority rating was developed during the *Modified CSE Phase I Report* (USACE, 2009) and instead it was deferred to this CSE Phase II investigation.
[3] - A through G represents a rating where A is the highest priority rating and G is the lowest priority rating.
[4] - Alternate rating.

AFB = Air Force Base
CHE = Chemical Warfare Material Hazard Evaluation
CSE = Comprehensive Site Evaluation
EHE = Explosive Hazard Evaluation
MRS = Munitions Response Site
NA = not applicable
HHE = Health Hazard Evaluation

12.0 PERCHLORATE REPORTING

Perchlorate sampling has previously been performed at Cannon AFB. Previously analyzed drinking water and surface water samples were found to be above the USEPA and DoD Preliminary Remediation Goal of 15 ppb (parts per billion). Soil concentrations were not found to be above the USEPA Region VI residential soil screening level of 55,000 ppb (parts per billion) and the industrial soil screening level of 720,000 ppb. Cannon AFB has developed a Perchlorate Action Plan to address perchlorate levels (DENIX, 2011).

No perchlorate sources were identified at Cannon AFB MRA TS835. Therefore, sampling for perchlorate was not warranted for this MRA and is not proposed to be completed in the future.

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13.0 SUMMARY AND CONCLUSIONS

This section summarizes the significant results obtained and conclusions reached as a result of CSE Phase II activities conducted at Cannon AFB. Only the most significant findings are presented in this section and are reproduced directly or abstracted from information contained in this report. The conclusions provide general and comparative interpretations of the findings, in terms of the general objectives of the CSE Phase II.

13.1 Summary of Comprehensive Site Evaluation Phase II Activities

This CSE Phase II activity compiled and evaluated information on Cannon AFB relating to the possible presence of potentially explosive MEC and associated contamination of environmental media from MC. Sources of this information were observations during detailed visual surveys and environmental media sampling. This information was reviewed and used to develop and refine the CSM of potential exposures to MEC and MC. The CSM related the indicated sources of MEC/MC to potential direct contact exposures to people at Cannon AFB in consideration of both the current and projected future land uses. These relationships, or potentially complete exposure pathways, also considered the possible transport or migration of MEC and MC from place to place as the result of natural processes or the activities of people, as appropriate. These land use scenarios were evaluated with respect to how people would interact with the land at Cannon AFB. The compiled information was then used to conduct an assessment of the potential explosive and environmental hazards at the MRA.

13.2 Summary of Comprehensive Site Evaluation Phase II Findings

The CSE Phase II resulted in the collection, evaluation, and synthesis of information regarding past ordnance-related activities at Cannon AFB, current conditions on-site with respect to the presence of MEC and MC, physical setting of the land, and plans for the future use of the property. A summary of the findings, based on data collected during the CSE Phase II, is provided in this section.

13.2.1 MRA TS835 – 1940s Skeet Range

TS835, active from 1940 to the 1950s, occupies an original footprint of approximately 29.4 acres (CH2M Hill, 1983). The eastern portion of the site extends beyond the installation boundary onto Rajen Dairy private property and appears to primarily be used for storage. The acreage of this site includes both on-base and off-base property, and includes approximately 4.5 acres that are overlapped by IRP Site LF-02. The on-base area is an unused field.

A visual survey was performed on 15 March 2011 to characterize TS835. Varying densities of clay target fragments were observed, and the localized areas of these fragments were delineated according to medium and low density. Based on GPS records, the total area impacted by clay target debris is estimated at 2.45 acres.

Surface and subsurface soil sampling was performed to evaluate whether MC, including lead and PAHs associated with the shooting activities within TS835, have impacted the environmental media. In addition, surface soil sampling was performed south of the SR to evaluate installation background concentration of PAHs. Lead was significantly less than the NMED and USEPA residential screening level of 400 mg/kg in all 41 surface samples collected at the SR. PAHs were determined to be above NMED residential SSLs and USEPA residential RSLs and background concentrations in surface and subsurface samples from all areas where clay target fragments were observed. Samples were collected up to 1.5 ft bgs in areas of visible clay target debris; however, vertical delineation of PAH contamination at SR has not been completed.

Based on the results of the soil sampling activities performed for the CSE Phase II, lead from small arms ammunition are not considered to be a contaminant of concern at TS835. However, PAHs exceed NMED residential SSLs and USEPA residential RSLs in areas where clay target debris was visibly observed, indicating that the targets used for skeet practice are the source of localized PAH contamination. Recommendations for the SR are presented in Section 14.5.

13.3 Assessment of Potential Munitions Constituents Releases

Results of the environmental medium sampling indicated that impacts to soil greater than the NMED residential SSLs, and greater than USEPA residential RSLs are present for PAHs at TS835 thereby presenting a human health risk based on this MC release. Removal of PAH-contaminated soil at SR is recommended, with confirmation sampling to confirm the PAH concentrations in soil at the horizontal and vertical limits of excavation remain below the residential land use scenario.

Lead investigated at TS835 yielded results that do not pose unacceptable risks under any potential land use scenarios.

13.4 Summary of the Munitions Response Site Prioritization Protocol

MRA TS835 at Cannon AFB was scored using the MRSPP, however, individual scores were created for each of the multiple MRSs that the MRA was subdivided into as described in Section 14. The results of this assessment indicated the following (Note: Priority 1 indicates the highest potential hazard and Priority 8 indicates the lowest potential hazard.):

- MRS TS835: *Priority 4*

MRS TS835 scored a priority of 4. Only small arms and clay targets were used at MRA TS835. The reason for an elevated priority ranking for this MRS is primarily due to the CHF (several PAH compounds exceeded their respective USEPA RSLs). Since no historical evidence suggests this range was used as anything but a skeet range, no explosive or CWM hazard are considered associated with this MRS. Lead concentrations were well below the applicable screening levels.

- MRS TS835a: *Priority 8*

MRS TS835a scored a priority of 8. Only small arms and clay targets were used at MRA TS835. Within this MRS, lead concentrations were well below screening levels and there was no visible evidence to indicate PAH impact from clay targets. Since no historical evidence suggests this range was used as anything but a skeet range, no explosive or CWM hazard are considered associated with this MRS.

- MRS TS835b: *Priority 8*

MRS TS835b (the off-base portion of MRA TS835) scored a priority of 8. Only small arms and clay targets were used at MRA TS835. Data collected within the MRA indicated that there is no evidence of munitions impact at or near the fence line at the Base boundary [see Sections 4.1 and 5.6]. Consequently, MRS TS835b is given an alternate HHE score of "No Known or Suspected Hazard."

14.0 RECOMMENDATIONS

14.1 Cohort Assigment

To comply with USAF Knowledge Driven/Performance-Based Management initiative, MRAs are subdivided into seven "cohorts." The assignment of MRA to different cohorts supports the streamlining of the restoration process, including the development and implementation of munitions response actions for specific cohort types. The cohort type will be reflected in the site description in EESOH-MIS. The seven USAF MMRP cohorts are shown in Table 14-1.

Table 14-1: Air Force MMRP Cohort Assignments

Cohort	Description
A	Small Arms Ranges
B	Bore-sight Ranges
C	EOD Ranges and OB/OD Sites
D	CWM Sites
E	Pyrotechnic/Practice Sites
F	All Other Sites
G	Munitions Constituents

CWM = chemical warfare material
EOD = explosive ordnance disposal
MMRP = Military Munitions Response Program
OB/OD = open burn/open detonation

As the USAF MMRP evolves, the cohort assignments may be expanded or consolidated to reflect what has been learned about the MRA. In implementation of the CSE Phase II, the cohort type was defined by the range-type as designated in documentation. As warranted, the cohort assignment is further refined based on field investigation in future phases. Any MRA with a site description of "multi-use" in EESOH-MIS shall be assigned a site description that reflects a specific cohort. The site description shall be revised to the range-type designated in documentation. Reassignments of cohort or site descriptions may be required in the future and will be based on the types of munitions found during future fieldwork.

The cohort types assigned to the Cannon AFB MRA is as follows:

- 1940s SR (TS835): A (Small Arms Ranges)

14.2 Process Streamlining Opportunities

The separation of the 1940s SR (MRA TS835) into three MRSs, as detailed in the following section, is recommended as a process streamlining measure. The purpose of three separate MRSs is to allow for management of three separate MMRP actions at the single MRA (Figure 14-1).

14.3 Additional Munition Response Site

Based on information gathered during the CSE Phase II and depending on site-specific factors, each MRA may be designated as a single MRS, or it may be subdivided for the purposes of evaluation and response into multiple MRSs. Subdividing MRAs into multiple MRSs allows for more efficient characterization so that munitions responses specific to local conditions can be conducted.

An MRA must be composed of at least one MRS, but may contain multiple MRSs. The total area of all MRSs contained within an MRA must, however, equal the area of the MRA. This will ensure that the total acreage within an MRA was investigated during the CSE Phases I and II. Typical site-specific factors that may be considered during subdivision of MRAs into MRSs include:

- The prevalence of MEC or the extent of MC-contaminated media present within different areas of the MRA;
- The type of MEC or MC present within the MRA;
- Physical features (vegetation, topography, land areas versus water bodies, accessibility, and location of receptors that may be potentially exposed to MEC, etc.); and
- Geological and hydrogeological characteristics.

Areas within the MRA where the presence of MEC is not suspected or has not been confirmed during the CSE Phase II can be aggregated into a single MRS.

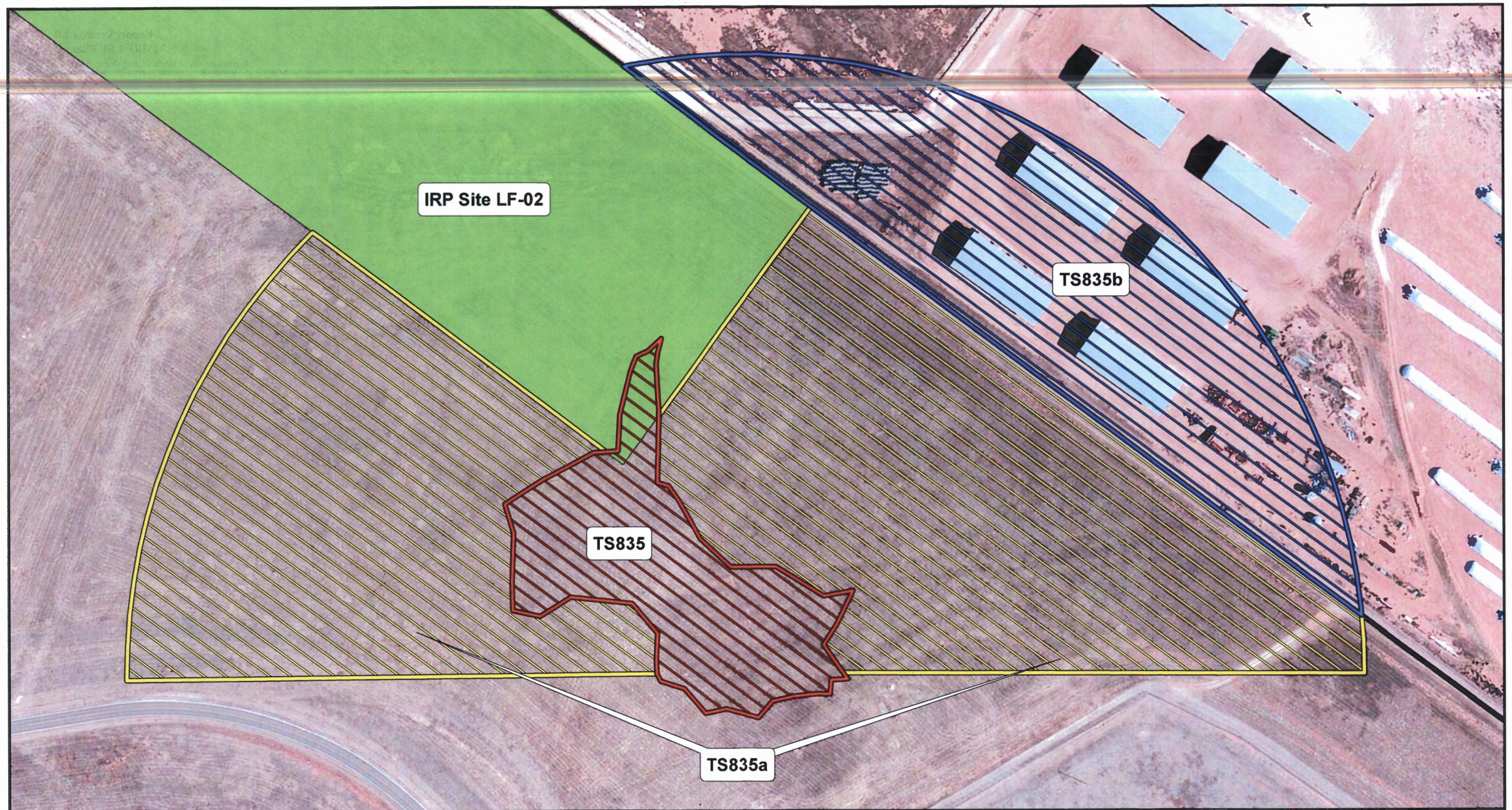
Based on the results of the CSE Phase II, a separate MRS designation of the PAH-contaminated soil at the 1940s SR as described in Section 14.2 is recommended. Additionally, a separate MRS is recommended for the off-base portion of the MRA. Figure 14-1 shows the delineation of the visual extent of clay target debris, which is proposed as a boundary representing the lateral extent of PAH contamination. This figure also shows the delineation of the IRP site LF-02 as well as the three MRSs described below.

MRS TS835, defined as the area of PAH-impacted soils at the 1940s SR, measures approximately 2.45 acres based on visual confirmation of clay target debris.

MRS TS835a, defined as the remaining on-base portion of the original MRA not impacted by PAH or lead-contaminated soil, occupies a footprint of approximately 15.7 acres.

MRS TS835b, defined as the off-base portion of the original MRA, occupies a footprint of approximately 6.32 acres.

Approximately 4.5 acres of IRP Site LF-02 overlap the original definition of the MRA. This area is excluded from the MMRP.



Legend

- TS835
- TS835b
- TS835a
- IRP Site LF-02

0 100 200 400 Feet

N

Note: Imagery © 2011 Microsoft Corporation
Available Exclusivly by DigitalGlobe, Aquisition date: Oct- Dec 2010.

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DESIGNED: D. Felertag	DATE: 08/09/2011
DRAWN: A. Ryder	DATE: 02/23/2012

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Military Munitions Response Program
Former 1940's Skeet Range
- TS835 -
MRS Designations
TS835, TS835a, and TS835b
Cannon AFB, NM

PROJECT NO. - FIGURE: 14-1

14.4 Change to Munition Response Area/Munition Response Site Footprint

Based on the results of the CSE Phase II, the defined footprint of MRA TS835 should be adjusted to reflect the removal of the LF-02 area, and the addition of the small portion of the PAH-impacted area that extends beyond the original boundary of the firing arc. The revised area of MRA TS835 is 24.5 acres.

As discussed in the Final CSE Phase II Work Plan, and in Section 2.6.1 above, the orientation of the MRA should also be rotated approximately 30 degrees clockwise, as compared to the footprint used during the Modified CSE Phase I. The figures shown in this CSE Phase II report utilize the revised orientation.

14.5 Future Response Actions and Objectives

NFA is recommended for MRS TS835a at Cannon AFB, NM. MEC and MC were not detected in soils at concentrations exceeding the applicable USEPA or NMED screening levels for the COCs.

NFA is recommended for MRS TS835b at Cannon AFB, NM. There is no indication that MEC or MC are present in the off-base portion of the MRA.

Additional munitions response, e.g. an EE/CA with a subsequent non-time-critical RA of PAH-contaminated soil and clay target debris, is recommended for MRS TS835 at Cannon AFB based on initial soil sampling results. Additional horizontal and vertical delineation at MRS TS835 will provide more accurate contaminated soil quantities.

Conclusions and recommendations for the 1940s SR from the CSE Phase II investigation are summarized as Table 14-2 located in Section 14.8.

14.6 Identify Gaps in Conseptual Site Model

The CSM for the Cannon AFB MRAs is well defined. No gaps in the CSM were identified.

14.7 Department of Defense Munitions Response Site Prioritization Protocol Priority

The DoD MSRPP Priority for the MRSs at Cannon AFB is as follows:

- MRS TS835: MRSPP Priority 4; an EE/CA with a subsequent non-time-critical RA is recommended
- MRS TS835a: MRSPP Priority 8; NFA is recommended
- MRS TS835b: MRSPP Priority 8; NFA is recommended

14.8 Site Sequencing Considerations

There are no applicable site sequencing considerations for the MRSs at Cannon AFB proposed for NFA (TS835a and TS835b), or for the MRS proposed for future munitions response (TS835).

Table 14-2: Conclusions and Recommendations

MRA	Conclusions	Recommendation
1940s SR (MRA TS835)	**MEC Results:** No MEC discovered during the site surveys. **MC Results**: A total of 12 surface soil samples and 13 subsurface soil samples were collected where clay target debris was identified and analyzed for PAH compounds. All samples yielded values greater than the NMED SSLs and USEPA RSL for the respective PAH compounds. A total of 41 surface samples were collected according to predetermined locations within the 1940s SR and analyzed for lead via XRF. All samples yielded values less than the NMED SSL and USEPA RSL for lead. **MRSPP Scores:** • **MRS TS835**: 4 • **MRS TS835a**: 8 • **MRS TS835b**: 8	Divide the MRA into three MRSs to include the visible footprint of clay target debris (TS835), the remaining on-base portion (TS835a), and the off-base area (TS835b). Future Munitions Response Actions at **MRS TS835** – *EE/CA with subsequent RA.* Future Munitions Response Actions at **MRS TS835a** – *NFA.* Future Munitions Response Actions at **MRS TS835b** – *NFA.*

CA = Cost Analysis
EE = Engineering Evaluation
MC = munitions constituents
MEC = munitions and explosives of concern
MRA = Munitions Response Area
MRS = Munitions Response Site
MRSPP = Munitions Response Sites Prioritization Protocol
NFA = No Further Action
NMED = New Mexico Environment Department
PAH = polynuclear aromatic hydrocarbon
RA = Removal Action
RSL = Regional Screening Levels (USEPA 2009)
SR = Skeet Range
SSL = Soil Screening Levels
USEPA = U.S. Environmental Protection Agency
XRF = X-ray fluorescence

APPENDIX A

Definitions

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DEFINITIONS

Anomaly – Any identified subsurface mass that may be geologic in origin, unexploded ordnance (UXO), or some other man-made material. Such identification is made through geophysical investigation and reflects the response of the sensor used to conduct the investigation. (Handbook on the Management of Munitions Response Actions, Interim Final, EPA, May 2005)

Anomaly Avoidance –Techniques employed on property known or suspected to contain unexploded ordnance, other munitions that may have experienced abnormal environments (e.g., discarded military munitions), munitions constituents in high enough concentrations to pose an explosive hazard, or chemical agents, regardless of configuration, to avoid contact with potential surface or subsurface explosive or chemical agent (CA) hazards, to allow entry to the area for the performance of required operations. (AF Manual 91-201 and DoD 6055.9-STD)

Applicable or Relevant and Appropriate Requirements – Applicable requirements are cleanup standards, standards of control, and other substantive environmental protection requirements promulgated under Federal or state environmental law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance found at a CERCLA site. Relevant and appropriate requirements are cleanup standards that, while not "applicable," address situations sufficiently similar to those encountered at a CERCLA site where their use is well suited to the particular site. (NCP, 40 CFR Part 300, July 2005)

Chemical Agent (CA) – An agent that, through its chemical properties, produces lethal or other damaging effects on human beings, except that such term does not include riot control agents, chemical herbicides, smoke, and other obscuration materials. This definition is based on the definition of "chemical agent and munition" in 50 U.S.C. 1521(j)(1).

Chemical Warfare Materiel (CWM) – Items generally configured as a munition containing a chemical compound that is intended to kill, seriously injure, or incapacitate a person through its physiological effects. CWM includes V- and G-series nerve agents or H-series (mustard) and L-series (lewisite) blister agents in other-than-munition configurations; and certain industrial chemicals (e.g., hydrogen cyanide [AC], cyanogen chloride [CK], or carbonyl dichloride [called phosgene or CG]) configured as a military munition. CWM does not include riot control devices, chemical defoliants and herbicides, industrial chemicals (e.g., AC, CK, or CG) not configured as a munition, smoke and other obscuration producing items, flame and incendiary producing items, or soil, water, debris or other media contaminated with low concentrations of chemical agents where no CA hazards exist. (MRSPP, 32 CFR Part 179, October 2005)

CWM contains the following four subcategories:

1) CWM, explosively configured – All UXO or discarded military munitions (DMM) that contain a CA fill and any explosive component. Examples are M55 rockets with CA, the M23 VX mine, and the M360 105-mm GB artillery cartridge.

2) CWM, nonexplosively configured – All UXO or DMM that contain a CA fill but that do not contain any explosive components. Examples are any chemical munitions that do not contain explosive components and VX or mustard agent spray canisters.

3) CWM, bulk container – All discarded (e.g., buried) non-munitions-configured containers of CA (e.g., a ton container) and CAIS K941, toxic gas set M-1 and K942, toxic gas set M-2/E11.

4) Chemical Agent Identification Sets (CAIS) – Military training aids containing small quantities of various CA and other chemicals. All forms of CAIS are scored the same in this rule, except CAIS K941, toxic gas set M-1; and CAIS K942, toxic gas set M-2/E11, which are considered forms of CWM, bulk container, due to the relatively large quantities of agent contained in those types of sets.

Closed Range – A military range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities or is not considered by the military to be a potential range area. A closed range is still under the control of a DoD Component. (MGDERP, September 2001)

Defense Sites – Locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used for or was permitted for the treatment or disposal of military munitions. (10 U.S.C. 2710(e)(1))

Department of Defense (DoD) Components – The Office of the Secretary of Defense (OSD), the Military Departments, the Defense Agencies, the Department Field Activities, and any other Department organizational entity or instrumentality established to perform a government function. (MRSPP, 32 CFR Part 179, October 2005)

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710(e)(2))

Explosive Ordnance Disposal (EOD) Personnel – Active duty military personnel of any military service branch that are trained in the detection, identification, field evaluation, safe rendering, recovery, and final disposal of explosive ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration. (Handbook on the Management of Munitions Response Actions, Interim Final, EPA, May 2005)

Facility – A building, structure, or other improvement to real property, in relation to work classification. (10 U.S.C. 2801)

Formerly Used Defense Sites (FUDS) – Facility or site (property) that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to the contamination by hazardous substances. By the DoD Environmental Restoration Program (ERP) policy, the FUDS program is limited to those real properties that were transferred from DoD control prior to 17 October 1986. FUDS properties can be located within the 50 States, District of Columbia, Territories, Commonwealths, and possessions of the United States. (FUDS Program Policy, ER 200 3-1, May 2004)

Hazardous Substance – (A) Any substance designated pursuant to Section 1321(b)(2)(A) of Title 33; (B) any element, compound, mixture, solution, or substance designated pursuant to Section 9602 of this title; (C) any hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of the Solid Waste Disposal Act (42 U.S.C. 6921) (but not including any waste the regulation of which under the Solid Waste Disposal Act [42 U.S.C. 6901 et seq.] has been suspended by Act of Congress); (D) any toxic pollutant listed under section 1317(a) of Title 33; (E) any hazardous air pollutant listed under Section 112 of the Clean Air Act (42 U.S.C. 7412); and (F) any imminently hazardous chemical substance or mixture with respect to which the Administrator has taken action pursuant to Section 2606 of Title 15. The term does not include petroleum, including crude oil or any fraction thereof, which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of this paragraph, and the term does not include natural gas, natural gas liquids, liquefied natural gas, or synthetic gas usable for fuel (or mixtures of natural gas and such synthetic gas). (CERCLA, 42 U.S.C. § 9601 et seq.)

Installation (as defined by the Restoration Management Information System [RMIS] Data Element Dictionary for a Federal Facility Identification [FFID]) – The FFID number is a unique identifier, assigned to an installation/property in RMIS. The 14-character aggregate string is used in RMIS as the key column for each data table and is used to track all associated records for each installation. An installation may have a single range or multiple ranges (and each range may have more than one site contained within its boundaries) and a single or multiple sites, not associated with a range. (Management Guidance for the Defense Environmental Restoration Program, September 2001)

Land Use Controls (LUCs) – Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, contaminated property in order to reduce risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and/or physical barriers to limit access to property, such as fences or signs. The legal mechanisms are generally the same as those used for institution controls (ICs) as discussed in the NCP. ICs are a subset of LUCs and are primarily legal mechanisms imposed to ensure the continued effectiveness of land use restrictions imposed as part of a remedial decision. Legal mechanisms include restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions. (MGDERP, September 2001)

Material That Potentially Presents an Explosive Hazard (MPPEH) – Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions

debris remaining after munitions use, demilitarization, or disposal; and range-related debris), or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions. (DoD Instruction 4140.62, Management and Disposition of MPPEH, December 2004)

Military Installation – A base, camp, post, station, yard, center, or other activity under the jurisdiction of the Secretary of a Military Department, or, in the case of an activity in a foreign country, under the operational control of the Secretary of a military department or the Secretary of Defense, without regard to the duration of operational control. (10 U.S.C. 2801)

Military Munitions – All ammunition products and components produced for or used by the Armed Forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, and demolition charges; and devices and components of any item thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4))

Military Range – Designated land and water areas set aside, managed, and used to research, develop, test, and evaluate military munitions, other ordnance, or weapon systems, or to train military personnel in their use and handling. Ranges include firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, and buffer zones with restricted access and exclusionary areas. (40 CFR 266.201)

Munitions and Explosives of Concern (MEC) – Military munitions that are 1) unexploded ordnance, as defined in 10 U.S.C. 101(e)(5); 2) abandoned or discarded, as defined in 10 U.S.C. 2710(e)(2); 3) MC (e.g., TNT, RDX) present in soil, facilities, equipment, or other materials in high enough concentrations so as to pose an explosive hazard. (MRSPP, 32 CFR Part 179, October 2005)

Munitions Constituent (MC) – Any material that originates from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710(e)(4))

Munitions Debris – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal. (DoD 6055.9-STD)

Munitions Response – Response actions, including investigation, removal actions, and remedial actions, to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or MC or to support a determination that no removal or remedial action is required. (MRSPP, 32 CFR Part 179, October 2005)

Munitions Response Area (MRA) – Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites. (MRSPP, 32 CFR Part 179, October 2005)

Munitions Response Site (MRS) – A discrete location within an MRA that is known to require a munitions response. (MRSPP, 32 CFR Part 179, October 2005)

Outlier – An outlier is an observation that lies an abnormal distance from other values in a random sample from a population. In a sense, this definition leaves it up to the analyst (or a consensus process) to decide what will be considered abnormal. Before abnormal observations can be singled out, it is necessary to characterize normal observations.

Operational Range – A range that is under the jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities, or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities. (10 U.S.C. 101(e)(3))

Pollutant and Contaminant – These terms include, but are not be limited to, any element, substance, compound, or mixture, including disease-causing agents, which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring; except that the term pollutant or contaminant shall not include petroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of paragraph (14) and shall not include natural gas, liquefied natural gas, or synthetic gas of pipeline quality (or mixtures of natural gas and such synthetic gas). (CERCLA, 42 U.S.C. § 9601 et seq.)

Range Activities – Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the Armed Forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 U.S.C. 101(3)(2))

Range-Related Debris – Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g., targets, military munitions packaging and crating material) . (DoD 6055.9-STD)

Range Residue – Material, including but not limited to, parts and sections of practice bombs, artillery, small arms, mortars, projectiles, bombs, missiles, rockets, rocket mortars, targets, grenades, incendiary devices, experimental items, demolition devices, and any other material fired on or discovered on a range. (AFI 13-212, Range Planning and Operations, August 2001)

Real Property – Real estate owned by the United States and under the control of the DoD. Includes lands, buildings, structures, utilities systems, improvements and appurtenances thereto. Includes equipment attached to and made part of buildings and structures (such as heating systems) but not moveable equipment (such as plant equipment). (MGDERP, September 2001)

Relative Risk – The evaluation of individual sites to determine high, medium, or low relative risk to human health and the environment, based on contaminant hazards, migration pathways and receptors, in accordance with the DoD's *Risk-Based Site Evaluation Primer*. (MGDERP, September 2001)

Removal – The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment, as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under Section 9604(b) of this title, and any emergency assistance which may be provided under the Disaster Relief and Emergency Assistance Act [42 U.S.C. 5121 et seq.] The requirements for removal actions are addressed in 40 CFR §§300.410 and 300.415. The three types of removals are emergency, time-critical, and non-time critical removals (CERCLA, 42 U.S.C. § 9601 et seq.):

1) Emergency – Emergency removal or response is performed when an immediate or imminent danger to public health or the environment is present and action is required within hours. Trained responders identify the explosive threat and make the decision as to whether the munitions and explosive of concern should be moved or blown in place and ensure the threat is removed safely and expeditiously.

2) Time-critical – A response to a release or threat of release that poses such a risk to public health (serious injury or death), or the environment, that cleanup or stabilization actions must be initiated within six months.

3) Non-time critical – An action initiated in response to a release or threat of a release that poses a risk to human health and welfare, or the environment. Initiation of removal cleanup actions may be delayed for six months or more.

Risk Reduction – The movement of any site from a higher to lower relative risk category as a result of natural attenuation, interim remedial, remedial, or removal actions taken. (DoD Instruction 4715.7, Environmental Restoration Program, April 1996)

Site (as defined in the Restoration Management Information System Data Element Dictionary for a SITE_ID) – A unique name given to a distinct area of an installation containing one or more releases or threatened releases of hazardous substances treated as a discreet entity or consolidated grouping for response purposes. Includes any building, structure, impoundment, landfill, storage container, or other site or area where a hazardous substance was or has come to be located, including formerly used sites eligible for building demolition/debris removal. Installations and ranges may have more than one site. (MGDERP, September 2001)

Stakeholder – Groups or individuals interested in, concerned about, affected by, having a vested interest in, or may be involved in the munitions response at an MRA/MRS.

Unexploded Ordnance (UXO) – Military munitions that have been primed, fuzed, armed, or otherwise prepared for action and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material, and remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5))

UXO Technicians – Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, and contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III. (Department of Defense Explosive Safety Board TP18, December 2004).

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APPENDIX B

Acronyms

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ACRONYMS AND ABBREVIATIONS

AES	Atomic Emission Spectrometry
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment (formerly Air Force Center for Environmental Excellence)
AFSOC	Air Force Special Operations Command
amsl	above mean sea level
APP	Accident Prevention Plan
ASTM	American Society for Testing and Materials
BASH	Bird Aircraft Strike Hazard
bgs	below ground surface
BKG	background
CA	Cost Analysis
CERCLA	Comprehensive Environmental Restoration, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHE	Chemical Warfare Materiel Hazard Evaluation
CHF	Contamination Hazard Factor
COC	Chain-of-Custody
COPC	contaminants of potential concern
CSE	Comprehensive Site Evaluation
CSM	Conceptual Site Model
CWM	Chemical Warfare Materiel
DL	detection limit
DMM	discarded military munitions
DMT	Data Management Tool
DoD	Department of Defense
DQO	Data Quality Objective
DU	Depleted Uranium
EE	Engineering Evaluation
EESOH-MIS	U.S. Air Force Enterprise Environmental Safety and Occupational Health Management Information System
EHE	Explosive Hazard Evaluation
ELAP	Environmental Laboratory Accreditation
EOD	Explosive Ordnance Disposal
ERP	Environmental Restoration Program
ERPIMS	Environmental Resources Program Information Management System
ERPTools	Environmental Resource Program Tools
ESS	Explosive Safety Submission

ft	feet
FUDS	Formerly Used Defense Site
GC/MS	Gas Chromatography/Mass Spectrometry
GIS	Geographic Information System
GPS	Global Positioning System
H	High
HHE	Health Hazard Evaluation
HHRA	human health risk assessment
HRR	historical records review
HRS	Hazard Ranking System
in	inches
ICP	Inductively Coupled Plasma
ID	identification
IDW	investigation derived waste
IRP	Installation Restoration Program
J	estimated value; detected at a concentration less than the reporting limit
K_{oc}	organic carbon/water partition coefficient
K_{ow}	octanol/water partition coefficient
L	low
LCS	laboratory control sample
LF-02	Landfill No. 2
LOD	limit of detection
M	medium
MC	Munitions Constituents
MEC	Munitions and Explosives of Concern
mg/kg	milligram per kilogram
MMRP	Military Munitions Response Program
MPF	Migration Pathway Factor
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	matrix spike/matrix spike duplicate
msl	mean sea level
NA	not applicable
ND	not-detected above the method detection limit
NELAP	National Environmental Laboratory Approval Program
NFA	No Further Action

NIST	National Institute of Standards and Technology
NM	New Mexico
NMED	New Mexico Environment Department
OB/OD	Open Burn/Open Detonation
PA	Preliminary Assessment
PAH	polynuclear aromatic hydrocarbons
pH	negative of log hydrogen ion concentration
PMP	Project Management Professional
POL	petroleum, oil, and lubricants
Ppb	parts per billion
ppm	part per million
PT	physical training
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RA	Removal Action
RACER	Remedial Action Cost Engineering Requirements
RCRA	Resource Conservation and Recovery Act
RF	receptor factor
RL	reporting limit
RPD	relative percent difference
RRSE	Relative Risk Site Evaluation
RSD	Relative Standard Deviation
RSL	Regional Screening Level
SECDEF	Secretary of Defense
SI	Site Investigation
SIM	Selected Ion Monitoring
SLERA	screening-level ecological risk assessment
SOF	Special Operations Forces
SOP	Standard Operating Procedure
SOW	Scope of Work
SR	skeet range
SRM	standard reference material
SS	spill sites
SSHP	Site-Specific Health and Safety Plan
SSL	Soil Screening Level
ST	storage tank
SVOC	semivolatile organic compound

TFW	Tactical Fighter Wing
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
UTL	upper tolerance limit
UXO	unexploded ordnance
Versar	Versar, Inc.
XRF	X-ray fluorescence
°F	degrees Fahrenheit
%D	percent difference
%R	percent recovery

APPENDIX C

References

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APPENDIX D

Photo-Documentation Log

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Photographic Documentation
CSE Phase II for Former Clay Target Range
Cannon Air Force Base (AFB), New Mexico (NM)

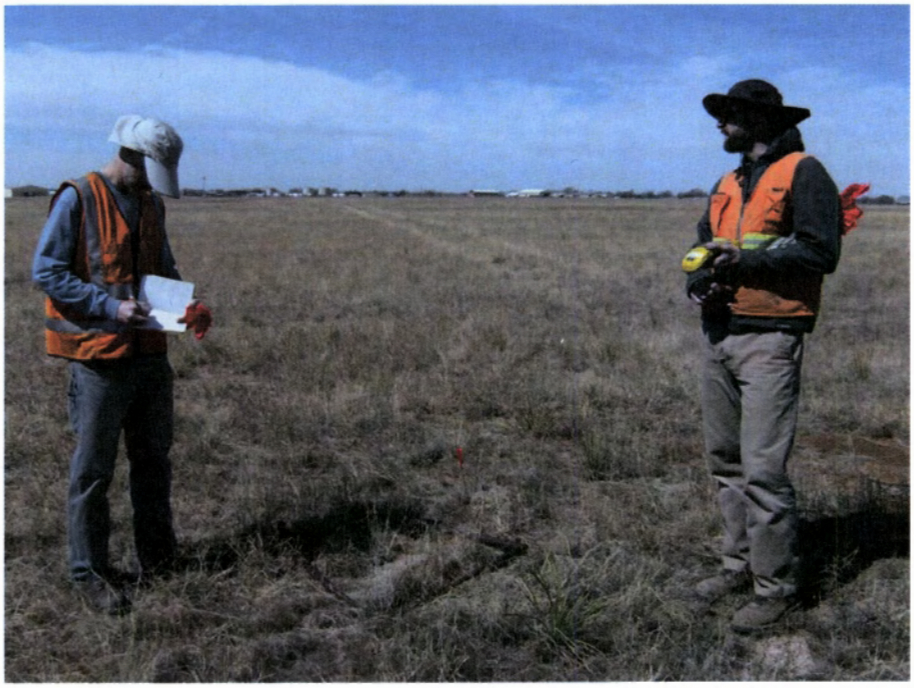
Photographic Log Registry – Photographs 1 – 30

Photograph No.	Date	Description
1	3/15/11	Metal pipe and concrete debris in area to west and north. Possibly from low and high houses.
2	3/15/11	Metal pipe and concrete debris in area to west and north. Possibly from low and high houses.
3	3/15/11	Metal pipe pictured with butt in place.
4	3/15/11	POI001 – Concrete pad 1. Approximately 3' x 3'. Photo looking northwest.
5	3/16/11	Presumed high house location. Photo looking northwest.
6	3/16/11	Looking from SR007 sample location (foreground) east toward Rajen Dairy Property beyond security access road and fence.
7	3/16/11	Looking from SR007 sample location (foreground) toward Rajen Dairy Property beyond security access road and fence.Photo looking northeast.
8	3/16/11	Concrete Pad 6.
9	3/16/11	Concrete Pad 6.
10	3/16/11	POI011 – Asbestos tile.
11	3/16/11	POI008 – Concrete debris.
12	3/16/11	POI012 – Wood debris.
13	3/16/11	POI012 – Wood debris.
14	3/16/11	Low density clay target fragments.
15	3/16/11	POI015 – Medium density clay target fragments.
16	3/16/11	POI016 – Low density clay target fragments.
17	3/16/11	Low density clay target fragments.
18	3/16/11	Western edge of landfill and just north of the MRA looking southeast at presumed former landfill.
19	3/17/11	Corner of AOI002 – Low density clay target debris.
20	3/17/11	SR042A Sample – Representative medium density clay target fragments.
21	3/17/11	SR042A Sample location. Sample was sieved.
22	3/17/11	SR043A Sample location. Photo looking northwest.
23	3/17/11	SR045 Sample location. Clay target fragments at sample surface.
24	3/17/11	Representative of disturbed piles within AOI004.
25	3/17/11	SR050A Sample location.
26	3/17/11	SR051A Sample location.

Photograph No.	Date	Description
27	3/16/11	.50 caliber projectile found at southern edge of MRA.
28	3/16/11	SR052A Sample location.
29	3/16/11	SR053A Sample location.
30	3/15/11	Visual survey of MRA using rope to mark off 15' transect spacing.

Photograph No. 01
Date: 3/15/11

Metal pipe and concrete debris in area to west and north. Possibly from low and high houses.



Photograph No. 02
Date: 3/15/11

Metal pipe and concrete debris in area to west and north. Possibly from low and high houses.

Photograph No. 03
Date: 3/15/11

Metal pipe pictured with butt in place.

Photograph No. 04
Date: 3/15/11

POI001 – Concrete pad 1. Approximately 3' x 3'. Photo looking northwest.

Photograph No. 05
Date: 3/16/11

Presumed high house location. Photo looking northwest.

Photograph No. 06
Date: 3/16/11

Looking from SR007 sample location (foreground) east toward Rajen Dairy Property beyond security access road and fence.

Photograph No. 07
Date: 3/16/11

Looking from SR007 sample location (foreground) toward Rajen Dairy Property beyond security access road and fence. Photo looking northeast.

Photograph No. 08
Date: 3/16/11

Concrete Pad 6.

Photograph No. 09
Date: 3/16/11

Concrete Pad 6.

Photograph No. 10
Date: 3/16/11

POI011 – Asbestos tile.

Photograph No. 11
Date: 3/16/11

POI008 – Concrete debris.

Photograph No. 12
Date: 3/16/11

POI012 – Wood debris.

Photograph No. 13
Date: 3/16/11

POI012 – Wood debris.

Photograph No. 14
Date: 3/16/11

Low density clay target fragments.

Photograph No. 15
Date: 3/16/11

POI015 – Medium density clay target fragments.

Photograph No. 16
Date: 3/16/11

POI016 – Low density clay target fragments.

Photograph No. 17
Date: 3/16/11

Low density clay target fragments.

Photograph No. 18
Date: 3/16/11

Western edge of landfill and just north of the MRA looking southeast at presumed former landfill.

Photograph No. 19
Date: 3/17/11

Corner of AOI002 – Low density clay target debris.

Photograph No. 20
Date: 3/17/11

SR042A Sample – Representative medium density clay target fragments.

Photograph No. 21
Date: 3/17/11

SR042A Sample location. Sample was sieved.

Photograph No. 22
Date: 3/17/11

SR043A Sample location. Photo looking northwest.

Photograph No. 23
Date: 3/17/11

SR045 Sample location. Clay target fragments at sample surface.

Photograph No. 24
Date: 3/17/11

Representative of disturbed piles within AOI004.

Photograph No. 25
Date: 3/17/11

SR050A Sample location.

Photograph No. 26
Date: 3/17/11

SR051A Sample location.

Photograph No. 27
Date: 3/17/11

.50 caliber projectile found at southern edge of MRA.

Photograph No. 28
Date: 3/17/11

SR052A Sample location.

Photograph No. 29
Date: 3/17/11

SR053A Sample location.

Photograph No. 30
Date: 3/17/11

Visual survey of MRA using rope to mark off 15' transect spacing.

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APPENDIX E

Field Notes and Field Forms

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Versar

CHAIN OF CUSTODY RECORD

№ 0156

PROJECT NO.	PROJECT NAME	LAB:
111736.0006	CANNON AFB CSA PHASE II	MICROBAC

SAMPLERS: (Signature) (Printed) [illegible], CRAIG [illegible]

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	VOA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SBD (ft)	SED (ft)	SACODE	LOTCTLNUM	Preservative
[illegible]1A	3/17/11	1300	SO		LK6001	1	X							[illegible]	[illegible]	N	-	-
LK6002A	3/17/11	1335	SO		LK6002	1	X							0.0	0.5	N	-	-
LK6003A	3/17/11	1340	SO		LK6003	1	X							0.0	0.5	N	-	-
LK6004A	3/17/11	1345	SO		LK6004	1	X							0.0	0.5	N	-	-
LK6005A	3/17/11	1350	SO		LK6005	1	X							0.0	0.5	N	-	-
LK6005A MS ~~DUP~~	3/17/11	1350	SO		LK6005	1	X							0.0	0.5	MS	-	-
LK6005A MSD ~~DUP~~	3/17/11	[illegible]	SO		LK6005	1	X							0.0	0.5	MD	-	-
LK6006A	3/17/11	[illegible]	SO		LK6006	1	X							0.0	0.5	N	-	-
LK6007A	3/17/11	1400	SO		LK6007	1	X							0.0	0.5	N	-	-
LK6007AMSD	3/17/11	1400	SO		LK6007	1	X							0.0	0.5	FD	-	-
LK6008A	3/17/11	1405	SO		LK6008	1	X							0.0	0.5	N	-	-
LK6009A	3/17/11	1410	SO		LK6009	1	X							[illegible]	0.5	N	-	-

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[illegible]	3/17/11 1630	FED EX	
(Printed) [illegible]		(Printed)	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
(Printed)		(Printed)	

Remarks: [illegible]

Temp Received

Turn-Around-Time [illegible]

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).

Versar

CHAIN OF CUSTODY RECORD

№ 0157

PROJECT NO.	PROJECT NAME	LAB:
117-6.0006	CANNON AFB CSE PHASE II	MCLOFAC

SAMPLERS: (Signature) (Printed) Patrick Lawlis, Craig Kelly

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	PAH SW8270C						SBD (ft)	SED (ft)	SACODE	LOTCTLNUM	Preservative
BKG01DA	3/17/11	1415	SD		BKG01D	1	X						0.0	0.5	N	-	—

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[illegible]	3/17/11 1430	FEDEX	
(Printed) [illegible] Tort		(Printed)	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
(Printed)		(Printed)	

Remarks: Temp Received

CALL [illegible] QUESTIONS 720 231 6022 (cell)

Turn-Around-Time 14 DAY

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field File (pink).

Versar

CHAIN OF CUSTODY RECORD

№ 0158

PROJECT NO.	PROJECT NAME	LAB:

SAMPLERS: *(Signature)* [illegible] (Printed) [illegible]

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SBD (ft)	SED (ft)	SACODE / LOTCTLNUM / Preservative	REMARKS
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]						[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]								[illegible]	

Relinquished by: *(Signature)*	Date / Time	Received by: *(Signature)*	Date / Time
[illegible]	3/17/11 1430	FED EX	
(Printed) Gary Tort		(Printed)	
Relinquished by: *(Signature)*	Date / Time	Received for Laboratory by: *(Signature)*	Date / Time
(Printed)		(Printed)	

Remarks: QUESTIONS - ALL GARY TORT 720.231.8022 (cell)

Temp Received

Turn-Around-Time 7 DAYS

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).

Versar

CHAIN OF CUSTODY RECORD

№ 0159

PROJECT NO.	PROJECT NAME	LAB:
111736.0006	CANNON AFB CSE PHASE II	MICROBAC

SAMPLERS: (Signature)

(Printed) PATRICK LOVILL, CRAIG KISK

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS							SBD (ft)	SED (ft)	REMARKS SACODE	LOTCTLNUM	Preservative
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1	[illegible]						[illegible]	[illegible]	N		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1	[illegible]								[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1	[illegible]								[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	1	[illegible]								N		[illegible]

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[illegible]	3/17/11 1430	FED EX	
(Printed) Gary Toff		(Printed)	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
(Printed)		(Printed)	

Remarks: Call Gary Toff with questions 720.231.6022

Temp Received

Turn-Around-Time 7 DAYS

FedEx Airbill #

Distribution: [illegible]inal Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field File [illegible]k).

Versar

CHAIN OF CUSTODY RECORD

№ 0160

PROJECT NO.	PROJECT NAME	LAB:
11736.0006	CANNON AFB CSE PHASE II	MICROBAC

SAMPLERS: (Signature) [illegible]

(Printed) [illegible]

PARAMETERS: RAH, BLTOC

REMARKS: HOLD ALL

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	RAH	BLTOC						SBD (ft)	SED (ft)	SACODE	LOTCTLNUM	Preservative
[illegible]	3/17/11	[illegible]	SO		[illegible]	1	X							1.5	1.0	N	-	-
[illegible]	↓	[illegible]	↓		[illegible]	1	X							↓	↓	N	-	-
[illegible]		[illegible]			[illegible]	1	X									N	-	-
[illegible]					[illegible]	1										N	-	-
[illegible]		[illegible]			[illegible]	1	X							1.0	1.5	N	-	-
[illegible]		[illegible]			[illegible]	1	X							1.5	1.0	N	-	-
[illegible]		[illegible]			[illegible]	1	X									N	-	-
[illegible]		[illegible]			[illegible]	1	X									N	-	-
[illegible]		[illegible]			[illegible]	1	X									N	-	-
[illegible]					[illegible]	1	X									N	-	-
[illegible]		[illegible]			[illegible]	1	X									N	-	-
[illegible]	↓	[illegible]	↓		[illegible]	1	X							↓	↓	N	-	-

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[illegible]	3/17/11 1430	FED EX	
(Printed) Gary Torf		(Printed)	
Relinquished by: (Signature)	**Date / Time**	**Received for Laboratory by: (Signature)**	**Date / Time**
(Printed)		(Printed)	

Remarks: (ALL COMM TO GARY TORF WITH QUESTIONS) 720 231 8022 (CELL)

Temp Received

Turn-Around-Time HOLD ALL SAMPLE ANALYSIS

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).

Versar

CHAIN OF CUSTODY RECORD

№ 0161

PROJECT NO.	PROJECT NAME	LAB:
1111736.0006	CANNON AFB CSE PHASE II	MICROBAC

SAMPLERS: (Signature)

(Printed) Derrick Limmer, Craig Kisiv

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	PARAMETERS: PAH 8270C							SBD (ft)	SED (ft)	REMARKS: SACODE	LOTCTLNUM	Preservative
SR053B	3/17/11	1325	SO		SR053	1	X							0.5	1.0	N	–	–

HOLD ALL

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
Gary Torf	3/17/11 1430	FEDEX	
(Printed) Gary Torf		(Printed)	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
(Printed)		(Printed)	

Remarks: CALL GARY TORF WITH QUESTIONS 720.231.8022 (CELL)

Temp Received

Turn-Around-Time HOLD ALL SAMPLE ANALYSIS

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field File (pink).

Versar

CHAIN OF CUSTODY RECORD

№ 0154

PROJECT NO.	PROJECT NAME	LAB:
1117.6.0006	CANNON AFB CSE PHASE II	MICROBAC

SAMPLERS: (Signature) [signature] (Printed) PATRICK LAWLER / CRAIG KISH

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	LEAD 6010B							SBD (ft)	SBD (ft)	REMARKS SACODE / LOTCTLNUM / Preservative
SR001A	3/10/11	1033	SO		SR001	1	X							0.0	0.5	N - -
SR001AMS	3/10/11	1033	SO		SR001	1	X							0.0	0.5	MS - -
SR001AMSD	3/10/11	1033	SO		SR001	1	X							0.0	0.5	SD - -
SR003A	3/10/11	1044	SO		SR003	1	X							0.0	0.5	N - -
SR004A	3/10/11	1050	SO		SR004	1	X							0.0	0.5	N - -
SR008A	3/10/11	1110	SO		SR008	1	X							0.0	0.5	N - -
SR010A	3/10/11	1120	SO		SR010	1	X							0.0	0.5	N - -
SR016A	3/10/11	1320	SO		SR016	1	X							0.0	0.5	N - -
SR020A	3/10/11	1338	SO		SR020	1	X							0.0	0.5	N - -
SR024A	3/10/11	1355	SO		SR024	1	X							0.0	0.5	N - -
SR027A	3/10/11	1415	SO		SR027	1	X							0.0	0.5	N - -
SR027ADUP	3/10/11	1415	SO		SR027	1	X							0.0	0.5	FD - -

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[signature]	3/17/11 1630	FEDEX	
(Printed) GARY TORT		(Printed)	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
(Printed)		(Printed)	

Remarks: PRESTON CALL GARY TORT 720.231.8022 (CELL)

Temp Received

Turn-Around-Time 14 DAY

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field Files (pink).

Versar

CHAIN OF CUSTODY RECORD

№ 0155

PROJECT NO.	PROJECT NAME	LAB:
111736.0006	CANNON AFB CSE PHASE II	MICROBAC

SAMPLERS: (Signature) (Printed) Derek Lawler, Craig Fisk

FIELD SAMPLE NUMBER	DATE	TIME	MATRIX	METH.	LOCATION ID	NO. OF CONTAINERS	LEAD 6010B						SBD (ft)	SED (ft)	REMARKS SACODE	LOTCTLNUM	Preservative
SR032A	3/16/11	1455	SO		SR032	1	X						0.0	0.5	N	-	-
SR034A	3/16/11	1505	SO		SR034	1	X						0.0	0.5	N	-	-
SR034ADUP	3/16/11	1505	SO		SR034	1	X						0.0	0.5	FD	-	-
SR037A	3/16/11	1525	SO		SR037	1	X						0.0	0.5	N	-	-

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Date / Time
[signature]	3/17/11 1630	FED EX	
(Printed) GARY TOFF		(Printed)	
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time
(Printed)		(Printed)	

Remarks: QUESTIONS CALL GARY TOFF 720.231.8022 (CELL)

Temp Received

Turn-Around-Time 14 DAY

FedEx Airbill #

Distribution: Original Plus One Accompanies Shipment (white and yellow); Copy to Coordinator Field File (pink).

Location _____ Date _____

Project / Client _____

Location CANNON AFB Date 3/15/11

Project / Client CSE PHASE II FIELD WORK

FORMER 1940s SKEET RANGE

1200 SAFETY BRIEFING AT SR (Skeet Range)

- Gary Torf } Versar
- David Feiertag
- Patrick Lawler } Jacobs
- Craig Kish
- HOSPITAL ROUTE
- SLIP/TRIP/FALL
- WX, BIOLOGICAL HAZ.
- SUNSCREEN, WATER/ELECTROLYTES

1215 BEGIN VISUAL SURVEY

SPACING = 15.0 ft

4-man VS crew.

1230 FOUND CONCRETE PADS (BROKEN) & 3 SLOPED 1½" PIPES ABOUT 3' WIDE x 4' LONG NEAR OLD GRINDING ARC/GRINDING POSITION. MIGHT HAVE BEEN A MARKER FOR A FIRING POSITION.

POI 001 - POINT OF INTEREST FOR PIPES.

ALSO TOOK PHOTO BOTH IN PLACE & STANDING UP (PHOTOS 1 & 2).

FOUND CONCRETE OBJECT IN AREA TO WEST & NORTH. POSSIBLY FROM COW/HOG HOUSES. ONE IS ~55' SOUTH OF PIPES & OTHER ARE ~50' W & SW. LARGER CONCRETE (~4' x 4') IS ~60' NW.

Location: Cannon AFB Date: 3/15/11

Project / Client: CGE PH 2 Fieldwork - Ground Stress Analysis
Visual Survey

POI 002 - Shotgun casing. Dates HV 16 marked on bottom. Found to west of former concrete foundations.

Pad 1 - Marked as a POI in GPS. Full concrete pad (~3' by 3'). Southern most pad.
Photo 3: Pad 1 (Photo looking NW).

Pad 2 - Marked as POI in GPS. Full concrete pad (~3' by 3'). About 25' NW of Pad 1.

Pad 3 - Same as Pads 1 & 2. Located ~60' NW of Pad 2. Found a lot of bare ground betwn Pads 2 & 3 where another pad might have been located.

Pad 4 - Same as Pads 1-3. Located ~25' NNW of Pad 3.

Pad 5 - Larger pad than Pads 1-4. Located ~30' N of Pad 4. 5' wide (along NE/SW axis) x 8' (along NW/SE axis). Seems to be lined up along firing line, which about from the back of the previously POI. Mountains should be behind. This is likely the High House (Assumed location).
Photo 4: Looking NW at Assumed High House Foundation.

13:25. Anita stopped at site to give us keys.

Pad 6: Overturned pad found ~120' west of Pad 5. May be the missing pad between Pads 2 & 3. Found irregular concrete surface so finished a piece

Location: Cannon AFB Date: 3/15/11

Project / Client: CGE PH 2 Fieldwork - Ground Stress Analysis
Visual Survey

over; found the bottom was a smooth finished surface w/ a straight and sharp edge.

13:40 - Started ~~transect~~ transect visual survey. Up until 13:40 we did a reconnaissance survey by individuals to find pads: general layout.

POI 003: 50-gal. galvanized found near SE corner of Fan. Moderate Bend.

POI 004: Two plastic shotgun shells (Remington).

POI 005: Monitoring well on ~3'x3' pad w/ 4 metal bollards. No well ID. 14"OD" well protected w/ ~27" stick up.

POI 006: Concrete debris SE of Pad 1.

POI 007: Concrete debris NE of Pad 1 (more other concrete debris).

POI 008: Full photo of concrete debris. (Above Pad)

Location CANNON AFB Date 3/15/11

Project / Client CSG PH. II Site Walk, Cannon Skeet Range

VISUAL SURVEY

AOI 009: CONCRETE ASBLS. SINGLE PIECE.

AOI 010: PER GLOVE: SOME CONCRETE ASBLS.

AOI 011: POTENTIAL ASBESTOS CONTAINING TILE. BROKEN SEVERAL FRAGMENTS (~25 PIECES RANGING FROM ~3"x3" TO LESS THAN 1"x1").

AOI 012: WOOD ASBLS.

AOI 013: METAL ~~ASBESTOS~~ FENCE POST. BENT OVER, BUT STILL IN PLACE.

AOI 014: SHOT GUN SHELL (PLASTIC).

1705 - FINISHED VISUAL SURVEY

AOI 001: EXTENT OF SKEET PEBBLES DISCOVERED DURING VISUAL SURVEY. INCLUDES ANY SKEET FRAGMENTS; SO IS CONSIDERED LOW DENSITY. GPS DIDN'T WORK, SO RECORDED AUTOMAT.

1750 - LEAVE SKEET RANGE.

1805 - ARR BOP IN BLDG 355.

Location CANNON AFB Date 3/16/11 (WED)

Project / Client CSG PH II Site Walk Cannon Skeet Range

LOAD SAMPLING

0830 - AT BLDG 355 FOR SUPPLIES.

DAVID FRAZIER HAD CONVERSATIONS W/ USACE, AFCEC, & BRC ABOUT DECIDING LOAD SAMPLING FROM FORMER LANDFILL ALONG FENCELINE PREVIOUSLY INVESTIGATED BY USACE. GOT OK.

CREW: SAME AS 3/15/11 (P. 59)

EQP: SLIDE HAMMER, LINERS, BAGGIES, & OTHER SAMPLING EQP. USING GPS UNIT A TO RECORD SAMPLE LOCN.

PURPOSE: COLLECT LOAD SAMPLES & RECORD MED DENSITY SKEET FRAGMENTS ON PAH SAMPLING.

WEATHER: SUNNY, 60°F W/ HIGH EXPECTED TO 80°F. 5-10 MPH WIND FROM SOUTH.

H&S: USE OF SLIDE HAMMER. BOTTLE CLEAN TO AVOID FALLING.

MOB TO SOUTH CORNER TO START SAMPLING NEAR FENCELINE.

Location CANNON AFB Date 3/16/11

Project / Client CSE Alt II Groundwater Former Storage Range Load Simulation

10:33 SR001A Collect 0-6" BGS soil for XRF
Grassy area behind fence line (bee dwelling)
Munitions storage fence
Dark silty soil, no MD.
5 Blows

10:40 SR002A Collect 0-6" BGS soil for XRF
Grassy area about 4' SW of security access rd.
Reddish brown silt, dry, well sorted.
5 Blows
NO MD noted.

10:44 SR003A 0-6" BGS soil for XRF
Grassy area about 50' E of munitions storage area fence corner.
Same soil as SR002.
12 Blows.
NO MD noted

10:50 SR004A 0-6" BGS soil for XRF
Grassy area betw. 3rd munitions storage fence; base fence to north

Location Cannon AFB Date 3/16/11

Project / Client CSE Alt II Groundwater, Former Storage Range Load Simulation

of SR003. Same soil as others.
8 Blows.
NO MD.

10:55 SR005A 0-6" BGS soil for XRF
Grassy area NE of SR004.
Same soil description as others.
3 Blows
NO MD

11:00 SR006A 0-6" BGS soil for XRF
Grassy area NE of SR005 ; ~4' west of the access rd. Same soil description as others.
8 Blows NO MD

11:05 SR007A 0-6" BGS soil for XRF
Grassy area N of SR006 ; ~10' west of the access rd. Same soil description as others. (west of dancer's hayshed).
14 Blows. NO MD

Location: Cannon AFB Date: 3/16/11

Project / Client: CSE Ph. II Fieldwork, Former Skeet Range Lead Sampling

PHOTO 5: Looking E at SR0007 Local w/ Security Access Rd, Fence, & Dirt Mound in Bkgd

PHOTO 6: Same as Photo 5. Looking NE.

11:10 SR0008A 0-6" BGS Soil for XRF.
Grassy area north of SR0007 about 10' west of Security Access Rd. West of the northern end of the dirt mound.
Same soil composition as others.
18 Blows.
No MD.

11:15 SR0009A 0-6" BGS Soil for XRF.
Grassy area north of SR0008 about 10' west of road. Same soil as others.
8 Blows. No MD.

11:20 SR0010A 0-6" BGS Soil for XRF.
Grassy area to west of SR0009. Same soil.
8 Blows. No MD (Gravel mix in lab).

11:25 SR0011A 0-6" BGS Soil for XRF.
Grassy area W of SR0008. Same soil.
8 Blows. No MD.

Location: Cannon AFB Date: 3/16/11

Project / Client: CSE Ph. II Fieldwork, Former Skeet Range Lead Sampling

11:30 SR0012A 0-6" BGS Soil for XRF.
Grassy area west of SR0007. Same soil.
6 Blows. No MD.

Note that we found some skeet fragments w/in boundary of former IRP identified area is moved, so skeet may have been moved across boundary of the landfill by mowing or former w/ OPS. We did not sample but will note extent of fragments.

11:35 SR0013A 0-6" BGS Soil for XRF
Grassy area south of SR0012. Same soil.
8 Blows. No MD

11:40 SR0014A 0-6" BGS Soil for XRF.
Grassy area south of SR0013. Same soil.
8 Blows. No MD

Lunch. Left Cannon at 1:00. 355 to start the XRF analysis of samples collected this am.

13:15 SR0015A 0-6" BGS Soil for XRF.
Grassy area west of SR0014, north of ~~Soil Sampling~~

Location CANNON AFB Date 3/16/11

Project / Client CSE PHASE II GOLF COURSE FORMER SKEET RANGE LEAD SAMPLING

MUNITIONS STORAGE AREA AND SE of the MUNITIONS WALL. 6 BLOWS. NO MD. SAME SOIL TYPE.

1320 SR016A 0-6" BGS SOIL FOR XRF. LOCATED NORTH OF SR015. GRASSY AREA w/ MODERATE COVER. NO MD. 10 BLOWS. SAME SOIL TYPE.

1330 SR017A 0-6" BGS SOIL FOR XRF. LOCATED NORTH OF SR016. GRASSY AREA w/ MODERATE COVER. NO MD. 10 BLOWS. SAME SOIL TYPE.

1332 SR018A 0-6" BGS SOIL FOR XRF. LOCATED NNW OF SR017. GRASSY AREA w/ MODERATE COVER. NO MD. SAME SOIL TYPE. 5 BLOWS.

1335 SR019A 0-6" BGS SOIL FOR XRF, LOCATED NW OF SR018. GRASSY AREA OF MODERATE COVER. NO MD. SAME SOIL TYPE. 8 BLOWS.

1338 SR020A 0-6" BGS SOIL FOR XRF. LOCATED NORTH OF SR019. SAME VEGETATION AND SOIL TYPE AS SR019A. 9 BLOWS.

Location CANNON AFB Date

Project / Client CSE PHASE II FORMER SKEET RANGE LEAD SAMPLING

1341 SR021A 0"-6" BGS SOIL FOR XRF. LOCATED NORTH OF SR020. SAME VEGETATION AND SOIL TYPE AS SR020A. 4 BLOWS.

1344 SR022A 0-6" BGS SOIL FOR XRF. LOCATED NORTH OF SR021. SAME VEG & SOIL TYPE. 32 BLOWS. NOTE SOME OLD, COMPACTED CLAY w/ GRAVEL TO 1½", MOD. POORLY SORTED. GRAVEL IS SUBANGULAR. SAMPLED AT ≈ 2½" BGS. NO MD.

1347 SR023A 0-6" BGS SOIL FOR XRF. LOCATED WEST OF SR022 IN GRASSY AREA w/ MOD. TO GOOD COVER. 24 BLOWS. SOIL IS SILT w/ GRAVEL TO ¾", SUBANGULAR, MOD. POORLY SORTED. NO CLAY OBSERVED. NO MD.

1355 SR024A 0-6" BGS SOIL FOR XRF. LOCATED WEST OF SR023 IN GRASSY AREA w/ GOOD COVER. 15 BLOWS. SILT, REDDISH BROWN (SAME AS SR001-011). NO MD.

Location CANNON AFB Date 3/16/11

Project / Client CSE PH II FIELDWORK FORMER SKEET RANGE
LEAD SAMPLING

1405 - SRØ25A. 0-6" BGS SOIL FOR XRF.
LOCATED IN GRASSY AREA w/ MOD TO GOOD COVER
WEST OF SRØ24. 11 BLOWS. SILT (REDDISH BROWN).
NO MD.

1410 SRØ26A. 0-6" BGS SOIL FOR XRF.
LOCATED IN GRASSY AREA w/ MOD COVER TO WEST OF
SRØ25. 14 BLOWS. SILT.
NO MD.

1415 SRØ27A. 0-6" BGS SOIL FOR XRF.
LOCATED TO WEST OF SRØ26 IN MOD. GRASSY AREA
ABOUT 40' FROM ARM MOTOR RD. FOUND SOME
GLASS, SO MAY HAVE SOME LANDFILL. NO RECOVERY
OFFSET 12" TO EAST. ~25 BLOWS. SANDY SILT
w/ ANGULAR GRAVEL TO ½", MOD. WELL SORTED.
NO MD.

1420 SRØ28A. 0-6" BGS SOIL FOR XRF.
LOCATED SOUTH OF SRØ27 ; ~75' EAST OF ARM MOTOR
ROAD. USED SHOVEL TO DIG TO 6" & COLLECT FROM THE
SIDEWALL. ALL IS LIKELY IN TOP 2". TAN
SAND TO SILT. ALL IS SILT w/ GRAVEL TO ½" ANGULAR.
NO MD.

Location CANNON AFB Date 3/16/11

Project / Client CSE PH II FIELDWORK. FORMER SKEET RANGE
LEAD SAMPLING

1435 - SRØ29A. 0-6" BGS SOIL FOR XRF.
LOCATED TO EAST OF SRØ28 IN MOD. TO GOOD VEG.
COVER (GRASS). SILT. REDDISH BROWN.
13 BLOWS. NO MD.

1445 SRØ30A. 0-6" BGS SOIL FOR XRF.
LOCATED EAST OF SRØ29 IN MOD. COVER (GRASS).
REDDISH BROWN SILT.
15 BLOWS. NO MD.

1450 SRØ31A. 0-6" BGS SOIL FOR XRF.
LOCATED EAST OF SRØ30 IN GRASS w/ MOD. COVER.
REDDISH BROWN SILT.
12 BLOWS. NO MD.

1455 SRØ32A. 0-6" BGS SOIL FOR XRF.
LOCATED EAST OF SRØ31 IN GRASSY AREA w/
MOD. COVER. REDDISH BROWN SILT.
10 BLOWS. NO MD.

1500 SRØ33A. 0-6" BGS SOIL FOR XRF.
LOCATED SOUTHWEST OF SRØ32. GRASSY AREA.
REDDISH BROWN SILT. 12 BLOWS. NO MD.

Location Cannon AFB Date 3/16/11

Project / Client CSE Ph II Fieldwork, Former Skeet Range

Lead Sampling

1505 SR034A 0-6" BGS soil for XRF.
Located south of SR033 in grassy area w/ mod. cover. Reddish brown silt.
14 blows, no MD.

1510 SR035A 0-6" BGS soil for XRF.
Location SSE of SR034 in grassy area w/ mod. cover. w/ concrete from skeet fragments, but none at this loc'n.
Reddish brown silt. 10 blows.
No MD at immed. loc'n.

1515 SR036A 0-6" BGS soil for XRF.
Loc'n SE of SR035 in grass w/ mod cover near downslope of bottom of skeet. Silt.
11 blows. No skeet at immed. loc'n. No MD.

1525 SR037A 0-6" BGS soil for XRF.
Loc'n south of SR036 in grass w/ mod cover. Loc'n near downslope of skeet extent, but no skeet in immed. loc'n. 9 blows. No MD.
Reddish brown silt.

Location Cannon AFB Date 3/16/11

Project / Client CSE Ph II Fieldwork, Former Skeet Range

Lead Sampling

1530 SR038A 0-6" BGS soil for XRF.
Loc'n ~5' from PAB (DOS 001); NW of SR037 in grassy area w/ mod cover. We have skeet fragments w/ about 2' of this loc'n, but none in the immed. loc'n. 12 blows. No MD at immed. loc'n. Silt.

1535 SR039A 0-6" BGS soil for XRF.
Loc'n NW of SR038 in grass w/ good cover. 14 blows. No MD. Reddish brown silt.

1540 SR040A 0-6" BGS soil for XRF.
Loc'n NW of SR039 in grass w/ mod to good cover. 6 blows. Reddish brown silt.
No MD.

1545 SR041A 0-6" BGS soil for XRF.
Loc'n NW of SR040 in grass w/ mod cover.
14 blows. Reddish brown silt. No MD.

Done sampling, no grid to perform XRF.
Return to site to demobilize. PPE/skeet fragment around.

Location CANNON AFB Date

Project / Client CSG PH II FIELDWORK - FORMAL SHOOT REPORT

AL TAKES GPS TO SOMEWHAT EXTENT OF SHOOT FRAGMENTS.
AOI 0001 WILL BE AREA OF SHOOT LIMITS

PHOTO 7: PA06 AS FOUND
PHOTO 8: PA06
PHOTO 9: ASBESTOS SILO (POI 011).
~~PHOTO 10: ASBESTOS SILO (POI 011).~~ UC
PHOTO 11: CONCRETE DEBRIS (AOI 004)
PHOTO 12: WOOD DEBRIS (AOI 012)
PHOTO 13: SAME AS PHOTO 12 (AOI 012)
PHOTO 14: LOW DENSITY SHOOT FRAGMENTS

POI 015: LOW SHOOT FRAGMENTS
PHOTO 15: POI 015 (MEDIUM DENSITY SHOOT)

POI 016: LOW DENSITY SHOOT.
PHOTO 16: POI 016.

POI 017: PHOTO 17: LOW DENSITY SHOOT.

POI 018 (NO PHOTO).

PHOTO 17: AS WESTERN EDGE OF LANDFILL; DUST MONITOR

Location CANNON AFB Date 3/16/11

Project / Client CSG PH II FIELDWORK, FORMAL SHOOT REPORT

OF THE MRA LOOKING SE AT SHOOTS/DEBRIS
IN PRESUMED FORMAL LANDFILL.

LAST POI FOR LOW DENSITY SHOOT WAS AOI 022 (POI 015 THROUGH AOI 022).
ALSO HAD AOI 002 FOR LOW DENSITY AREA.

PHOTO 18: LOW DENSITY SHOOT (CONTAINED IN AOI 002).
REPRESENTATIVE OF MODERATE DENSITY SHOOT.
1805 - OFF RETRIEVED FLIGHTLINE RADIO FOR DAY.
1815 - BACK AT BLDG 355. GARY HAS 2 LOAD ANALYSES LEFT SO WE'LL WAITING FOR THEM.

Location: CANNON AFB Date: 3/17/11 (THU.25)

Project / Client: CSE AH II FIELDWORK - FORMER SKEET RANGE

CREW: SAME AS 3/15/11. ALL CONTRACTOR HOLDING COLLECT SAMPLES.

ACTIVITY: COLLECT PAH SAMPLES & PAH BACKGROUND SAMPLES TO EAST OF MUNITIONS STORAGE AREA.

EQP: GPS, SLIDE HAMMER, AUGERS, SLEEVES, COOLERS, & OTHER SAMPLING EQP.

WEATHER: SUNNY, 65°F w/ HIGH OF 85°F FORECASTED, 10-15 mph WIND FROM SW.

H&S: PROPER LIFTING TECHNIQUES, USE OF SLIDE HAMMER w/ HEARING PROTECTION.

0930: AT SITE AFTER LOOKING EQP.

1010 SR042A 0-6" BGS SOIL FOR PAH ONLY. (SUB270C) LOCATED IN GRASSY AREA w/ AOI002 (NEAR CENTER). THIS IS REPRESENTATIVE OF A MEDIUM DENSITY CLAY TARGET (SKEET) FRAGMENT AREA. 7 BLOWS. REDDISH BROWN SILT, FOUND MANY SMALL SKEET FRAGMENTS RANGING FROM ~1/8" TO ~1/2". (PHOTO: 020). SAMPLE WAS SIEVED FOLLOWING SAMPLE COLLECTION WITH A #10 (2mm) SIEVE. MINIMAL CLAY TARGET DEBRIS OBSERVED IN SIEVE.

Location: CANNON AFB Date: 3/17/11

Project / Client: CSE AH II FIELDWORK - FORMER SKEET RANGE PAH SAMPLING

0950 COLLECT P01023 AT MEDIUM DENSITY CLAY TARGET DEBRIS, NORTH OF FORMER HIGH HOUSE. PHOTO: 019

1020 COLLECT SR042B 6"-12" bgs FOR PAH ONLY. SAMPLE WILL BE HELD PENDING "A" INTERVAL RESULTS. 32 BLOWS. USED HAND TROWEL TO CLEAN HOLE TO 6" BGS TO AVOID SLOUGH IN 6"-12" SAMPLE. NOTED SKEET FRAGMENTS IN SIZE RANGE TO ~1" BGS. SOIL TYPE WAS THE SAME. NO OBSERVED SKEET IN THE 6"-12" BGS INTERVAL.

1030 SR043A 0-6" BGS SOIL FOR PAH. (SUB270C) LOCATED AT P01023 IN GRASSY AREA w/ MEDIUM DENSITY SKEET. 8 BLOWS. REDDISH BROWN SILT. NO SKEET FRAGMENTS FOUND.

PHOTO 20, 21: SAMPLING AT SR043, LOOKING NW.

SR043ADUP FIELD DUPLICATE SAMPLE SPLIT AT LOCN SR043 FROM 0-6" BGS. ADD ALSO TO DUP. ACC. NO SKEET FRAGMENTS IN SOIL.

Location Cannon AFB Date 3/17/11

Project / Client CSE Ph II Fieldwork, Found Shot Range, PAH Sampling

1035 SR043B. 6"-12" BGS soil for PAH. (SW8270C) Sample will be held pending analysis of 0-6" BGS sample (i.e., analyzed only if 0-6" interval is over the standard). No odors. 18 blows. Same silt.

1040 SR044A 0-6" BGS soil for PAH. (SW8270C) Located ~6' SE of SR043B in low density shot fragments. Grassy area w/ non to good cover. 10 blows. Same silt as SR043. Note a few pieces of shot in soil, & also a 45-cal slug (photo 22).

Photo 22: Shot: 45-cal projectile in SR044A.

1045 SR044B. 6"-12" BGS soil for PAH (SW8270C). Sample will be held pending analysis of the 0-6" BGS interval.

~~Photo # 22 45 cal bullet~~ found in SR. See above 3/17/11

No MD in SR044B

AOI003. Area of low density shot surrounding AOI003, with less density area

Location Cannon AFB Date 3/17/11

Project / Client CSE Ph II Fieldwork. Found Shot Ranges, PAH Sampling.

AOI004 - Area containing pockets of low to med density shot fragments. Disturbed earth from burrowing animals (e.g., rabbits). Fragments are typically larger fragments than in other areas.

1105 SR045A. 0-6" soil for PAH (SW8270C) Located w/ AOI004 in grassy area w/ animal burrows. 3 blows. Soil is reddish-brown silt. Found shot fragments in 0-6" interval. Saw shot in sidewall to 5" BGS. Found both larger fragments (~1/2") but also tiny fragments that cannot all be removed. Numerous tiny fragments in the sample.

Photo 23: Shot on ground at SR045.

1110 SR045B. 6-12" BGS soil for PAH (SW8270C). Sample will be held pending analytical results from 0-6" interval.
Numerous tiny fragments ~ 1/16"

Location CANNON AFB Date 3-17-11

Project / Client CSE PHASE II FIELDWORK

FORMER SKEET RANGE PAH SAMPLING

1125 SR045C 12"-18" bgs for soil 8270C PAHs
Sample will be held pending analytical results of SR045A
No fragments observed

PHOTO #24 Representative of disturbed piles w/in AOI004

PHOTO #25 closeup of pile w/in AOI004 at center of previous photo showing target debris (see PHOTO #24)

1130 SR046A 0"-6" bgs for soil 8270C PAHs
A few small pieces ~ 3/8" target debris
a few smaller flecks of target debris

1135 SR046B 6"-12" bgs for soil 8270C PAHs
Sample will be held pending analysis/results of SR046A
No Target debris observed in sample

1145 SR047A 0"-6" bgs for soil 8270C PAHs
Several small fragments. A few smaller flecks of Target debris < 1/16"

Location CANNON AFB Date 3-17-11

Project / Client CSE PHASE II FIELDWORK

FORMER SKEET RANGE SAMPLING

1150 SR047B 6"-12" bgs for soil PAHs 8270C
SAMPLE will be held pending results of SR047A. A few small flecks observed in sample

1200 COLLECT SR048A 0"-6" FOR PAH 8270C. NO SKEET DEBRIS OBSERVED.
COLLECT SR048A DUP AT THIS LOCATION AS WELL.

1205 COLLECT SR048B 6"-12" BGS FOR PAH 8270C. NO SKEET DEBRIS OBSERVED. SAMPLE WILL BE HELD PENDING RESULTS OF SR048A

1215 COLLECT SR049A 0"-6" BGS FOR PAH 8270C. SOME SKEET DEBRIS (< 1/2") AND SEVERAL SKEET FLAKES (< 1/16") IDENTIFIED IN SAMPLE ALIQUOT.

1220 COLLECT SR049B 6"-12" BGS FOR PAH 8270C. NO SKEET DEBRIS IDENTIFIED. HOLD PENDING RESULTS OF SR049A

Location CANNON AFB Date 3/17/11

Project / Client CSE PHASE II

FORMER SKEET RANGE PAH SAMPLING

12[25] SR050A. 0-6" BGS SOIL FOR PAH (SW8270C)
COLLECTED IN GRASSY AREA W/ MOD COVER REPRESENTING
LOW SKEET DENSITY. BROWN SILT. 12 BLOWS.
PHOTO TAKEN SHOWING SKEET & SAMPLE CONTAINER
ID W/ SAMPLE LOC'N.
NOTE SEVERAL PIECES OF 1/4" - 1/2" SKEET, BUT VERY
FEW SMALLER PIECES, ALTHOUGH SOME MIGHT HAVE GONE
INTO THE SAMPLE.

12[30] SR050B. 6"-12" BGS SOIL FOR PAH (SW8270C).
SAMPLE WILL BE HELD PENDING ANALYTICAL
RESULTS FOR THE 0-6" SAMPLE.
NO SKEET FOUND IN SAMPLE.

12[35] SR051A. 0-6" BGS SOIL FOR PAH (SW8270C).
COLLECTED IN GRASSY AREA ~30' NW OF SR050.
IN LOW SKEET DENSITY. PHOTO TAKEN OF SKEET
& SAMPLE ID. SAME REDDISH BROWN SILT.
FOUND SEVERAL LARGER SKEET FRAGMENTS TO ~1/2" AS WELL
AS MANY SMALL SKEET PIECES THAT COULD NOT ALL BE
DISCARDED FROM THE SAMPLE.

12[40] SR051B 6"-12" SOIL FOR PAH (SW8270C).
SAMPLE WILL BE HELD PENDING ANALYTICAL

Location CANNON AFB Date 3/17/11

Project / Client CSE PHASE II

FORMER SKEET RANGE PAH SAMPLING

RESULTS FOR THE 0-6" BGS INTERVAL.
NO SKEET FOUND IN SAMPLE SOIL FOR SR051B.

13[10] SR052A. 0-6" BGS SOIL FOR PAH (SW8270C).
VERY SMALL, MINIMAL SKEET (<1/16")
IDENTIFIED IN SAMPLE. PHOTO OF SKEET
AND SAMPLE ID.
SR052A MS AND SR052A MSD
COLLECTED IN THIS LOCATION AS WELL.

1315 SR052B 6-12" BGS SOIL FOR
PAH 8270C. NO TARGET OBJECTS
IDENTIFIED. HOLD PENDING RESULTS
OF SR052A.

13[20] SR053A. 0-6" BGS SOIL FOR PAH (SW8270C).
GRASSY AREA W/ MOD COVER. REPRESENTATIVE OF
THE VISIBLE DENSITY. 6 BLOWS. SAME SILT AS
SR052. NO SKEET FRAGMENTS FOUND IN SOIL.
PHOTO OF AREA W/ SAMPLE ID.

13[25] SR053B 6"-12" BGS SOIL FOR PAH (SW8270C).
WILL HOLD SAMPLE PENDING ANALYTICAL RESULTS FOR
0-6" BGS, NO SKEET FOUND IN SAMPLE.

Location CANNON AFB Date 3/17/11

Project / Client CSC PH. II, FIELDWORK - FORMER SKEET RANGE. PAH SAMPLING (BKG).

1330 - BKG001A 0-6" BGS SOIL FOR PAH (SW8270C). PAH RESULTS & BACKGROUND LOC'N FOR PAH. LOCATED IN GRASSY AREA W/ MOD TO GOOD COVER BETWEEN MUNITIONS STORAGE AREA & OLD FARM, ~550' SOUTH OF THE NE CORNER OF THE FENCE TO THE MUNITIONS STORAGE AREA. SOIL IS THE SAME REDDISH BROWN SILT AS AT THE STUDY AREA. NO MD.

1335 - BKG002A SAME SAMPLING DESCRIPTION AND SOIL TYPE AS BKG001. LOCATED APPROX. 100' SE OF BKG001.

1340 COLLECT BKG003A SAME SAMPLING DESCRIPTION AND SOIL TYPE AS BKG001. LOCATED APPROX. 100' SW OF BKG002.

1345 COLLECT BKG004A SAME AS BKG001/002 & 003. LOC'D APPROX ~100' SOUTH OF BKG002. NO MD.

1350 COLLECT BKG005A SAME AS BKG001 - BKG004. LOCATED APPROX 100' SW OF BKG004. NO MD. ALSO MS/MSD (3 x 400 CONTAINERS).

Location CANNON AFB Date 3/17/11

Project / Client CSC PH. II FIELDWORK - FORMER SKEET RANGE PAH BACKGROUND SAMPLING.

1355 BKG006A 0-6" BGS SOIL FOR PAH (SW8270C). SOIL TYPE IS SAME SILT. LOC'D ~100' SOUTH OF BKG004. NO MD

1400 BKG007A 0-6" BGS SOIL FOR PAH 8270C. SAME SOIL TYPE AS BKG004. NO MD. BKG007ADUP ~~BKG007DUP~~. ALSO DUPLICATE AT LOC'N BKG007.

1405 BKG008A 0-6" BGS SOIL FOR PAH (SW8270C). SAME SOIL TYPE (SILT). NO MD.

1410 BKG009A 0-6" BGS SOIL FOR PAH 8270C. SAME SOIL TYPE AS BKG008. NO MD.

1415 BKG010A 0-6" BGS SOIL FOR PAH 8270C. SAME SOIL TYPE AS BKG009. NO MD.

VERSAR

Soil Sampling Log

LOCID
SRØØ1

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	03-16-11	1033

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF, GT, PL, CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
NO MD dried field cover, native grasses, semi-maintained	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		silty, dry		N		DRY	A	12.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOC ID
SR002

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1040

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF GT DK CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
NO MD DRIED field cover, native grasses	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILTY, DRY		N		D	A	9.67		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOC ID
SR003

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1044

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF, PL, GT, CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
DRY FIELD COVER NO MD Next to dirt Road	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILTY, DRY		N		D	A	6.33		
	0.5									
							B			
	1.0									
							C			
	1.5									
							D			
	2.0									
							E			
	2.5									
							F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR004

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1050

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL CT CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
No MD Dry field cover	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

HMI:	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		Dry Silty		N			A	10.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SRP05

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1055

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF GT PL CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
NO MD DRY FIELD COVER, NATIVE GRASSES	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY, SILTY		N		D	A	13.7		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SB206

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006		1100

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☐ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
Next to road west of N/S fence No MD Dry vegetative cover	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	Reason:
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
	0.5	DRY SILTY		N		D	(A)	8.7		
	1.0						B			
	1.5						C			
	2.0						D			
	2.5						E			
	3.0						F			

ADDITIONAL NOTES:

VERSAR

Soil Sampling Log

LOCID
SR007

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1105

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DJ, PL, CT, CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
WEST OF HAYSHED N15FT from gravel road PHOTO taken ~ 1110	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	(A)	11.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES: (2) PHOTOS TAKEN ~ 1110

VERSAR

Soil Sampling Log

LOCID
SR008

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1110

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF CT PL CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
Next to Gravel road Dry vegetative cover	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	A	19.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR009

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1115

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DI PL GT CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
next to gravel road dry vegetative cover No MD	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	A	10.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR010

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1120

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
~~DF~~ PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
DRY vegetative field cover NO MD	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILTY DRY		N		D	A	15.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOC ID
SR011

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1125

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
~~DP~~ PL ~~GT~~ CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
DRY vegetative field cover no MD	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	A	12.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR012

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1130

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF, PJ, GT, CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
DRY field vegetative cover native grasses No MD	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	A	16.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR013

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1135

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
DRY Vegetative Cover No MD	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	A	9.7		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR014

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3-16-11	1140

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF, LPL, GT, CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
DRY vegetative cover No MD	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		DRY SILTY		N		D	A	133		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR015A

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1315

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASS 1" HIGH, MODERATE COVER.	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT, REDDISH-BROWN	N	N	NA	D	A	12.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

6 BLOWS TO GET TO 6" BGS

VERSAR

Soil Sampling Log

LOCID
SL016

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1320

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MOLEHILLS OVER	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT, REDDISH-BROWN	N	N	NA	D	A	9.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SB017

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1330

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF DL GT GT	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MODERATE COVER	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	Reason: NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT REDDISH-BROWN	N	N	NA	✓	A	9.7		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

10 BLOWS TO 6" B.S.

VERSAR

Soil Sampling Log

LOC ID	
1332	

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	5:20

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF GT	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY w/ MODERATE COVER	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	NA
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1332		SILT Light Brown	N	N	NA	D	A	14.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR019

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/10/11	1335

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASS w/ MODERATE COVER	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT Reddish Brown	N	N	NONE	D	(A)	11.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SL024

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1338

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF BL GT CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASS w/ MODERATE COVER	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	NA
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1330		SILT LIGHT BROWN	N	N	NA	D	A	21.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SB-021

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	5/16/11	1341

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF FL GT CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
Grass w/ moderate cover	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	NA
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT Reddish Brown	N	N	NA	D	A	14.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID	Project Name	Project Number	Sampling Date	Time Sampling Started
SA022	Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1344

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PI) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation): GRASS w/ MODERATE COVER

Checked by/Date:

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT LIGHT BROWN SOME ROOTS PRESENT	N	N	NA	D	(A)	6.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

32 GROWS. PART OF SOIL HAD A DRY, COMPACTED CLAY. SOME GRAVEL TO 1/4", SUBANGULAR, ~~MODERATE~~ MODERATELY SORTED.

VERSAR

Soil Sampling Log

LOC ID
SRDC3

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1347

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASS w/ MODERATE COVER	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	Reason:
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT REDDISH BROWN w/	N	N	NA	D	(A)	9.7		
	0.5	10% GRAVEL LESS THAN 1-INCH SUB ANGULAR.					B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR024

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1355

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PJ) GT (TK)	Versar/Jacobs	[x] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASS W/ MODERATE COVER	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1355		SILT REDDISH BROWN	N	N	NA	D	A	17.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR025

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1405

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF FL GT CR	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE COVER	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1405		SILT (REDDISH BROWN)	N	N	NA	D	A	15.3		
	0.5									
							B			
	1.0									
							C			
	1.5									
							D			
	2.0									
							E			
	2.5									
							F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID	Project Name	Project Number	Sampling Date	Time Sampling Started
SR 026	Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1410

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PI) GT (CK)	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MODERATE COVER	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1410		SILT (LIGHT BROWN)	N	N	NA	D	(A)	9.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR027

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1415

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF DL GT CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [X] Hand Auger [X] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	OFFSET 12" EAST BECAUSE WE GOT NO RECOVERY AT INITIAL LOCN.
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1415		SANDY SILT w/ GRAVEL TO 1/2" ANGULAR. REDDISH BROWN (MOIST) (DRY)	Y	N	NA	D	A	25.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

FOUND GLASS IN INITIAL LOCN, SO MAY BE BACKFILL.

VERSAR

Soil Sampling Log

LOCID
SR028

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1420

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PD) GT (CN)	Versar/Jacobs	[x] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE COVER	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		ALL to 2" SILTS (GRAVEL SILT to ½" ANGULAR), SILT from 2"-6"	Y	N	NA	D	(A)	17.7		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:
GRAVELLY SOIL APPROXIMATELY 60-70' NORTHEAST OF PERIMETER ROAD. POTENTIAL FILL MATERIAL.

VERSAR

Soil Sampling Log

LOCID
SR029

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1435

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (GT)	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE DENSITY	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
35		SILT REDDISH BROWN	N	N	NA	D	A	10.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR030

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1445

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA EAST OF SR029.	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1445		SILT ASHISH BROWN	N	N	NA	D	(A)	12.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR031

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1450

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (DF) GT (GK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA 70 EAST OF SR031	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	NA
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT REDDISH BROWN	N	N	NA	D	(A)	10.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR03Z

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1455

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PL) GT (TK)	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE COVER	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1455		SILT REDDISH BROWN	N	N	NA	D	(A)	8.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR033

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1500

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (P) GT (R)	Versar/Jacobs	[x] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/MODERATE COVER. 4'x4' BARE AREA 3' NW OF SAMPLE LOCATION.	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT REDDISH BROWN	N	N	NA	D	(A)	11.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID	Project Name	Project Number	Sampling Date	Time Sampling Started
SR034	Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1505

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (D) GT (K)	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE COVER	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1505		SILT REDDISH BROWN	N	N	NA	D	(A)	26.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR035

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1510

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PJ) GT (TK)	Versar/Jacobs	[x] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MODERATE CONGLOMERATE	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		SILT REDDISH BROWN	N	N	NA	D	A	12.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

CLAY TARGET DEBRIS IDENTIFIED APPROXIMATELY 3' NORTHEAST OF SAMPLE; NONE IDENTIFIED AT SAMPLE LOCATION.

VERSAR

Soil Sampling Log

LOCID
SR036

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1515

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PT GT CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MODERATE COVERAGE	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1515		SILT REDDISH BROWN	N	N	NA	D	A	10.5		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

CLAY TARGET DEBRIS IDENTIFIED IN VICINITY, BUT NOT AT SAMPLE LOCATION.

VERSAR

Soil Sampling Log

LOCID
SR037

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1525

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PJ) GT (CK)	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MODERATE COVERAGE	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	Reason:
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
5		SILT REDDISH BROWN	N	N	NA	D	(A)	13.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR038

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1530

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PB) GT (K)	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE COVERAGE	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1530	0.5	SILT REDDISH BROWN	N	N*	NA	D	(A)	11.0		
	1.0						B			
	1.5						C			
	2.0						D			
	2.5						E			
	3.0						F			

ADDITIONAL NOTES:

CLAY TARGET DEBRIS IDENTIFIED APPROX. 2' FROM SAMPLE LOCATION; NONE WITHIN SAMPLE ALIQUOT.

VERSAR

Soil Sampling Log

LOCID
SR039

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1535

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF FL GT GK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ GOOD COVER	

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	NA
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
15		SILT REDDISH BROWN	N	N	NA	D	A	12.3		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR040

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1540

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (D) GT (GR)	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA w/ MODERATE COVERAGE	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	(N)	
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
1540		SILT REDDISH BROWN	N	N	NA	D	(A)	12.0		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR041

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/16/11	1545

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF (PJ) GT (CK)	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
GRASSY AREA W/ MODERATE DENSITY	

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	(N)	Reason:
	New (unplanned) location?	Y	(N)	
	New coordinates recorded, if applicable?	Y	(N)	
	Background Area?	Y	(N)	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
5		SILT REDDISH BROWN	N	N	N/A	D	(A)	110		
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
SR042

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	1010

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date
med. density skeet debris, grassy area [inside AOI002].	

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	N	Y	med density skeet debris	D	A	—	N	Y
0920	0.5	"	N	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on Hold, pending A results.

VERSAR

Soil Sampling Log

LOCID
SR043

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF, PL, GT, CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending analytical results of A sample.

* Dup sample collected at A.

VERSAR

Soil Sampling Log

LOCID
SR044

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	✓	Y		D	A	—	N	Y
	0.5	"	✓	N	—	D	B	—	N	~~Y~~
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A results

VERSAR

Soil Sampling Log

LOCID
SR045

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5									
		"	/	Y		D	B	—	N	Y
	1.0									
		"	/	N	—	D	C	—	N	Y
	1.5									
							D			
	2.0									
							E			
	2.5									
							F			
	3.0									

ADDITIONAL NOTES:

B & C sample on hold pending A results

VERSAR

Soil Sampling Log

LOCID
SR046

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/4	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A result.

VERSAR

Soil Sampling Log

LOCID
SR047

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A result.

VERSAR

Soil Sampling Log

LOCID
SR048

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt		Y		D	A	—	N	Y
	0.5	"		N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A result.

VERSAR

Soil Sampling Log

LOCID
SR049

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
	0.5	red-brown silt	~~Y~~ /	Y		D	A	—	N	Y
	1.0	"	/	N	—	D	B	—	N	Y
	1.5						C			
	2.0						D			
	2.5						E			
	3.0						F			

ADDITIONAL NOTES:

B sample on hold pending A result.

VERSAR

Soil Sampling Log

LOCID
SR050

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				Reason:
Circle Y(es) or N(o)	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A result.

VERSAR

Soil Sampling Log

LOCID
SR051

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A result.

VERSAR

Soil Sampling Log

LOCID	Time Sampling Started
SR052	

Project Name	Project Number	Sampling Date	Total Depth Sampled (ft)
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	1.0

Sampler(s)	Company	Sampling Equipment
DF, PL, GT, CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:

Location - Ground surface description (munitions debris and amount/extent, vegetation)

Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold pending A result

VERSAR

Soil Sampling Log

LOCID
SR053

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	1.0

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	Y		D	A	—	N	Y
	0.5	"	/	N	—	D	B	—	N	Y
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0									

ADDITIONAL NOTES:

B sample on hold, pending A result.

VERSAR

Soil Sampling Log

LOCID
BKG 001

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 002

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 003

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PI. GT CK	Versar/Jacobs	[X] Slide Hammer w/ disposable sleeve [ ] Hand Auger [ ] Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 004

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 005

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red brown silt	✓	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 006

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown clay	/	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 007

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	✓	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 008

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
	0.5	red-brown silt	/	N	—	D	A	—	N	Y
							B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 009

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DE PL GT CK	Versar/Jacobs	☑ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location: Circle Y(es) or N(o)				Reason:
	Moved from planned location?	Y	N	
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	N	—	D	A	—	N	Y
	0.5						B			
	1.0						C			
	1.5						D			
	2.0						E			
	2.5						F			
	3.0	ADDITIONAL NOTES:								

VERSAR

Soil Sampling Log

LOCID
BKG 010

Project Name	Project Number	Sampling Date	Time Sampling Started
Cannon AFB CSE Phase II	11.1736.0006	3/17/11	

Sampler(s)	Company	Sampling Equipment	Total Depth Sampled (ft)
DF PL GT CK	Versar/Jacobs	☒ Slide Hammer w/ disposable sleeve ☐ Hand Auger ☐ Other:	0.5

Location - Ground surface description (munitions debris and amount/extent, vegetation)	Checked by/Date

Location:				
Circle Y(es) or N(o)	Moved from planned location?	Y	N	Reason:
	New (unplanned) location?	Y	N	
	New coordinates recorded, if applicable?	Y	N	
	Background Area?	Y	N	

TIME	Depth (ft)	Lithology	Potential Fill Material? (Y/N)	Munitions Debris Present? (Y/N)	Munitions Debris Description (types, amounts)	Moisture (D[ry], M[oist], W[et])	Sample Collected/ Interval Designation (circle)	XRF Lead Result (ppm)	Off-site Lead Analysis? (Y/N)	PAH Analysis? (Y/N)
		red-brown silt	/	N	—	D	A	—	N	Y
	0.5									
							B			
	1.0									
							C			
	1.5									
							D			
	2.0									
							E			
	2.5									
							F			
	3.0									

ADDITIONAL NOTES:

3-16-2011 CANNON AFB

INNOV-X SYSTEMS MODEL Delta S-4000
Serial # 500301 Date of MFG 10-10

Gary Tay 1300

DATE/TIME	RUN #	MODE	TYPE	LOC ID	LEAD Pb	%RSD

3-16-11

Initializing system. HW fail. Called Eric Paulk at Pine Environmental for reset code.
when trying to perform initial Calibration, error stating "Warning" Please unlock the trigger before standardizing.
Trigger will not unlock.

Code #-998, #-1000

Password 1234

Reset unit.
#1 Change batteries
#2 Take battery out for 2 minutes, to reset.

1405 Replaced battery, restarted unit.

Cal check passed Rate CPS 30425
Resolution (cv) 156.

NIST 2709a TV= 17.3 ± 0.1
2781 TV= 202.1 ± 6.5
2702 TV= 132.8 ± 1.1

Date/Time	Run #	# MODE	TYPE	LOC ID	Result	$\bar{x}$	% RSD
3-16 1415	#2	3-beam Dirl	standard	2709a			
	#2-1		↓	↓	11±2		
	#2-2				10±2		
	#2-3				8±2	9.67	15.8%
	#3-1	standard	NIST 2781		202±4		
	#3-2	↓	↓		194±4	199	2.1%
	#3-3				201±4	98.4% of Expected	
1427	#4-1	↓	NIST 2709a		10±2		
	#4-2		↓		10±2		
	#4-3				12±2	10.67	10.8%
1430	#5-1	↓	NIST 2702		113±4		
	#5-2		NIST 2702		116±4		
	#5-3		NIST 2702		107±4	112.0	4.1%
						84.3% of Expected	
	#6-1	Hand	standard	SiO_2	Not detected		
	#6-2	↓	↓	↓	Not detected		
	#6-3				Not detected		
1445	#7-1	SRØØ1A	1033		11±2		
	#7-2				13±2		
	#73				12±2	12.0	8.33% RSD
1449	#8-1	Soil	3 Beam	SRØØ2A	10±2		
	#8-2	↓	↓	↓	10±2		
	#8-3				9±2	9.67	5.97% RSD

Date/Tim
3-
3-16 145
150
150
151
1514
1517
1522

	Date/Time	Type	LOCID	RESULT	$\bar{x}$	% RSD
D	3-16 1454	SOIL	SR003A	7±1		
		↓	RUN 9-2	7±1		
			RUN 9-3	5±1	6.33	18.2% RSD

	Date/Time	RUN#	TYPE	LOCID	RESULT	$\bar{x}$	% RSD
8%	3-16 1459	10-1	SOIL	SR004A	9±2		
%		10-2	↓	↓	11±2	10.0	10% RSD
Expected		10-3			10±2		
	1504	11-1	SOIL	SR005A	12±2		
		11-2	↓	↓	15±2		
8%		11-3			14±2	13.7	11.2% RSD
	1507	12-1	SOIL	SR006A	8±1		
		12-2	↓	↓	10±2		
%		12-3			8±1	8.7	13.3% RSD
Expected	1510	13-1	SOIL	SR007A	12±2		
		13-2	↓	↓	9±2		
		13-3			13±2	11.3	18.4% RSD
	1514	14-1	SOIL	SR008A	14±2		
		14-2	↓	↓	20±2		
		14-3			24±2	19.3	26.0% RSD
		→					<50ppm ok
RSD	1517	15-1	SOIL	SR009A	9±1		
		15-2	↓	↓	12±2		
		15-3			10±1	10.3	14.7% RSD
	1522	16-1	SOIL	SR010A	11±2		
RSD		16-2	↓	↓	19±2		
		16-3			16±2	15.3	26.4% RSD ok

DATE/TIME	RUN #	TYPE	LOC ID	RESULT	$\bar{x}$	%RSD	DATE/TIM
3-16 1526	17-1	SOIL	SRØ12A	15±2			3-16 155
	17-2	↓	↓	16±2			
	17-3			18±2	16.3	9.4% RSD	
1529	18-1	SOIL	SRØ11A	12±2			
	18-2	↓	↓	14±2			3-16 1556
~~1529~~	18-3			11±2	12.3	12.4% RSD	
1533	19-1	SOIL	SRØ13A	10±2			
	19-2	↓	↓	9±2			
	19-3			10±2	9.7	5.97% RSD	3-16 1632
1536	20-1	SOIL	SRØ14A	4±2			
	20-2	↓	↓	12±2			
	20-3			17±2	13.3	24.1% RSD	
					<50ppm OK		1636
1543	20-1	SOIL	SR008A DUP	16±2			
	20-2	↓	↓	24±2			
	20-3			19±2	19.7	20.5% RSD	
					<50ppm OK		1639
	SR008A DUP		19.3/19.7 RPD = 2.1% RPD				
1546	22-1	STD	NIST 2781	199±4			
	22-2	↓	↓	205±4			
	22-3			194±4	199.3	2.76% RSD	~~1647~~
					199.3/TV202.1 = 98.6% RECOVERY		
							1647

	DATE/TIME	RUN#	TYPE	LOCID	$\bar{X}$	% RSD
D	3-16 1552	23-1	STANDARD	NIST 2702	108±4	
		23-2	↓	↓	107±4	
RSD		23-3			114±4	109.7 3.45% RSD
					109.7/TV 132.8 = 82.6% of Exp	
	3-16 1556	24-1	BLANK	STANDARD SIO2	Not detected	
4% RSD		24-2	↓	↓	Not detected	
		24-3			Not detected	
97% RSD	3-16 1632	25-1	SOIL	SRØ15A	15±2	
		25-2	↓	↓	10±2	
		25-3			11±2	12.0 22.0% RSD
1% RSD		→				<50ppm OK
K	1636	26-1	SOIL	SRØ16A	6±1	
		26-2	↓	↓	12±2	
		26-3			9±2	9.0 33.3% RSD
5% RSD		→				<50ppm OK
OK	1639	27-1	SOIL	SRØ17A	11±2	
		27-2	↓	↓	11±2	
		27-3			7±2	9.7 23.9% RSD
		→				<50ppm OK
2.76% RSD	~~1647~~	28-1	SOIL	SRØ18A	15±2	
= 98.6%		28-2	↓	↓	13±2	
RECOVERY		28-3			15±2	14.3 8.06% RSD
	1647	29-1	SOIL	SRØ19A	13±2	
		29-2	↓	↓	10±2	
		29-3			10±2	11.0 15.7% RSD

DATE/TIME	RUN#	TYPE	LOCID	RESULT	$\bar{X}$	% RSD	DATE/TI.
3-16 1652	30-1	SOIL	SRØ20A	22±2			3-16 172
	30-2	↓	↓	23±2			
	30-3			18±2	21.0	12.6% RSD	
1656	31-1	SOIL	SRØ21A	17±2			
	31-2	↓	↓	10±2			1724
	31-3			15±2	14.0	25.8% RSD	
						<50ppm OK	
1659	32-1	SOIL	SRØ22A	6±2			
	32-2	↓	↓	6±2			1727
	32-3			7±2	6.3	9.1% RSD	
1703	33-1	SOIL	SRØ23A	10±2			
	33-2	↓	↓	10±2			1731
	33-3			9±2	9.7	6.0% RSD	
1707	34-1	SOIL	SRO24A	13±2			
	34-2	↓	↓	39±2			
	34-3			28±2	26.7	48.9% RSD	1735
	35-1	SOIL	SRO24A REPEAT	20±2			
	35-2	↓	↓	20±2			
1713	35-3			11±2	17.0	30.6% RSD	
					<50ppm OK		1739
1715	36-1	SOIL	SRØ25A	21±2			
	36-2	↓	↓	8±2			
	36-3			17±2	15.3	43.4% RSD	1742
					<50ppm OK		

	DATE/TIME	RUN#	TYPE	LOCID	RESULT	$\bar{x}$	% RSD
SD	3-16 1720	37-1	SOIL	SRØ26A	10±2		
		37-2	↓	↓	7±1		
6% RSD		37-3	↓	↓	11±2	9.3	22.3% RSD
	→ <50ppm OK						
	1724	38-1	SOIL	SRØ27A	19±2		
.8% RSD		38-2	↓	↓	36±2		
, OK		38-3	↓	↓	20±2	25.0	38% RSD
	→ <50ppm OK						
	1727	39-1	SOIL	SRØ28A	16±2		
6 RSD		39-2	↓	↓	16±2		
		39-3	↓	↓	21±2	17.7	16.3% RSD
	1731	40-1	SOIL	SRØ29A	13±2		
.6 RSD		40-2	↓	↓	8±2		
		40-3	↓	↓	9±2	10.0	26.4% RSD
	→ <50ppm OK						
7% RSD	1735	41-1	SOIL	SRØ30A	14±2		
		41-2	↓	↓	9±1		
		41-3	↓	↓	14±2	12.3	23.4% RSD
:% RSD	→ <50ppm OK						
	1739	42-1	SOIL	SRØ31A	11±2		
		42-2	↓	↓	10±2		
		42-3	↓	↓	9±2	10.0	10% RSD
4% RSD	1742	43-1	SOIL	SRØ32A	7±1		
OK		43-2	↓	↓	11±2		
		43-3	↓	↓	6±1	8.0	33.1% RSD
	→ <50ppm OK						

DATE/TIME	RUN#	TYPE	LOCID	RESULT	$\bar{x}$	% RSD	DATE/TIM
3-16 1746	44-1	SOIL	SRØ33A	10±2			3-16 181
	44-2	↓	↓	14±2			
	44-3			9±2	11.0	24.1% RSD	
	→				<50ppm OK		182
1750	45-1	SOIL	SRØ34A	25±2			
	45-2	↓	↓	22±2			
	45-3			31±2	26.0	17.6% RSD	
1754	46-1	SOIL	SRØ35A	13±2			1826
	46-2	↓	↓	14±2			
	46-3			10±2	12.3	16.9% RSD	
1758	47-1	SOIL	SRØ36A	10±2			
	47-2	↓	↓	11±2			1829
	47-3			ABORTED RUN	10.5	6.7% RSD	
1802	48-1	SOIL	SRØ37A	17±2			
	48-2	↓		12±2			
	48-3			10±2	13.0	27.7% RSD	
	→				<50ppm OK		
1806	49-1	SOIL	SRØ38A	12±2			
	49-2	↓	↓	12±2			
	49-3			9±2	11.0	15.7% RSD	
1810	50-1	SOIL	SRØ39A	14±2			
	50-2	↓	↓	13±2			
	50-3			10±2	12.3	16.9% RSD	

DATE/TIME	RUN#	TYPE	LOCID	RESULT	$\bar{X}$	%RSD
3-16 1815	51-1	SOIL	SR940A	12±2		
	51-2	↓	↓	12±2		
	51-3			12±2	12.0	8%
1822	52-1	SOIL	SR941A	8±1		
	52-2	↓	↓	12±2		
	52-3			13±2	11.0	24.1% RSD
	→					<50ppm OK
1826	53-1	STANDARD	NIST 2702	112±4		
	53-2	↓	↓	118±4		
	53-3			107±4	110.7	2.9% RSD
	→				110.7/TV 132.8 = 83% of expected VA	
1829	54-1	BLANK	STANDARD SIO2	Not detected		
	54-2	↓	↓	Not detected		
	54-3			Not detected		

3-16-11
1833

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APPENDIX F

Ordnance Technical Data Sheets

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APPENDIX G

Off-Site Laboratory Analytical Data Sheets

(Provided Separately on a CD)

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APPENDIX H

Data Validation Reports

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DATA REVIEW REPORT

PROJECT NAME:	MMRP CSE Phase II, Cannon AFB
CLIENT NAME:	USACE Omaha District
LABORATORY NAME:	Microbac Laboratories, Inc., Ohio Valley Division
LAB PROJECT NUMBER:	L11030658
QAPP:	Final CSE Phase II Work Plan Cannon AFB, September 2010; DoD QSM, Version 4.1
DATA REVIEWER:	Gary Torf

INTRODUCTION

The data review report was prepared in accordance with the guidance listed in the *Final Comprehensive Site Evaluation Phase II Work Plan, Military Munitions Response Program (MMRP), Cannon Air Force Base, New Mexico,* September 2010; the *Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1*; and with respect to the following analytical methods:

Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846), Third Edition, Final Update III

- 8270C – Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

DATA VERIFICATION

Data verification is a sample-specific assessment performed to evaluate sample data completeness, correctness, consistency, and compliance with the quality objectives of the project plan and contract requirements.

Data verification was performed on the laboratory data package to determine whether 1) the samples were collected and analyzed for the list of analytes and test methods specified; 2) sample detection limits met project-specific objectives; 3) analytical holding times were met; and 4) measurement acceptance criteria for QC samples were met. Sample-specific data verification was performed on all field samples collected and analyzed.

The field sample identifiers and corresponding laboratory sample identifiers were as follows:

FIELD SAMPLE ID	LABORATORY SAMPLE ID	MATRIX
SR042A	L11030658-01	Soil
SR043A	L11030658-02	Soil
SR043ADUP	L11030658-03	Soil
SR044A	L11030658-04	Soil
SR045A	L11030658-05	Soil

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DATA REVIEW REPORT

FIELD SAMPLE ID	LABORATORY SAMPLE ID	MATRIX
SR046A	L11030658-06	Soil
SR047A	L11030658-07	Soil
SR048A	L11030658-08	Soil
SR048ADUP	L11030658-09	Soil
SR049A	L11030658-10	Soil
SR050A	L11030658-11	Soil
SR051A	L11030658-12	Soil
SR052A	L11030658-13	Soil
SR052AMS	L11030658-14	Soil
SR0052AMSD	L11030658-15	Soil
SR053A	L11030658-16	Soil

- The samples were transported to the laboratory in two (2) coolers, with a documented temperature upon receipt of 3.0°C for each cooler.

DATA VALIDATION

Data validation is a method-specific assessment that substantiates whether analytical requirements have been met and data qualifiers applied appropriately and consistently for specific sample analyses. Data validation has been performed on one field sample analyzed by the listed analytical method. The Data Validation Report follows the data qualifier summary tables.

DATA QUALIFIER DEFINITION

The following definitions provide a brief explanation of the data review flags used during the data review process:

U The analyte was not detected, and is reported as less than the limit of detection (LOD).

J The reported result is an estimated value.

B The analyte result is associated with a contaminated blank.

R The data are rejected due to deficiencies in the ability to analyze the sample and meet QC criteria.

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DATA REVIEW REPORT

SUMMARY OF DATA QUALIFIERS

The following tables summarize the final data qualifiers applied during the data review. Sample results that have not been qualified indicate the data meet all acceptance criteria, and results are considered usable unless specifically qualified as rejected. Qualification for non-detect analytes ("U") has not been noted in the summary tables.

METHOD 8270C PAHs BY GC/MS

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
SR042A	Naphthalene	J	>DL<LOQ
SR043A	Naphthalene	J	DUP>CL
	Acenaphthylene	J	>DL<LOQ
	Acenaphthene	J	DUP>CL
	Fluorene	J	DUP>CL
	Phenanthrene	J	DUP>CL
	Anthracene	J	DUP>CL
	Fluoranthene	J	DUP>CL
	Pyrene	J	DUP>CL
	Benzo(a)anthracene	J	DUP>CL
	Chrysene	J	DUP>CL
	Benzo(b)fluoranthene	J	DUP>CL
	Benzo(k)fluoranthene	J	DUP>CL
	Benzo(a)pyrene	J	DUP>CL
	Indeno(1,2,3-cd)pyrene	J	DUP>CL
	Dibenz(a,h)anthracene	J	DUP>CL
	Benzo(g,h,i)perylene	J	DUP>CL
	1-Methylnaphthelene	J	>DL<LOQ,DUP>CL
	2-Methylnaphthalene	J	DUP>CL
SR043ADUP	Naphthalene	J	DUP>CL
	Acenaphthylene	J	DUP>CL
	Acenaphthene	J	DUP>CL
	Fluorene	J	DUP>CL
	Phenanthrene	J	DUP>CL
	Anthracene	J	>DL<LOQ,DUP>CL
	Fluoranthene	J	DUP>CL
	Pyrene	J	DUP>CL
	Benzo(a)anthracene	J	DUP>CL
	Chrysene	J	DUP>CL
	Benzo(b)fluoranthene	J	DUP>CL
	Benzo(k)fluoranthene	J	DUP>CL
	Benzo(a)pyrene	J	DUP>CL
	Indeno(1,2,3-cd)pyrene	J	DUP>CL
	Dibenz(a,h)anthracene	J	DUP>CL

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DATA REVIEW REPORT

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
	Benzo(g,h,i)perylene	J	DUP>CL
	1-Methylnaphthalene	J	DUP>CL
	2-Methylnaphthalene	J	DUP>CL
SR044A	Anthracene	J	>DL<LOQ
SR045A	1-Methylnaphthalene	J	>DL<LOQ
SR046A	Naphthalene	J	>DL<LOQ
	Acenaphthene	J	>DL<LOQ
SR047A	Anthracene	J	>DL<LOQ
SR048A	Acenaphthene	J	DUP>CL
	Phenanthrene	J	DUP>CL
	Fluoranthene	J	DUP>CL
	Pyrene	J	DUP>CL
	Benzo(a)anthracene	J	DUP>CL
	Chrysene	J	DUP>CL
	Benzo(b)fluoranthene	J	DUP>CL
	Benzo(k)fluoranthene	J	DUP>CL
	Benzo(a)pyrene	J	DUP>CL
	Indeno(1,2,3-cd)pyrene	J	DUP>CL
	Dibenz(a,h)anthracene	J	DUP>CL
	Benzo(g,h,i)perylene	J	DUP>CL
SR048ADUP	Acenaphthene	J	DUP>CL
	Phenanthrene	J	DUP>CL
	Fluoranthene	J	>DL<LOQ, DUP>CL
	Pyrene	J	>DL<LOQ, DUP>CL
	Benzo(a)anthracene	J	DUP >CL
	Chrysene	J	DUP >CL
	Benzo(b)fluoranthene	J	DUP >CL
	Benzo(k)fluoranthene	J	DUP >CL
	Benzo(a)pyrene	J	DUP >CL
	Indeno(1,2,3-cd)pyrene	J	DUP >CL
	Dibenz(a,h)anthracene	J	DUP >CL
	Benzo(g,h,i)perylene	J	DUP >CL
SR049A	Anthracene	J	>DL<LOQ
SR050A	Fluorene	J	>DL<LOQ
	2-Methylnaphthalene	J	>DL<LOQ
SR051A	Anthracene	J	>DL<LOQ
SR052A	Phenanthrene	J	>DL<LOQ
SR052AMS	None	None	Not applicable
SR0052AMSD	None	None	Not applicable
SR053A	Phenanthrene	J	>DL<LOQ
	Pyrene	J	>DL<LOQ
	Benzo(a)anthracene	J	>DL<LOQ

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DATA REVIEW REPORT

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
	Chrysene	J	>DL<LOQ
	Benzo(b)fluoranthene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Benzo(a)pyrene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ

CL – control limit
DL – detection limit
DUP – duplicate
LOQ – limit of quantitation

DATA VALIDATION REPORT
Method 8270C Polynuclear Aromatic Hydrocarbons (PAHs) by GC/MS
Field Sample SR043A, SR052A

I. DELIVERABLES

All deliverables were present.
YES

II. SAMPLE PRESERVATION

All samples were appropriately preserved upon sample collection.
YES
Comments: Samples were received at the laboratory in a cooler with a recorded temperature of 3.0°C.

III. HOLDING TIMES

All samples met prescribed holding times. Soil samples were extracted within 14 days of collection. All samples were analyzed within 40 days after extraction.
YES

IV. SAMPLE PREPARATION PROCEDURES

All samples were prepared for analysis with applicable extraction procedures. Appropriate extract clean-up techniques were used when necessary, and percent solids were calculated for non-aqueous samples.
YES

V. INSTRUMENT TUNE PERFORMANCE RESULTS

The GC/MS was tuned at the beginning of each 12-hour sequence. All decafluorotriphenylphosphine (DFTPP) performance results were within the specified acceptance criteria.
YES

VI. INSTRUMENT CALIBRATIONS

Initial instrument calibrations met the specified criteria. The percent relative standard deviation (RSD) of the response factors for the calibration check compounds (CCCs) were equal to or less than 30%. If the average response factor was used for quantitation, the analyte RSD was equal to or less than 15%; if a linear least squares regression was used for quantitation, the analyte correlation coefficient (r) was equal to or greater than 0.995; if a non-linear regression was used for quantitation, the coefficient of determination (COD) was equal to or greater than 0.990.
YES

A second source calibration verification standard was analyzed after each initial instrument calibration, and the analytes were within 20% of the expected value.
YES

Continuing instrument calibration verification was performed daily and after every 12 hours of analysis. The percent difference or percent drift for all analytes was equal to or less than 20%.
YES

VII. RETENTION TIME WINDOW ESTABLISHMENT AND EVALUATION

A retention time (RT) window was established for each analyte and surrogate using either the midpoint standard of the initial calibration for analytical sequences that include the initial instrument calibration, or using the initial continuing instrument calibration verification for analytical sequences that do not include an initial instrument calibration.
YES

For each sample, the relative retention time (RRT) was within ± 0.06 RRT units for each analyte and surrogate.
YES

VIII. INTERNAL STANDARD VERIFICATION

Internal standard retention times of every sample and standard was ± 30 seconds from the RT of either the midpoint standard of the initial calibration for analytical sequences that include the initial instrument calibration or of the initial continuing instrument calibration verification for analytical sequences that do not include an initial instrument calibration.
YES

The internal standard EICP (extracted ion current profile) areas of every sample and standard was within -50% to +100% of the initial calibration midpoint standard.
YES

IX. METHOD BLANK ANALYSIS RESULTS

Target analytes, other than common lab contaminants, were not detected in the method blank at a concentration greater than ½ the limit of quantitation (LOQ) and greater than 1/10 the concentration in any sample. No common lab contaminants were detected at concentrations greater than the LOQ.
YES

X. OTHER BLANK ANALYSIS RESULTS

No target analytes were detected in other blanks above the LOQ.

Comments: There were no additional blank results

XI. LABORATORY CONTROL SAMPLE (LCS) RESULTS

Recoveries of all analytes in the LCS met the specified control limits.
YES

XII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

All MS/MSD results met specified recovery and precision limits.
YES
Comments: The validated sample SR052A was designated for matrix spike analyses. The results met specified control limits.

XIII. FIELD SAMPLE DUPLICATE RESULTS

Field sample duplicate results met specified precision limits.
NO
Comments: A field duplicate sample was collected for validated sample SR043A and field sample SR048A. The majority of analytes had duplicate precision above the 30% relative percent difference limit for the field duplicates associated with SR043A (ranging between 174% and 200%) and SR048A (ranging between 130% and 154%). Analyte results have been qualified for the analytes in the duplicate samples which were above the control limit.

XIV. SURROGATE COMPOUND RECOVERY RESULTS

Recovery of all surrogate compounds met the specified control limits.
YES

XV. DETECTION LIMITS

All results met specified detection limits. The LOQ was verified by analyzing a standard at a concentration ≤ the LOQ. Results were qualified when detected between the detection limit and the LOQ.
YES

XVI. SAMPLE RESULTS

The validated sample results were reviewed and all compound identifications were acceptable.
YES

Manual chromatographic integrations were documented.
YES

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DATA REVIEW REPORT

PROJECT NAME:	MMRP CSE Phase II, Cannon AFB
CLIENT NAME:	USACE Omaha District
LABORATORY NAME:	Microbac Laboratories, Inc., Ohio Valley Division
LAB PROJECT NUMBER:	L11030664
QAPP:	Final CSE Phase II Work Plan Cannon AFB, September 2010; DoD QSM, Version 4.1
DATA REVIEWER:	Gary Torf

INTRODUCTION

The data review report was prepared in accordance with the guidance listed in the *Final Comprehensive Site Evaluation Phase II Work Plan, Military Munitions Response Program (MMRP), Cannon Air Force Base, New Mexico,* September 2010; the *Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1*; and with respect to the following analytical methods:

Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846), Third Edition, Final Update III

- 8270C – Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

DATA VERIFICATION

Data verification is a sample-specific assessment performed to evaluate sample data completeness, correctness, consistency, and compliance with the quality objectives of the project plan and contract requirements.

Data verification was performed on the laboratory data package to determine whether 1) the samples were collected and analyzed for the list of analytes and test methods specified; 2) sample detection limits met project-specific objectives; 3) analytical holding times were met; and 4) measurement acceptance criteria for QC samples were met. Sample-specific data verification was performed on all field samples collected and analyzed.

The field sample identifiers and corresponding laboratory sample identifiers were as follows:

FIELD SAMPLE ID	LABORATORY SAMPLE ID	MATRIX
SR042B	L11030664-01	Soil
SR043B	L11030664-02	Soil
SR044B	L11030664-03	Soil
SR045B	L11030664-04	Soil
SR045C	L11030664-05	Soil
SR046B	L11030664-06	Soil
SR047B	L11030664-07	Soil
SR048B	L11030664-08	Soil
SR049B	L11030664-9	Soil
SR050B	L11030664-10	Soil
SR051B	L11030664-11	Soil
SR052B	L11030664-12	Soil
SR053B	L11030664-13	Soil

- The samples were transported to the laboratory in two (2) coolers, with a documented temperature upon receipt of 3.0°C for each cooler.

DATA VALIDATION

Data validation is a method-specific assessment that substantiates whether analytical requirements have been met and data qualifiers applied appropriately and consistently for specific sample analyses. Data validation has been performed on one field sample analyzed by the listed analytical method. The Data Validation Report follows the data qualifier summary tables.

DATA QUALIFIER DEFINITION

The following definitions provide a brief explanation of the data review flags used during the data review process:

U The analyte was not detected, and is reported as less than the limit of detection (LOD).

J The reported result is an estimated value.

B The analyte result is associated with a contaminated blank.

R The data are rejected due to deficiencies in the ability to analyze the sample and meet QC criteria.

VERSAR, INC.
DATA REVIEW REPORT

SUMMARY OF DATA QUALIFIERS

The following tables summarize the final data qualifiers applied during the data review. Sample results that have not been qualified indicate the data meet all acceptance criteria, and results are considered usable unless specifically qualified as rejected. Qualification for non-detect analytes ("U") has not been noted in the summary tables.

METHOD 8270C PAHs BY GC/MS

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
SR042B	Anthracene	J	>DL<LOQ
SR043B	Fluoranthene	J	>DL<LOQ
SR044B	Acenaphthene	J	>DL<LOQ
SR045B	1-Methylnaphthalene 2-Methylnaphthalene	J J	>DL<LOQ >DL<LOQ
SR045C	Naphthalene	J	>DL<LOQ
SR046B	Acenaphthene	J	>DL<LOQ
SR047B	Phenanthrene	J	>DL<LOQ
SR048B	None	None	Not applicable
SR049B	Pyrene Benzo(a)anthracene Dibenz(a,h)anthracene	J J J	>DL<LOQ >DL<LOQ >DL<LOQ
SR050B	Phenanthrene	J	>DL<LOQ
SR051B	None	None	Not applicable
SR052B	Benzo(a)pyrene Indeno(1,2,3-cd)pyrene Benzo(g,h,i)perylene	J J J	>DL<LOQ >DL<LOQ >DL<LOQ
SR053B	Acenaphthene	J	>DL<LOQ

DL – detection limit
LOQ – limit of quantitation

DATA VALIDATION REPORT
Method 8270C Polynuclear Aromatic Hydrocarbons (PAHs) by GC/MS
Field Sample SR045C

I. DELIVERABLES

All deliverables were present.
YES

II. SAMPLE PRESERVATION

All samples were appropriately preserved upon sample collection.
YES
Comments: Samples were received at the laboratory in a cooler with a recorded temperature of 3.0°C.

III. HOLDING TIMES

All samples met prescribed holding times. Soil samples were extracted within 14 days of collection. All samples were analyzed within 40 days after extraction.
YES

IV. SAMPLE PREPARATION PROCEDURES

All samples were prepared for analysis with applicable extraction procedures. Appropriate extract clean-up techniques were used when necessary, and percent solids were calculated for non-aqueous samples.
YES

V. INSTRUMENT TUNE PERFORMANCE RESULTS

The GC/MS was tuned at the beginning of each 12-hour sequence. All decafluorotriphenylphosphine (DFTPP) performance results were within the specified acceptance criteria.
YES

VI. INSTRUMENT CALIBRATIONS

Initial instrument calibrations met the specified criteria. The percent relative standard deviation (RSD) of the response factors for the calibration check compounds (CCCs) were equal to or less than 30%. If the average response factor was used for quantitation, the analyte RSD was equal to or less than 15%; if a linear least squares regression was used for quantitation, the analyte correlation coefficient (r) was equal to or greater than 0.995; if a non-linear regression was used for quantitation, the coefficient of determination (COD) was equal to or greater than 0.990.
YES

A second source calibration verification standard was analyzed after each initial instrument calibration, and the analytes were within 20% of the expected value.
YES

Continuing instrument calibration verification was performed daily and after every 12 hours of analysis. The percent difference or percent drift for all analytes was equal to or less than 20%.
YES

VII. RETENTION TIME WINDOW ESTABLISHMENT AND EVALUATION

A retention time (RT) window was established for each analyte and surrogate using either the midpoint standard of the initial calibration for analytical sequences that include the initial instrument calibration, or using the initial continuing instrument calibration verification for analytical sequences that do not include an initial instrument calibration.
YES

For each sample, the relative retention time (RRT) was within ± 0.06 RRT units for each analyte and surrogate.
YES

VIII. INTERNAL STANDARD VERIFICATION

Internal standard retention times of every sample and standard was ± 30 seconds from the RT of either the midpoint standard of the initial calibration for analytical sequences that include the initial instrument calibration or of the initial continuing instrument calibration verification for analytical sequences that do not include an initial instrument calibration.
YES

The internal standard EICP (extracted ion current profile) areas of every sample and standard was within -50% to +100% of the initial calibration midpoint standard.
YES

IX. METHOD BLANK ANALYSIS RESULTS

Target analytes, other than common lab contaminants, were not detected in the method blank at a concentration greater than ½ the limit of quantitation (LOQ) and greater than 1/10 the concentration in any sample. No common lab contaminants were detected at concentrations greater than the LOQ.
YES

X. OTHER BLANK ANALYSIS RESULTS

No target analytes were detected in other blanks above the LOQ.

Comments: There were no additional blank results.

XI. LABORATORY CONTROL SAMPLE (LCS) RESULTS

Recoveries of all analytes in the LCS met the specified control limits.
YES

XII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

All MS/MSD results met specified recovery and precision limits.

Comments: The validated sample was not designated for matrix spike analyses.

XIII. FIELD SAMPLE DUPLICATE RESULTS

Field sample duplicate results met specified precision limits.

Comments: A field duplicate sample was not analyzed in the sample delivery group.

XIV. SURROGATE COMPOUND RECOVERY RESULTS

Recovery of all surrogate compounds met the specified control limits.
YES

XV. DETECTION LIMITS

All results met specified detection limits. The LOQ was verified by analyzing a standard at a concentration ≤ the LOQ. Results were qualified when detected between the detection limit and the LOQ.
YES

XVI. SAMPLE RESULTS

The validated sample results were reviewed and all compound identifications were acceptable.
YES

Manual chromatographic integrations were documented.
YES

VERSAR, INC.
DATA REVIEW REPORT

PROJECT NAME:	MMRP CSE Phase II, Cannon AFB
CLIENT NAME:	USACE Omaha District
LABORATORY NAME:	Microbac Laboratories, Inc., Ohio Valley Division
LAB PROJECT NUMBER:	L11030665
QAPP:	Final CSE Phase II Work Plan Cannon AFB, September 2010; DoD QSM, Version 4.1
DATA REVIEWER:	Gary Torf

INTRODUCTION

The data review report was prepared in accordance with the guidance listed in the *Final Comprehensive Site Evaluation Phase II Work Plan, Military Munitions Response Program (MMRP), Cannon Air Force Base, New Mexico,* September 2010; the *Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1*; and with respect to the following analytical methods:

Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846), Third Edition, Final Update III

- 6010B – Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)

DATA VERIFICATION

Data verification is a sample-specific assessment performed to evaluate sample data completeness, correctness, consistency, and compliance with the quality objectives of the project plan and contract requirements.

Data verification was performed on the laboratory data package to determine whether 1) the samples were collected and analyzed for the list of analytes and test methods specified; 2) sample detection limits met project-specific objectives; 3) analytical holding times were met; and 4) measurement acceptance criteria for QC samples were met. Sample-specific data verification was performed on all field samples collected and analyzed.

The field sample identifiers and corresponding laboratory sample identifiers were as follows:

FIELD SAMPLE ID	LABORATORY SAMPLE ID	MATRIX
SR001A	L11030665-01	Soil
SR001AMS	L11030665-02	Soil
SR001AMSD	L11030665-03	Soil
SR003A	L11030665-04	Soil
SR004A	L11030665-05	Soil
SR008A	L11030665-06	Soil
SR010A	L11030665-07	Soil
SR016A	L11030665-08	Soil
SR020A	L11030665-09	Soil
SR024A	L11030665-10	Soil
SR027A	L11030665-11	Soil
SR027ADUP	L11030665-12	Soil
SR032A	L11030665-13	Soil
SR034A	L11030665-14	Soil
SR034ADUP	L11030665-15	Soil
SR037A	L11030665-16	Soil

- The samples were transported to the laboratory in two (2) coolers, with a documented temperature upon receipt of 3.0°C for each cooler.

DATA VALIDATION

Data validation is a method-specific assessment that substantiates whether analytical requirements have been met and data qualifiers applied appropriately and consistently for specific sample analyses. Data validation has been performed on one field sample analyzed by the listed analytical method. The Data Validation Report follows the data qualifier summary tables.

DATA QUALIFIER DEFINITION

The following definitions provide a brief explanation of the data review flags used during the data review process:

U The analyte was not detected, and is reported as less than the limit of detection (LOD).

J The reported result is an estimated value.

B The analyte result is associated with a contaminated blank.

R The data are rejected due to deficiencies in the ability to analyze the sample and

meet QC criteria.

SUMMARY OF DATA QUALIFIERS

The following tables summarize the final data qualifiers applied during the data review. Sample results that have not been qualified indicate the data meet all acceptance criteria, and results are considered usable unless specifically qualified as rejected. Qualification for non-detect analytes ("U") has not been noted in the summary tables.

METHOD 6010B LEAD BY ICP

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
SR001A	Lead	None	Not applicable
SR001AMS	Lead	None	Not applicable
SR001AMSD	Lead	None	Not applicable
SR003A	Lead	None	Not applicable
SR004A	Lead	None	Not applicable
SR008A	Lead	None	Not applicable
SR010A	Lead	None	Not applicable
SR016A	Lead	None	Not applicable
SR020A	Lead	None	Not applicable
SR024A	Lead	None	Not applicable
SR027A	Lead	None	Not applicable
SR027ADUP	Lead	None	Not applicable
SR032A	Lead	None	Not applicable
SR034A	Lead	None	Not applicable
SR034ADUP	Lead	None	Not applicable
SR037A	Lead	None	Not applicable

DATA VALIDATION REPORT
Method 6010B Lead by ICP
Field Sample SR001A

I. DELIVERABLES

All deliverables were present.
YES

II. SAMPLE PRESERVATION

All samples were appropriately preserved upon sample collection.
YES

III. HOLDING TIMES

All samples were analyzed within the prescribed holding time of 180 days from collection until analysis.
YES

IV. SAMPLE PREPARATION PROCEDURES

All samples were prepared for analysis with applicable digestion procedures. Percent solids were calculated for non-aqueous samples.
YES

V. INTERFERENCE CHECK SOLUTION

An appropriate interference check standard was analyzed at the beginning of the analytical sequence. All target elements were within 20% of the expected value.
YES

VI. INSTRUMENT CALIBRATIONS

Initial instrument calibrations met the specified criteria. The daily calibration consisted of at least one high concentration standard and a calibration blank. If more than one standard was used for the calibration, the correlation coefficient (r) was equal to or greater than 0.995.
YES

A second source calibration verification standard was analyzed after the initial calibration and the elements were within 10% of the expected value.
YES

If a single-point calibration was used, a low concentration calibration check standard was

analyzed at a concentration at or below the limit of quantitation (LOQ) prior to sample analysis; the elements were within 20% of the expected value. If a multi-point calibration was used, at least one standard was at or below the LOQ.
YES

The calibration was verified by the analysis of continuing calibration verification standard after every 10 samples and at the end of the analytical sequence. All elements were within 10% of the expected value.
YES

A calibration blank was analyzed before beginning the analytical sequence, after every 10 samples and at the end of the analytical sequence with no elements detected at or above the limit of detection (LOD).
YES

VII. METHOD BLANK ANALYSIS RESULTS

No target elements were detected in the method blank at concentrations greater than ½ the LOQ and greater than 1/10 the amount measured in any sample.
YES

VIII. LABORATORY CONTROL SAMPLE (LCS) RESULTS

Recovery of all elements in the LCS met the specified control limits.
YES

IX. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

All MS/MSD results met specified recovery and precision limits.
YES
Comments: Field sample SR001A was designated for MS/MSD analyses.

X. FIELD SAMPLE DUPLICATE RESULTS

Field sample duplicate results met specified precision limits.

Comments: The validated field sample was not designated for field duplicate analyses. A single blind field duplicate was collected for field samples SR027A and SR034A, and the results were within QC limits.

XI. DILUTION TEST

A five-fold (5X) dilution test was performed and the results were within 10% of the original value.

Comments: A serial dilution test was not performed on the validated sample. A serial dilution was performed on field sample SR003A and the results were within QC limits.

XII. POST DIGESTION SPIKE ANALYSIS

A post digestion spike analysis was performed and the results were within 75-125% of the original value.

Comments: A post digestion spike analysis was not performed on the validated sample. A post digestion spike analysis was performed on field sample SR003A and the results were within QC limits.

XIII. DETECTION LIMITS

All reporting limits met specified quantitation limits. Results were qualified when detected between the detection limit and the LOQ.
YES
Comments: All field samples had detections of lead at concentrations greater than the LOQ.

XIV. SAMPLE RESULTS

The validated sample data were reviewed and all results were acceptable.
YES

VERSAR, INC.
DATA REVIEW REPORT

PROJECT NAME:	MMRP CSE Phase II, Cannon AFB
CLIENT NAME:	USACE Omaha District
LABORATORY NAME:	Microbac Laboratories, Inc., Ohio Valley Division
LAB PROJECT NUMBER:	L11030669
QAPP:	Final CSE Phase II Work Plan Cannon AFB, September 2010; DoD QSM, Version 4.1
DATA REVIEWER:	Gary Torf

INTRODUCTION

The data review report was prepared in accordance with the guidance listed in the *Final Comprehensive Site Evaluation Phase II Work Plan, Military Munitions Response Program (MMRP), Cannon Air Force Base, New Mexico,* September 2010; the *Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.1*; and with respect to the following analytical methods:

Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods (SW-846), Third Edition, Final Update III

- 8270C – Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

DATA VERIFICATION

Data verification is a sample-specific assessment performed to evaluate sample data completeness, correctness, consistency, and compliance with the quality objectives of the project plan and contract requirements.

Data verification was performed on the laboratory data package to determine whether 1) the samples were collected and analyzed for the list of analytes and test methods specified; 2) sample detection limits met project-specific objectives; 3) analytical holding times were met; and 4) measurement acceptance criteria for QC samples were met. Sample-specific data verification was performed on all field samples collected and analyzed.

The field sample identifiers and corresponding laboratory sample identifiers were as follows:

FIELD SAMPLE ID	LABORATORY SAMPLE ID	MATRIX
BKG001A	L11030669-01	Soil
BKG002A	L11030669-02	Soil
BKG003A	L11030669-03	Soil
BKG004A	L11030669-04	Soil
BKG005A	L11030669-05	Soil
BKG005AMS	L11030669-06	Soil
BKG005AMSD	L11030669-07	Soil
BKG006A	L11030669-08	Soil
BKG007A	L11030669-09	Soil
BKG007ADUP	L11030669-10	Soil
BKG008A	L11030669-11	Soil
BKG009A	L11030669-12	Soil
BKG0010A	L11030669-13	Soil

- The samples were transported to the laboratory in two (2) coolers, with a documented temperature upon receipt of 3.0°C for each cooler.

DATA VALIDATION

Data validation is a method-specific assessment that substantiates whether analytical requirements have been met and data qualifiers applied appropriately and consistently for specific sample analyses. Data validation has been performed on one field sample analyzed by the listed analytical method. The Data Validation Report follows the data qualifier summary tables.

DATA QUALIFIER DEFINITION

The following definitions provide a brief explanation of the data review flags used during the data review process:

U The analyte was not detected, and is reported as less than the limit of detection (LOD).

J The reported result is an estimated value.

B The analyte result is associated with a contaminated blank.

R The data are rejected due to deficiencies in the ability to analyze the sample and meet QC criteria.

VERSAR, INC.
DATA REVIEW REPORT

SUMMARY OF DATA QUALIFIERS

The following tables summarize the final data qualifiers applied during the data review. Sample results that have not been qualified indicate the data meet all acceptance criteria, and results are considered usable unless specifically qualified as rejected. Qualification for non-detect analytes ("U") has not been noted in the summary tables.

METHOD 8270C PAHs BY GC/MS

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
BKG001A	Dibenz(a,h)anthracene	J	>DL<LOQ
BKG002A	None	None	Not applicable
BKG003A	Benzo(a)anthracene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ
BKG004A	Phenanthrene	J	>DL<LOQ
	Chrysene	J	>DL<LOQ
	Benzo(b)fluoranthene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Benzo(a)pyrene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ
BKG005A	Fluorene	J	MS/MSD<LCL
	Phenanthrene	J	>DL<LOQ
	Benzo(a)anthracene	J	>DL<LOQ
	Chrysene	J	>DL<LOQ
	Benzo(b)fluoranthene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Benzo(a)pyrene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ
BKG005AMS	Fluorene	J	MS<LCL
BKG005AMSD	Fluorene	J	MSD<LCL
BKG006A	None	None	Not applicable
BKG007A	Fluoranthene	J	DUP>CL
	Pyrene	J	>DL<LOQ
	Chrysene	J	>DL<LOQ
	Benzo(b)fluoranthene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Benzo(a)pyrene	J	>DL<LOQ
BKG007ADUP	Fluoranthene	J	>DL<LOQ, DUP>CL
BKG008A	Phenanthrene	J	>DL<LOQ
	Benzo(a)anthracene	J	>DL<LOQ

VERSAR, INC.
DATA REVIEW REPORT

FIELD SAMPLE	ANALYTE	QUALIFIER	REASON
	Chrysene	J	>DL<LOQ
	Benzo(b)fluoranthene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Benzo(a)pyrene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ
BKG009A	Phenanthrene	J	>DL<LOQ
	Benzo(a)anthracene	J	>DL<LOQ
	Chrysene	J	>DL<LOQ
	Benzo(b)fluoranthene	J	>DL<LOQ
	Benzo(k)fluoranthene	J	>DL<LOQ
	Benzo(a)pyrene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ
BKG0010A	Benzo(a)anthracene	J	>DL<LOQ
	Indeno(1,2,3-cd)pyrene	J	>DL<LOQ
	Benzo(g,h,i)perylene	J	>DL<LOQ

CL – control limit
DL – detection limit
DUP – duplicate
LOQ – limit of quantitation
LCL – lower control limit

DATA VALIDATION REPORT
Method 8270C Polynuclear Aromatic Hydrocarbons (PAHs) by GC/MS
Field Sample BKG007A

I. DELIVERABLES

All deliverables were present.
YES

II. SAMPLE PRESERVATION

All samples were appropriately preserved upon sample collection.
YES
Comments: Samples were received at the laboratory in a cooler with a recorded temperature of 3.0°C.

III. HOLDING TIMES

All samples met prescribed holding times. Soil samples were extracted within 14 days of collection. All samples were analyzed within 40 days after extraction.
YES

IV. SAMPLE PREPARATION PROCEDURES

All samples were prepared for analysis with applicable extraction procedures. Appropriate extract clean-up techniques were used when necessary, and percent solids were calculated for non-aqueous samples.
YES

V. INSTRUMENT TUNE PERFORMANCE RESULTS

The GC/MS was tuned at the beginning of each 12-hour sequence. All decafluorotriphenylphosphine (DFTPP) performance results were within the specified acceptance criteria.
YES

VI. INSTRUMENT CALIBRATIONS

Initial instrument calibrations met the specified criteria. The percent relative standard deviation (RSD) of the response factors for the calibration check compounds (CCCs) were equal to or less than 30%. If the average response factor was used for quantitation, the analyte RSD was equal to or less than 15%; if a linear least squares regression was used for quantitation, the analyte correlation coefficient (r) was equal to or greater than 0.995; if a non-linear regression was used for quantitation, the coefficient of determination (COD) was equal to or greater than 0.990.
YES

A second source calibration verification standard was analyzed after each initial instrument calibration, and the analytes were within 20% of the expected value.
YES

Continuing instrument calibration verification was performed daily and after every 12 hours of analysis. The percent difference or percent drift for all analytes was equal to or less than 20%.
YES

VII. RETENTION TIME WINDOW ESTABLISHMENT AND EVALUATION

A retention time (RT) window was established for each analyte and surrogate using either the midpoint standard of the initial calibration for analytical sequences that include the initial instrument calibration, or using the initial continuing instrument calibration verification for analytical sequences that do not include an initial instrument calibration.
YES

For each sample, the relative retention time (RRT) was within ± 0.06 RRT units for each analyte and surrogate.
YES

VIII. INTERNAL STANDARD VERIFICATION

Internal standard retention times of every sample and standard was ± 30 seconds from the RT of either the midpoint standard of the initial calibration for analytical sequences that include the initial instrument calibration or of the initial continuing instrument calibration verification for analytical sequences that do not include an initial instrument calibration.
YES

The internal standard EICP (extracted ion current profile) areas of every sample and standard was within -50% to +100% of the initial calibration midpoint standard.
YES

IX. METHOD BLANK ANALYSIS RESULTS

Target analytes, other than common lab contaminants, were not detected in the method blank at a concentration greater than ½ the limit of quantitation (LOQ) and greater than 1/10 the concentration in any sample. No common lab contaminants were detected at concentrations greater than the LOQ.
YES

X. OTHER BLANK ANALYSIS RESULTS

No target analytes were detected in other blanks above the LOQ.

Comments: There were no additional blank results

XI. LABORATORY CONTROL SAMPLE (LCS) RESULTS

Recoveries of all analytes in the LCS met the specified control limits.
YES

XII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) RESULTS

All MS/MSD results met specified recovery and precision limits.

Comments: The validated sample was not designated for matrix spike analyses.

XIII. FIELD SAMPLE DUPLICATE RESULTS

Field sample duplicate results met specified precision limits.
NO
Comments: A field duplicate sample was collected for validated sample BKG007A. Fluoranthene was the only analyte detected above the LOQ in both the parent sample and the associated field duplicate. The relative percent difference was higher than the control limit of 30% relative percent difference (RPD) at 78%. The fluoranthene result has been qualified in the parent sample and the associated field duplicate sample.

XIV. SURROGATE COMPOUND RECOVERY RESULTS

Recovery of all surrogate compounds met the specified control limits.
YES

XV. DETECTION LIMITS

All results met specified detection limits. The LOQ was verified by analyzing a standard at a concentration ≤ the LOQ. Results were qualified when detected between the detection limit and the LOQ.
YES

XVI. SAMPLE RESULTS

The validated sample results were reviewed and all compound identifications were

acceptable.
YES

Manual chromatographic integrations were documented.
YES

(intentionally blank)

APPENDIX I

Background Study and Site-to-Background Comparisons

(intentionally blank)

	General Background Statistics for Data Sets with Non-Detects
User Selected Options	
From File	PROUCL.wst
Full Precision	OFF
Confidence Coefficient	95%
Coverage	95%
Different or Future K Values	1
Number of Bootstrap Operations	2000

ACENAPHTHYLENE

General Statistics

Number of Valid Data	10	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	10

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ACENAPHTHYLENE was not processed!

ANTHRACENE

General Statistics

Number of Valid Data	10	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	10

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable ANTHRACENE was not processed!

BENZO(a)ANTHRACENE

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.74	Minimum Detected	1.008
Maximum Detected	8.33	Maximum Detected	2.12
Mean of Detected	4.663	Mean of Detected	1.477
SD of Detected	1.829	SD of Detected	0.371

Minimum Non-Detect	1.25	Minimum Non-Detect	0.223
Maximum Non-Detect	1.25	Maximum Non-Detect	0.223

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Background Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Test Statistic	0.945
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	4.26	Mean (Log Scale)	1.282
SD	2.146	SD (Log Scale)	0.708
95% UTL 95% Coverage	10.51	95% UTL 95% Coverage	28.29
95% UPL (t)	8.385	95% UPL (t)	14.05
90% Percentile (z)	7.01	90% Percentile (z)	8.927
95% Percentile (z)	7.789	95% Percentile (z)	11.55
99% Percentile (z)	9.252	99% Percentile (z)	18.7
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	4.226	Mean in Original Scale	4.372
SD	2.113	SD in Original Scale	1.955
95% UTL with 95% Coverage	10.38	95% UTL with 95% Coverage	14.99
		95% BCA UTL with 95% Coverage	8.33
		95% Bootstrap (%) UTL with 95% Coverage	8.33
95% UPL (t)	8.289	95% UPL (t)	9.566
90% Percentile (z)	6.935	90% Percentile (z)	7.149
95% Percentile (z)	7.702	95% Percentile (z)	8.432
99% Percentile (z)	9.142	99% Percentile (z)	11.49
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	5.459	Data appear Normal at 5% Significance Level	
Theta Star	0.854		
nu star	98.26		
A-D Test Statistic	0.334	**Nonparametric Statistics**	
5% A-D Critical Value	0.722	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.213	Mean	4.471
5% K-S Critical Value	0.28	SD	1.735
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.582
		95% KM UTL with 95% Coverage	9.521
Assuming Gamma Distribution		95% KM Chebyshev UPL	12.4

Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	7.806
Mean	4.351	90% Percentile (z)	6.694
Median	3.91	95% Percentile (z)	7.325
SD	1.987	99% Percentile (z)	8.507
k star	3.741		
Theta star	1.163	**Gamma ROS Limits with Extrapolated Data**	
Nu star	74.83	95% Wilson Hilferty (WH) Approx. Gamma UPL	8.99
95% Percentile of Chisquare (2k)	14.77	95% Hawkins Wixley (HW) Approx. Gamma UPL	9.173
		95% WH Approx. Gamma UTL with 95% Coverage	12.6
90% Percentile	7.367	95% HW Approx. Gamma UTL with 95% Coverage	13.19
95% Percentile	8.586		
99% Percentile	11.2		

Note: DL/2 is not a recommended method.

BENZO(a)PYRENE

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-Transformed Statistics**	
Minimum	3.2	Minimum	1.163
Maximum	9.53	Maximum	2.254
Second Largest	7.87	Second Largest	2.063
First Quartile	3.74	First Quartile	1.318
Median	4.775	Median	1.556
Third Quartile	6.243	Third Quartile	1.828
Mean	5.297	Mean	1.602
SD	2.112	SD	0.374
Coefficient of Variation	0.399		
Skewness	1.023		

Background Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.889	Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% UTL with 95% Coverage	11.45	95% UTL with 95% Coverage	14.74
95% UPL (t)	9.358	95% UPL (t)	10.18
90% Percentile (z)	8.004	90% Percentile (z)	8.012
95% Percentile (z)	8.771	95% Percentile (z)	9.179
99% Percentile (z)	10.21	99% Percentile (z)	11.84
Gamma Distribution Test		**Data Distribution Test**	
k star	5.526	**Data appear Normal at 5% Significance Level**	
Theta Star	0.958		
MLE of Mean	5.297		

MLE of Standard Deviation	2.253		
nu star	110.5		
A-D Test Statistic	0.355	**Nonparametric Statistics**	
5% A-D Critical Value	0.727	90% Percentile	8.036
K-S Test Statistic	0.19	95% Percentile	8.783
5% K-S Critical Value	0.267	99% Percentile	9.381
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 95% Coverage	9.53
90% Percentile	8.311	95% Percentile Bootstrap UTL with 95% Coverage	9.53
95% Percentile	9.464	95% BCA Bootstrap UTL with 95% Coverage	9.53
99% Percentile	11.89	95% UPL	9.53
		95% Chebyshev UPL	14.95
95% WH Approx. Gamma UPL	9.797	Upper Threshold Limit Based upon IQR	9.996
95% HW Approx. Gamma UPL	9.88		
95% WH Approx. Gamma UTL with 95% Coverage	13.09		
95% HW Approx. Gamma UTL with 95% Coverage	13.42		

BENZO(b)FLUORANTHENE

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10

Raw Statistics		**Log-Transformed Statistics**	
Minimum	3.74	Minimum	1.319
Maximum	9.29	Maximum	2.229
Second Largest	8.75	Second Largest	2.169
First Quartile	4.158	First Quartile	1.425
Median	5.54	Median	1.708
Third Quartile	7.11	Third Quartile	1.961
Mean	5.897	Mean	1.721
SD	2.049	SD	0.342
Coefficient of Variation	0.347		
Skewness	0.569		

Background Statistics

Normal Distribution Test		**Lognormal Distribution Test**	
Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% UTL with 95% Coverage	11.86	95% UTL with 95% Coverage	15.15
95% UPL (t)	9.836	95% UPL (t)	10.8
90% Percentile (z)	8.523	90% Percentile (z)	8.671
95% Percentile (z)	9.267	95% Percentile (z)	9.819
99% Percentile (z)	10.66	99% Percentile (z)	12.4

Gamma Distribution Test		Data Distribution Test	
k star	6.755	Data appear Normal at 5% Significance Level	
Theta Star	0.873		
MLE of Mean	5.897		
MLE of Standard Deviation	2.269		
nu star	135.1		
A-D Test Statistic	0.395	Nonparametric Statistics	
5% A-D Critical Value	0.725	90% Percentile	8.804
K-S Test Statistic	0.198	95% Percentile	9.047
5% K-S Critical Value	0.267	99% Percentile	9.241
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 95% Coverage	9.29
90% Percentile	8.927	95% Percentile Bootstrap UTL with 95% Coverage	9.29
95% Percentile	10.06	95% BCA Bootstrap UTL with 95% Coverage	9.29
99% Percentile	12.41	95% UPL	9.29
		95% Chebyshev UPL	15.26
95% WH Approx. Gamma UPL	10.37	Upper Threshold Limit Based upon IQR	11.54
95% HW Approx. Gamma UPL	10.46		
95% WH Approx. Gamma UTL with 95% Coverage	13.55		
95% HW Approx. Gamma UTL with 95% Coverage	13.88		

BENZO(g,h,i)PERYLENE

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	8	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.88	Minimum Detected	1.058
Maximum Detected	7.75	Maximum Detected	2.048
Mean of Detected	4.656	Mean of Detected	1.476
SD of Detected	1.796	SD of Detected	0.369
Minimum Non-Detect	1.25	Minimum Non-Detect	0.223
Maximum Non-Detect	1.25	Maximum Non-Detect	0.223

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set

the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Background Statistics

Normal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.872
5% Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level	
Assuming Normal Distribution	
DL/2 Substitution Method	
Mean	4.253
SD	2.12
95% UTL 95% Coverage	10.42
95% UPL (t)	8.328
90% Percentile (z)	6.969
95% Percentile (z)	7.739
99% Percentile (z)	9.184
Maximum Likelihood Estimate(MLE) Method	
Mean	4.221
SD	2.085
95% UTL with 95% Coverage	10.29
95% UPL (t)	8.23
90% Percentile (z)	6.893
95% Percentile (z)	7.651
99% Percentile (z)	9.072

Gamma Distribution Test with Detected Values Only	
k star (bias corrected)	5.536
Theta Star	0.841
nu star	99.65
A-D Test Statistic	0.474
5% A-D Critical Value	0.722
K-S Test Statistic	0.247
5% K-S Critical Value	0.28
Data appear Gamma Distributed at 5% Significance Level	
Assuming Gamma Distribution	
Gamma ROS Statistics with Extrapolated Data	
Mean	4.35
Median	3.765
SD	1.95
k star	3.868
Theta star	1.125
Nu star	77.35
95% Percentile of Chisquare (2k)	15.13
90% Percentile	7.315
95% Percentile	8.508
99% Percentile	11.06

Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.9
5% Shapiro Wilk Critical Value	0.829
Data appear Lognormal at 5% Significance Level	
Assuming Lognormal Distribution	
DL/2 Substitution Method	
Mean (Log Scale)	1.281
SD (Log Scale)	0.707
95% UTL 95% Coverage	28.17
95% UPL (t)	14.01
90% Percentile (z)	8.907
95% Percentile (z)	11.51
99% Percentile (z)	18.64
Log ROS Method	
Mean in Original Scale	4.368
SD in Original Scale	1.923
95% UTL with 95% Coverage	14.8
95% BCA UTL with 95% Coverage	7.75
95% Bootstrap (%) UTL with 95% Coverage	7.75
95% UPL (t)	9.487
90% Percentile (z)	7.112
95% Percentile (z)	8.374
99% Percentile (z)	11.38
Data Distribution Test with Detected Values Only	
Data appear Normal at 5% Significance Level	
Nonparametric Statistics	
Kaplan-Meier (KM) Method	
Mean	4.478
SD	1.693
SE of Mean	0.568
95% KM UTL with 95% Coverage	9.405
95% KM Chebyshev UPL	12.22
95% KM UPL (t)	7.732
90% Percentile (z)	6.647
95% Percentile (z)	7.262
99% Percentile (z)	8.416
Gamma ROS Limits with Extrapolated Data	
95% Wilson Hilferty (WH) Approx. Gamma UPL	8.9
95% Hawkins Wixley (HW) Approx. Gamma UPL	9.073
95% WH Approx. Gamma UTL with 95% Coverage	12.42
95% HW Approx. Gamma UTL with 95% Coverage	12.98

Note: DL/2 is not a recommended method.

BENZO(k)FLUORANTHENE

General Statistics			
Total Number of Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-Transformed Statistics	
Minimum	3.31	Minimum	1.197
Maximum	10.2	Maximum	2.322
Second Largest	8.24	Second Largest	2.109
First Quartile	3.755	First Quartile	1.322
Median	4.675	Median	1.541
Third Quartile	6.368	Third Quartile	1.849
Mean	5.459	Mean	1.628
SD	2.277	SD	0.381
Coefficient of Variation	0.417		
Skewness	1.2		

Background Statistics			
Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.87	Shapiro Wilk Test Statistic	0.929
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		Assuming Lognormal Distribution	
95% UTL with 95% Coverage	12.09	95% UTL with 95% Coverage	15.44
95% UPL (t)	9.836	95% UPL (t)	10.6
90% Percentile (z)	8.377	90% Percentile (z)	8.301
95% Percentile (z)	9.204	95% Percentile (z)	9.533
99% Percentile (z)	10.76	99% Percentile (z)	12.36
Gamma Distribution Test		Data Distribution Test	
k star	5.242	Data appear Normal at 5% Significance Level	
Theta Star	1.041		
MLE of Mean	5.459		
MLE of Standard Deviation	2.384		
nu star	104.8		
A-D Test Statistic	0.391	Nonparametric Statistics	
5% A-D Critical Value	0.727	90% Percentile	8.436
K-S Test Statistic	0.167	95% Percentile	9.318
5% K-S Critical Value	0.267	99% Percentile	10.02
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 95% Coverage	10.2
90% Percentile	8.65	95% Percentile Bootstrap UTL with 95% Coverage	10.2
95% Percentile	9.878	95% BCA Bootstrap UTL with 95% Coverage	10.2

99% Percentile	12.47	95% UPL	10.2
		95% Chebyshev UPL	15.87
95% WH Approx. Gamma UPL	10.24	Upper Threshold Limit Based upon IQR	10.29
95% HW Approx. Gamma UPL	10.31		
95% WH Approx. Gamma UTL with 95% Coverage	13.76		
95% HW Approx. Gamma UTL with 95% Coverage	14.1		

CHRYSENE

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-Transformed Statistics	
Minimum	3.61	Minimum	1.284
Maximum	10.4	Maximum	2.342
Second Largest	8.82	Second Largest	2.177
First Quartile	4.305	First Quartile	1.459
Median	5.62	Median	1.716
Third Quartile	7.405	Third Quartile	2
Mean	6.083	Mean	1.743
SD	2.309	SD	0.369
Coefficient of Variation	0.38		
Skewness	0.74		

Background Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% UTL with 95% Coverage	12.8	95% UTL with 95% Coverage	16.74
95% UPL (t)	10.52	95% UPL (t)	11.62
90% Percentile (z)	9.041	90% Percentile (z)	9.172
95% Percentile (z)	9.88	95% Percentile (z)	10.49
99% Percentile (z)	11.45	99% Percentile (z)	13.49

Gamma Distribution Test		Data Distribution Test
k star	5.799	Data appear Normal at 5% Significance Level
Theta Star	1.049	
MLE of Mean	6.083	
MLE of Standard Deviation	2.526	
nu star	116	
A-D Test Statistic	0.336	Nonparametric Statistics
5% A-D Critical Value	0.727	90% Percentile 8.978
K-S Test Statistic	0.197	95% Percentile 9.689
5% K-S Critical Value	0.267	99% Percentile 10.26

Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 95% Coverage	10.4
90% Percentile	9.461	95% Percentile Bootstrap UTL with 95% Coverage	10.4
95% Percentile	10.74	95% BCA Bootstrap UTL with 95% Coverage	10.4
99% Percentile	13.44	95% UPL	10.4
		95% Chebyshev UPL	16.64
95% WH Approx. Gamma UPL	11.12	Upper Threshold Limit Based upon IQR	12.06
95% HW Approx. Gamma UPL	11.22		
95% WH Approx. Gamma UTL with 95% Coverage	14.77		
95% HW Approx. Gamma UTL with 95% Coverage	15.16		

DIBENZ(a,h)ANTHRACENE

General Statistics

Number of Valid Data	10	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	10

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable DIBENZ(a,h)ANTHRACENE was not processed!

FLUORANTHENE

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-Transformed Statistics	
Minimum	6.7	Minimum	1.902
Maximum	22.6	Maximum	3.118
Second Largest	18.5	Second Largest	2.918
First Quartile	7.943	First Quartile	2.072
Median	11.08	Median	2.386
Third Quartile	14.98	Third Quartile	2.704
Mean	12.18	Mean	2.414
SD	5.423	SD	0.432
Coefficient of Variation	0.445		
Skewness	0.815		

Background Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.892	Shapiro Wilk Test Statistic	0.918
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	

Assuming Normal Distribution		Assuming Lognormal Distribution	
95% UTL with 95% Coverage	27.97	95% UTL with 95% Coverage	39.28
95% UPL (t)	22.61	95% UPL (t)	25.64
90% Percentile (z)	19.13	90% Percentile (z)	19.44
95% Percentile (z)	21.1	95% Percentile (z)	22.74
99% Percentile (z)	24.8	99% Percentile (z)	30.52

Gamma Distribution Test		Data Distribution Test	
k star	4.279	Data appear Normal at 5% Significance Level	
Theta Star	2.847		
MLE of Mean	12.18		
MLE of Standard Deviation	5.888		
nu star	85.58		
A-D Test Statistic	0.432	Nonparametric Statistics	
5% A-D Critical Value	0.729	90% Percentile	18.91
K-S Test Statistic	0.218	95% Percentile	20.76
5% K-S Critical Value	0.267	99% Percentile	22.23
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 95% Coverage	22.6
90% Percentile	20.07	95% Percentile Bootstrap UTL with 95% Coverage	22.6
95% Percentile	23.2	95% BCA Bootstrap UTL with 95% Coverage	22.6
99% Percentile	29.85	95% UPL	22.6
		95% Chebyshev UPL	36.97
95% WH Approx. Gamma UPL	24.19	Upper Threshold Limit Based upon IQR	25.52
95% HW Approx. Gamma UPL	24.49		
95% WH Approx. Gamma UTL with 95% Coverage	33.33		
95% HW Approx. Gamma UTL with 95% Coverage	34.48		

FLUORENE

General Statistics

Number of Valid Data	10	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	10

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable FLUORENE was not processed!

INDENO(1,2,3-c,d)PYRENE

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics		Log-transformed Statistics	
Minimum Detected	2.73	Minimum Detected	1.004
Maximum Detected	7.04	Maximum Detected	1.952
Mean of Detected	4.367	Mean of Detected	1.423
SD of Detected	1.526	SD of Detected	0.335
Minimum Non-Detect	1.25	Minimum Non-Detect	0.223
Maximum Non-Detect	1.25	Maximum Non-Detect	0.223

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Background Statistics

Normal Distribution Test with Detected Values Only		Lognormal Distribution Test with Detected Values Only	
Shapiro Wilk Test Statistic	0.896	Shapiro Wilk Test Statistic	0.931
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	3.993	Mean (Log Scale)	1.234
SD	1.863	SD (Log Scale)	0.677
95% UTL 95% Coverage	9.416	95% UTL 95% Coverage	24.61
95% UPL (t)	7.574	95% UPL (t)	12.61
90% Percentile (z)	6.38	90% Percentile (z)	8.172
95% Percentile (z)	7.057	95% Percentile (z)	10.45
99% Percentile (z)	8.327	99% Percentile (z)	16.57
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	3.976	Mean in Original Scale	4.111
SD	1.814	SD in Original Scale	1.65
95% UTL with 95% Coverage	9.256	95% UTL with 95% Coverage	12.59
		95% BCA UTL with 95% Coverage	7.04
		95% Bootstrap (%) UTL with 95% Coverage	7.04
95% UPL (t)	7.463	95% UPL (t)	8.399
90% Percentile (z)	6.3	90% Percentile (z)	6.458
95% Percentile (z)	6.959	95% Percentile (z)	7.495
99% Percentile (z)	8.195	99% Percentile (z)	9.91
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	6.695	Data appear Normal at 5% Significance Level	
Theta Star	0.652		

nu star	120.5		
A-D Test Statistic	0.371	**Nonparametric Statistics**	
5% A-D Critical Value	0.722	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.203	Mean	4.203
5% K-S Critical Value	0.279	SD	1.451
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.487
		95% KM UTL with 95% Coverage	8.426
Assuming Gamma Distribution		95% KM Chebyshev UPL	10.84
Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	6.992
Mean	4.101	90% Percentile (z)	6.062
Median	3.75	95% Percentile (z)	6.589
SD	1.666	99% Percentile (z)	7.578
k star	4.731		
Theta star	0.867	**Gamma ROS Limits with Extrapolated Data**	
Nu star	94.63	95% Wilson Hilferty (WH) Approx. Gamma UPL	7.916
95% Percentile of Chisquare (2k)	17.56	95% Hawkins Wixley (HW) Approx. Gamma UPL	8.042
		95% WH Approx. Gamma UTL with 95% Coverage	10.77
90% Percentile	6.627	95% HW Approx. Gamma UTL with 95% Coverage	11.18
95% Percentile	7.613		
99% Percentile	9.702		

Note: DL/2 is not a recommended method.

NAPHTHALENE

General Statistics

Number of Valid Data	10	Number of Detected Data	0
Number of Distinct Detected Data	0	Number of Non-Detect Data	10

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable NAPHTHALENE was not processed!

PHENANTHRENE

General Statistics

Number of Valid Data	10	Number of Detected Data	9
Number of Distinct Detected Data	9	Number of Non-Detect Data	1
		Percent Non-Detects	10.00%

Raw Statistics		**Log-transformed Statistics**	
Minimum Detected	3.06	Minimum Detected	1.118
Maximum Detected	10.9	Maximum Detected	2.389
Mean of Detected	5.81	Mean of Detected	1.669

SD of Detected	2.66	SD of Detected	0.452
Minimum Non-Detect	1.25	Minimum Non-Detect	0.223
Maximum Non-Detect	1.25	Maximum Non-Detect	0.223

Warning: There are only 9 Detected Values in this data

Note: It should be noted that even though bootstrap may be performed on this data set the resulting calculations may not be reliable enough to draw conclusions

It is recommended to have 10-15 or more distinct observations for accurate and meaningful results.

Background Statistics

Normal Distribution Test with Detected Values Only		**Lognormal Distribution Test with Detected Values Only**	
Shapiro Wilk Test Statistic	0.91	Shapiro Wilk Test Statistic	0.935
5% Shapiro Wilk Critical Value	0.829	5% Shapiro Wilk Critical Value	0.829
Data appear Normal at 5% Significance Level		**Data appear Lognormal at 5% Significance Level**	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
DL/2 Substitution Method		DL/2 Substitution Method	
Mean	5.292	Mean (Log Scale)	1.455
SD	2.996	SD (Log Scale)	0.799
95% UTL 95% Coverage	14.01	95% UTL 95% Coverage	43.86
95% UPL (t)	11.05	95% UPL (t)	19.91
90% Percentile (z)	9.131	90% Percentile (z)	11.93
95% Percentile (z)	10.22	95% Percentile (z)	15.95
99% Percentile (z)	12.26	99% Percentile (z)	27.49
Maximum Likelihood Estimate(MLE) Method		Log ROS Method	
Mean	5.214	Mean in Original Scale	5.403
SD	3.001	SD in Original Scale	2.819
95% UTL with 95% Coverage	13.95	95% UTL with 95% Coverage	23.74
		95% BCA UTL with 95% Coverage	10.9
		95% Bootstrap (%) UTL with 95% Coverage	10.9
95% UPL (t)	10.98	95% UPL (t)	13.74
90% Percentile (z)	9.06	90% Percentile (z)	9.639
95% Percentile (z)	10.15	95% Percentile (z)	11.78
99% Percentile (z)	12.2	99% Percentile (z)	17.18
Gamma Distribution Test with Detected Values Only		**Data Distribution Test with Detected Values Only**	
k star (bias corrected)	3.842	Data appear Normal at 5% Significance Level	
Theta Star	1.512		
nu star	69.15		
A-D Test Statistic	0.318	**Nonparametric Statistics**	
5% A-D Critical Value	0.723	Kaplan-Meier (KM) Method	
K-S Test Statistic	0.178	Mean	5.535
5% K-S Critical Value	0.28	SD	2.518
Data appear Gamma Distributed at 5% Significance Level		SE of Mean	0.845
		95% KM UTL with 95% Coverage	12.87

Assuming Gamma Distribution		95% KM Chebyshev UPL	17.05
Gamma ROS Statistics with Extrapolated Data		95% KM UPL (t)	10.38
Mean	5.351	90% Percentile (z)	8.762
Median	4.73	95% Percentile (z)	9.677
SD	2.898	99% Percentile (z)	11.39
k star	2.422		
Theta star	2.209	**Gamma ROS Limits with Extrapolated Data**	
Nu star	48.43	95% Wilson Hilferty (WH) Approx. Gamma UPL	12.74
95% Percentile of Chisquare (2k)	10.83	95% Hawkins Wixley (HW) Approx. Gamma UPL	13.2
		95% WH Approx. Gamma UTL with 95% Coverage	18.95
90% Percentile	9.956	95% HW Approx. Gamma UTL with 95% Coverage	20.43
95% Percentile	11.96		
99% Percentile	16.36		

Note: DL/2 is not a recommended method.

PYRENE

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10

Raw Statistics		Log-Transformed Statistics	
Minimum	5.35	Minimum	1.677
Maximum	18.3	Maximum	2.907
Second Largest	13.6	Second Largest	2.61
First Quartile	6.238	First Quartile	1.83
Median	8.31	Median	2.099
Third Quartile	11.85	Third Quartile	2.47
Mean	9.488	Mean	2.165
SD	4.271	SD	0.427
Coefficient of Variation	0.45		
Skewness	0.996		

Background Statistics

Normal Distribution Test		Lognormal Distribution Test	
Shapiro Wilk Test Statistic	0.881	Shapiro Wilk Test Statistic	0.916
Shapiro Wilk Critical Value	0.842	Shapiro Wilk Critical Value	0.842
Data appear Normal at 5% Significance Level		Data appear Lognormal at 5% Significance Level	
Assuming Normal Distribution		**Assuming Lognormal Distribution**	
95% UTL with 95% Coverage	21.92	95% UTL with 95% Coverage	30.2
95% UPL (t)	17.7	95% UPL (t)	19.81
90% Percentile (z)	14.96	90% Percentile (z)	15.07
95% Percentile (z)	16.51	95% Percentile (z)	17.59
99% Percentile (z)	19.42	99% Percentile (z)	23.53
Gamma Distribution Test		**Data Distribution Test**	
k star	4.316	Data appear Normal at 5% Significance Level	
Theta Star	2.198		

MLE of Mean	9.488		
MLE of Standard Deviation	4.567		
nu star	86.32		
A-D Test Statistic	0.443	**Nonparametric Statistics**	
5% A-D Critical Value	0.729	90% Percentile	14.07
K-S Test Statistic	0.248	95% Percentile	16.19
5% K-S Critical Value	0.267	99% Percentile	17.88
Data appear Gamma Distributed at 5% Significance Level			
Assuming Gamma Distribution		95% UTL with 95% Coverage	18.3
90% Percentile	15.61	95% Percentile Bootstrap UTL with 95% Coverage	18.3
95% Percentile	18.03	95% BCA Bootstrap UTL with 95% Coverage	18.3
99% Percentile	23.18	95% UPL	18.3
		95% Chebyshev UPL	29.01
95% WH Approx. Gamma UPL	18.79	Upper Threshold Limit Based upon IQR	20.27
95% HW Approx. Gamma UPL	19		
95% WH Approx. Gamma UTL with 95% Coverage	25.86		
95% HW Approx. Gamma UTL with 95% Coverage	26.7		

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APPENDIX J

MRSPP Tables

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Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table A
MRS Background Information

Munitions Response Site Name: 1940s Skeet Range - TS835
Component: Air Force
Installation/Property Name: CANNON AIR FORCE BASE
Location (City, County, State): Clovis, Curry County, NM
Site Name/Project name (Project No.): 1940s Skeet Range - TS835

Date Information Entered\Updated: 4/2/2012 4:14:40 PM
Point of Contact Name: Mathew Higginbotham **Point of Contact Phone:** (575) 784-1092
Project Phase (check only one):

☐ PA	☑ SI	☐ RI	☐ FS	☐ RD
☐ RA	☐ RIP	☐ RC		

Media Evaluated (check all that apply):

☐ Groundwater	☐ Sediment (human receptor)
☑ Surface soil	☐ Surface Water (ecological receptor)
☐ Sediment (ecological receptor)	☐ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

MRS TS835 is located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area. MRS TS835 is the portion of MRA TS835 where munitions debris was found during the Comprehensive Site Evaluation Phase II visual survey. The MRA range was oriented to the northeast. MRS TS835 does not contain any structures. The area generally consists of an open field with a sparse vegetative cover of low grasses. The only remnants of the range observed on-base include clay target debris and several slabs of concrete. The topography is relatively flat, sloping gently to the southeast. The soil type at the MRS was generally fine sandy loam.

Description of Pathways for Human and Ecological Receptors:

There is no historical or physical evidence of explosive MEC associated with the MRS. Therefore, exposure to MEC is not applicable for this MRA. Only military munitions use identified at this MRA are associated with small arms. Once fired, these may result in release of MC. No sensitive ecological populations, habitat, or natural resources are at or adjacent to the site. Consequently, a biological assessment for impact from munitions-related activities is not warranted. Human and ecological receptors are not likely to come into contact with the groundwater medium at Cannon AFB. However, as previously stated, there is no historical or physical evidence of MEC at the Cannon AFB MRA; therefore, the potential pathways associated with the above listed receptors are considered incomplete with respect to MEC. The Modified CSE Phase I (USACE,2009) found that there is a there are no wetlands in the vicinity of the MRA, and the depth to groundwater is approximately 250 ft (CH2M Hill, 1983).

Description of Receptors (Human and Ecological):

The MRS is located amidst an active airfield, operational buildings, and recreational areas, in an area of maintained grasses. Cannon AFB is located approximately 8 miles west of the city of Clovis, in Curry County, New Mexico. It had a population estimate of 32,863 people in 2009 (U.S. Census, 2011). In 2009, the population density of Curry County was 32 persons per square mile (U.S. Census, 2011). The off-base portion of the MRA extending onto the Rajen Dairy Property contains four buildings. Numerous buildings are located within a one-mile radius of the MRA. There are more than 26 buildings within a 2-mile radius of the MRS.
The receptors that were considered for Cannon AFB were: authorized installation personnel, authorized contractors and visitors, trespassers, and biota.
Most of the vegetation at the site is grass typical of semiarid short grass prairies (CH2M Hill, 1983). The black-tailed prairie dog is a Federal Endangered Species Act candidate animal that has been found at the Base, however, according to the CSE Phase I, no black-tailed prairie dogs were found to be present at the MRS (USACE, 2009). Most biota would not likely find suitable habitat in the grassy areas with limited cover. The current land use of the MRS is private property mainly used for storage. Therefore, no ecological receptors are considered for the SR.

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Reference (Section, Page #):
GENERAL - 2.1,2-1/2.3.1-2.3.2,2-5/2.4,2-6,8.0, 8-1 to 8-6/9.2,9-1/10.2,10-1,10.3,10-1, LOCATION - 5.1, 5-1, POC - N/A, CONTRACTOR - N/A

Table 1

EHE Module: Munitions Type Data Element Worksheet

Classification	Description	Score
Sensitive	- All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. - All hand grenades containing energetic filler. - Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30

High explosive (used or damaged)	- All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive."
	- All DMM containing a high-explosive filler that have:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		25

Pyrotechnic (used or damaged)	- All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades).
	- All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		20

High explosive (unused)	- All DMM containing a high explosive filler that:
	  - Have not been damaged by burning or detonation
	  - Are not deteriorated to the point of instability.
		15

Propellant	- All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor).
	- All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are:
	  - Damaged by burning or detonation
	  - Deteriorated to the point of instability.
		15

Bulk secondary high explosives, pyrotechnics, or propellant	- All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. - Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10

Pyrotechnic (not used or damaged)	- All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that:
	  - Have not been damaged by burning or detonation
	  - Are not deteriorated to the point of instability.
		10

Practice	- All UXO that are practice munitions that are not associated with a sensitive fuze.
	- All DMM that are practice munitions that are not associated with a sensitive fuze and that have not:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		5

Riot control	- All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	- All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 30).**	**2**

Site-specific data used in selection MUNITIONS TYPE classification:
CSE Phase I described area as small arms use only - former skeet range. CSE Phase II visual survey noted clay target debris in MRS.

Reference (Section, Page #): (5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 2

EHE Module: Source of Hazard Data Element Worksheet

Classification	Description	Score
Former Range	- The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former Munitions treatment (i.e., OB/OD unit)	- The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	- The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	- The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	- The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	- The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	- The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	- The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	- The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	- The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
Source of Hazard	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 10).**	1

Site-specific data characteristics used to select the SOURCE OF HAZARD classification:

CSE Phase I described area as small arms use only - former skeet range. CSE Phase II visual survey noted clay target debris in MRS.

Reference (Section, Page #):	5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
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FFID: NM7572124454

Table 3

EHE Module: Information on the Location of Munitions Data Element Worksheet

Classification	Description	Score
Confirmed surface	- Physical evidence indicates that there are UXO or DMM on the surface of the MRS - Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	- Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. - Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	- Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. - Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	- There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	- There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	- There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms range (regardless of location	- The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
Location of Munitions	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 25).**	1

Site-specific data characteristics used to select the LOCATION OF MUNITIONS classification:

CSE Phase I described area as small arms use only. CSE Phase II visual survey noted clay target debris in MRS.

Reference (Section, Page #):	5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 4

EHE Module: Ease of Access Data Element Worksheet

Classification	Description	Score
No barrier	- There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	- There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	- There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	- There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
Ease of Access	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 10).**	10

Site-specific characteristics used to select the EASE OF ACCESS classification:

Reference (Section, Page #):	5.4,5-1,2.1,2-1,5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 5

EHE Module: Status of Property Data Element Worksheet

Classification	Description	Score
Non-DoD control	- The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	- The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	- The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
Status of Property	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	0

Site-specific characteristics used to select the EASE OF ACCESS classification:

Reference (Section, Page #):	5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 6

EHE Module: Population Density Data Element Worksheet

Classification	Description	Score
> 500 persons per square mile	- There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100- 500 persons per square mile	- There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	- There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
Population Density	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	1

Site-specific characteristics that helped select the POPULATION DENSITY classification

Reference (Section, Page #):	5.4,5-1,2.1,2-1,5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 7

EHE Module: Population Near Hazard Data Element Worksheet

Classification	Description	Score
26 or more inhabited structures	- There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	- There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	- There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	- There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	- There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	- There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
Population Near Hazard	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific data characteristics used to select the POPULATION NEAR HAZARD classification:

Reference (Section, Page #):	5.4,5-1,2.1,2-1,5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 8

EHE Module: Types of Activities/Structures Data Element Worksheet

Classification	Description	Score
Residential. educational, or subsitence	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	- There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
Types of Activites/Structures	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific data characteristics used to select the LOCATION OF MUNITIONS classification:

Reference (Section, Page #):	5.4,5-1,2.1,2-1,5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Worksheet

Classification	Description	Score
Ecological and cultural resources present	- There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	- There are ecological resources present on the MRS.	3
Cultural resources present	- There are cultural resources present on the MRS.	3
No ecological or cultural resources present	- There are no ecological resources or cultural resources present on the MRS.	0
Ecological and/or Cultural Resources	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	0

Site-specific characteristics used to select the ECOLOGICAL AND/OR CULTURAL RESOURCES classification:

Reference (Section, Page #):	5.4,5-1,2.1,2-1,5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 10
Determining the EHE Module Rating

	Source	Score
Explosive Hazard Factor Data Elements		
Munitions Type	Table 1	2
Source of Hazard	Table 2	1
Accessibility Factor Data Elements		
Information on Location of Munitions	Table 3	1
Ease of Access	Table 4	10
Status of Property	Table 5	0
Receptors Factor Data Elements		
Population Density	Table 6	1
Population Near Hazard	Table 7	5
Types of Activities/Structures	Table 8	5
Ecological and/or Cultural Resources	Table 9	0
	Sum	25

EHE Module Value	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Explosive Hazard
	Evaluation Pending

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 20

Determining the CHE Module Rating

	Source	Score
CWM Hazard Factor Data Elements		
CWM Configuration	Table 11	N/A
Source of CWM	Table 12	N/A
Accessibility Factor Data Elements		
Information on Location of Munitions	Table 13	N/A
Ease of Access	Table 14	N/A
Status of Property	Table 15	N/A
Receptors Factor Data Elements		
Population Density	Table 16	N/A
Population Near Hazard	Table 17	N/A
Types of Activities/Structures	Table 18	N/A
Ecological and/or Cultural Resources	Table 19	N/A
	Sum	N/A

CHE Module Value	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected CWM Hazard
	Evaluation Pending

Tables 11-19 were not generated because there is no known or suspected CWM hazard at the MRS.

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
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Table 21

HHE Module: Groundwater Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Migratory Pathway Factor		
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Receptor Factor		
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:

No groundwater samples were collected because no significant impact to groundwater was expected. Human and ecological receptors are not likely to come into contact with the groundwater medium at Cannon AFB. Groundwater at 250ft bgs.

Reference (Section, Page #):

8.2.3,8-6

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
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Table 22

HHE Module: Surface Water - Human Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors to have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No surface water on/near MRS. No surface water to sample.

Reference (Section, Page #):

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 23

HHE Module: Sediment - Human Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	N/A

Identified	Identified receptors to have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	N/A

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No bodies of water on/near MRS. No sediment to sample.

Reference (Section, Page #):

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 24

HHE Module: Surface Water - Ecological Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No surface water on/near MRS. No surface water to sample.

Reference (Section, Page #):

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
FFID: NM7572124454

Table 25

HHE Module: Sediment - Ecological Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	No Data
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	NA

Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	NA
Identified	Identified receptors to have access to sediment to which contamination has moved or can move.	H
Potential	potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	NA

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF

Sample comments:

No bodies of water on/near MRS. No sediment to sample.

Reference (Section, Page #):

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
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Table 26

HHE Module: Soil - Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
Lead	26	400	0.1
Pyrene	2300	2300	1.0
Naphthalene	31.9	56	0.6
Indeno[1,2,3-cd]pyrene	8430	62	136.0
Fluorene	80.9	2700	0.0
Fluoranthene	3390	2300	1.5
Dibenz[ah]anthracene	3700	6.2	596.8
Chrysene	3490	6200	0.6
Benzo[k]fluoranthene	6940	620	11.2
Benzo[b]fluoranthene	4440	62	71.6
Benzo[a]pyrene	10200	6.2	1645.2
Anthracene	293	22000	0.0
Acenaphthene	1450	3700	0.4
2-Methylnaphthalene	28.3	310	0.1
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**2464.9**
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	H

Evident	Analytical data or observable evidence indicates that contamination in the soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the soil to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors to have access to soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to soil to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:
Only small arms use at the MRS.

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Rationale for Selection of RF:

No ecological receptors. Most soil covered by grass.

Sample comments:

PAH samples above USEPA RSLs. PAH results in ug/kg. Lead at low concentrations - below the USEPA RSL of 400ppm.

Reference (Section, Page #):

5.6.3.1, 5-11 /5.6.3.2.1, 5-16 to 5-19

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835
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Table 27
Determining the HHE Module Rating

Media Source	Contaminant Hazard Factor	Migratory Pathway Factor Value	Receptor Factor Value	3-Letter Ratings (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)	NA	NA	NA	NA	NA
Surface Water/Human Endpoint (Table 22)	NA	NA	NA	NA	NA
Sediment/Human Endpoint (Table 23)	NA	NA	NA	NA	NA
Surface Water/Ecological Endpoint (Table 24)	NA	NA	NA	NA	NA
Sediment/Ecological Endpoint (Table 25)	NA	NA	NA	NA	NA
Soil (Table 26)	H	M	M	HMM	C

HHE Ratings (for reference only)	
HHH	A
HHM	B
HHL HMM	C
HML MMM	D
HLL MML	E
MLL	F
LLL	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected MC Hazard
	Evaluation Pending
HHE Module Ratings	C

Installation: CANNON AIR FORCE BASE
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Table 28
MRS Priority

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Prioritization No Longer Required		Prioritization No Longer Required		Prioritization No Longer Required	
No Known or Suspected Hazard		No Known or Suspected Hazard		No Known or Suspected Hazard	
Evaluation Pending		Evaluation Pending		Evaluation Pending	
			MRS Priority	4	

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table A
MRS Background Information

Munitions Response Site Name: 1940s Skeet Range - TS835a
Component: Air Force
Installation/Property Name: CANNON AIR FORCE BASE
Location (City, County, State): Clovis, Curry County, NM
Site Name/Project name (Project No.): 1940s Skeet Range - TS835a

Date Information Entered\Updated: 4/2/2012 4:49:55 PM
Point of Contact Name: MATHEW HIGGINBOTHAM **Point of Contact Phone:** (575) 784-1092
Project Phase (check only one):

☐ PA	☑ SI	☐ RI	☐ FS	☐ RD
☐ RA	☐ RIP	☐ RC		

Media Evaluated (check all that apply):

☐ Groundwater	☐ Sediment (human receptor)
☑ Surface soil	☐ Surface Water (ecological receptor)
☐ Sediment (ecological receptor)	☐ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

MRS TS835a is located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area. MRS TS835a is the on-base portion of MRA TS835 where no munitions debris was discovered during the Comprehensive Site Evaluation Phase II visual survey. The MRA range was oriented to the northeast. MRS TS835a does not contain any structures. The area generally consists of an open field with a sparse vegetative cover of low grasses. The topography is relatively flat, sloping gently to the southeast. The soil type at the MRS was generally fine sandy loam.

Description of Pathways for Human and Ecological Receptors:

There is no historical or physical evidence of explosive MEC associated with the MRS. Therefore, exposure to MEC is not applicable for this MRA. Only military munitions use identified at this MRA are associated with small arms. Once fired, these may result in release of MC. No sensitive ecological populations, habitat, or natural resources are at or adjacent to the site. Consequently, a biological assessment for impact from munitions-related activities is not warranted. Human and ecological receptors are not likely to come into contact with the groundwater medium at Cannon AFB. However, as previously stated, there is no historical or physical evidence of MEC at the Cannon AFB MRA; therefore, the potential pathways associated with the above listed receptors are considered incomplete with respect to MEC. The Modified CSE Phase I (USACE,2009) found that there is a there are no wetlands in the vicinity of the MRA, and the depth to groundwater is approximately 250 ft (CH2M Hill, 1983).

Description of Receptors (Human and Ecological):

The MRS is located amidst an active airfield, operational buildings, and recreational areas, in an area of maintained grasses. Cannon AFB is located approximately 8 miles west of the city of Clovis, in Curry County, New Mexico. It had a population estimate of 32,863 people in 2009 (U.S. Census, 2011). In 2009, the population density of Curry County was 32 persons per square mile (U.S. Census, 2011). The off-base portion of the MRA extending onto the Rajen Dairy Property contains four buildings. Numerous buildings are located within a one-mile radius of the MRA. There are more than 26 buildings within a 2-mile radius of the MRS.
The receptors that were considered for Cannon AFB were: authorized installation personnel, authorized contractors and visitors, trespassers, and biota.
Most of the vegetation at the site is grass typical of semiarid short grass prairies (CH2M Hill, 1983). The black-tailed prairie dog is a Federal Endangered Species Act candidate animal that has been found at the Base, however, according to the CSE Phase I, no black-tailed prairie dogs were found to be present at the MRS (USACE, 2009). Most biota would not likely find suitable habitat in the grassy areas with limited cover. The current land use of the MRS is private property mainly used for storage. Therefore, no ecological receptors are considered for the SR.

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Reference (Section, Page #):
GENERAL - 2.1,2-1/2.3.1-2.3.2,2-5/2.4,2-6/8.0, 8-1 to 8-6/9.2,9-1/10.2,10-1,10.3,10-1, LOCATION - 5.1, 5-1, POC - N/A, CONTRACTOR - N/A

Installation: CANNON AIR FORCE BASE
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FFID: NM7572124454

Table 1

EHE Module: Munitions Type Data Element Worksheet

Classification	Description	Score
Sensitive	- All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. - All hand grenades containing energetic filler. - Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30

High explosive (used or damaged)	- All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive."
	- All DMM containing a high-explosive filler that have:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		25

Pyrotechnic (used or damaged)	- All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades).
	- All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		20

High explosive (unused)	- All DMM containing a high explosive filler that:
	  - Have not been damaged by burning or detonation
	  - Are not deteriorated to the point of instability.
		15

Propellant	- All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor).
	- All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are:
	  - Damaged by burning or detonation
	  - Deteriorated to the point of instability.
		15

Bulk secondary high explosives, pyrotechnics, or propellant	- All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. - Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10

Pyrotechnic (not used or damaged)	- All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that:
	  - Have not been damaged by burning or detonation
	  - Are not deteriorated to the point of instability.
		10

Practice	- All UXO that are practice munitions that are not associated with a sensitive fuze.
	- All DMM that are practice munitions that are not associated with a sensitive fuze and that have not:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		5

Riot control	- All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	- All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 30).**	2

Site-specific data used in selection MUNITIONS TYPE classification:

CSE Phase I described area as small arms use only - former skeet range. No munitions debris found in this MRS during the CSE Phase II visual survey.

Reference (Section, Page #): 2.3.1,2-5/6.5,6-1/4.1,4-1

Installation: CANNON AIR FORCE BASE
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Table 2

EHE Module: Source of Hazard Data Element Worksheet

Classification	Description	Score
Former Range	- The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former Munitions treatment (i.e., OB/OD unit)	- The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	- The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	- The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	- The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	- The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	- The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	- The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	- The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	- The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
Source of Hazard	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 10).**	1

Site-specific data characteristics used to select the SOURCE OF HAZARD classification:

CSE Phase I described area as small arms use only - former skeet range. No munitions debris found in this MRS during the CSE Phase II visual survey.

Reference (Section, Page #): 2.3.1,2-5/6.5,6-1/4.1,4-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 3

EHE Module: Information on the Location of Munitions Data Element Worksheet

Classification	Description	Score
Confirmed surface	- Physical evidence indicates that there are UXO or DMM on the surface of the MRS - Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	- Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. - Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	- Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. - Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	- There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	- There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	- There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms range (regardless of location	- The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
Location of Munitions	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 25).**	1

Site-specific data characteristics used to select the LOCATION OF MUNITIONS classification:

CSE Phase I described area as small arms use only - former skeet range. No munitions debris found in this MRS during the CSE Phase II visual survey.

Reference (Section, Page #):	2.3.1,2-5/6.5,6-1/4.1,4-1

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Table 4

EHE Module: Ease of Access Data Element Worksheet

Classification	Description	Score
No barrier	- There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	- There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	- There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	- There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
Ease of Access	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 10).**	10

Site-specific characteristics used to select the EASE OF ACCESS classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1/

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 5

EHE Module: Status of Property Data Element Worksheet

Classification	Description	Score
Non-DoD control	- The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	- The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	- The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
Status of Property	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	0

Site-specific characteristics used to select the EASE OF ACCESS classification:

Reference (Section, Page #):	2.3.1,2-5/6.5,6-1/4.1,4-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 6

EHE Module: Population Density Data Element Worksheet

Classification	Description	Score
> 500 persons per square mile	- There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100- 500 persons per square mile	- There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	- There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
Population Density	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	1

Site-specific characteristics that helped select the POPULATION DENSITY classification

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1/

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 7

EHE Module: Population Near Hazard Data Element Worksheet

Classification	Description	Score
26 or more inhabited structures	- There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	- There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	- There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	- There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	- There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	- There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
Population Near Hazard	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific data characteristics used to select the POPULATION NEAR HAZARD classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1/

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 8

EHE Module: Types of Activities/Structures Data Element Worksheet

Classification	Description	Score
Residential. educational, or subsitence	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	- There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
Types of Activites/Structures	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific data characteristics used to select the LOCATION OF MUNITIONS classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1/

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Worksheet

Classification	Description	Score
Ecological and cultural resources present	- There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	- There are ecological resources present on the MRS.	3
Cultural resources present	- There are cultural resources present on the MRS.	3
No ecological or cultural resources present	- There are no ecological resources or cultural resources present on the MRS.	0
Ecological and/or Cultural Resources	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	0

Site-specific characteristics used to select the ECOLOGICAL AND/OR CULTURAL RESOURCES classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1/

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 10
Determining the EHE Module Rating

	Source	Score
Explosive Hazard Factor Data Elements		
Munitions Type	Table 1	2
Source of Hazard	Table 2	1
Accessibility Factor Data Elements		
Information on Location of Munitions	Table 3	1
Ease of Access	Table 4	10
Status of Property	Table 5	0
Receptors Factor Data Elements		
Population Density	Table 6	1
Population Near Hazard	Table 7	5
Types of Activities/Structures	Table 8	5
Ecological and/or Cultural Resources	Table 9	0
	Sum	25

EHE Module Value	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Explosive Hazard
	Evaluation Pending

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 20

Determining the CHE Module Rating

	Source	Score
CWM Hazard Factor Data Elements		
CWM Configuration	Table 11	N/A
Source of CWM	Table 12	N/A
Accessibility Factor Data Elements		
Information on Location of Munitions	Table 13	N/A
Ease of Access	Table 14	N/A
Status of Property	Table 15	N/A
Receptors Factor Data Elements		
Population Density	Table 16	N/A
Population Near Hazard	Table 17	N/A
Types of Activities/Structures	Table 18	N/A
Ecological and/or Cultural Resources	Table 19	N/A
	Sum	N/A

CHE Module Value	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected CWM Hazard
	Evaluation Pending

Tables 11-19 were not generated because there is no known or suspected CWM hazard at the MRS.

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 21

HHE Module: Groundwater Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	[illegible]
Receptor Factor		
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	[illegible]

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:

No significant impact to groundwater was expected. Groundwater is at 250 feet bgs.

Reference (Section, Page #):

8.2.3,8-6

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 22

HHE Module: Surface Water - Human Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	

Identified	Identified receptors to have access to surface water to whick contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to whick contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to whick contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No surface water on/near MRS. No surface water to sample.

Reference (Section, Page #):
8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 23

HHE Module: Sediment - Human Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	NA
Identified	Identified receptors to have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	NA

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No bodies of water on/near MRS. No sediment to sample.

Reference (Section, Page #):

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 24

HHE Module: Surface Water - Ecological Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No surface water on/near MRS. No surface water to sample.

Reference (Section, Page #):
3.3,3-2/8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 25

HHE Module: Sediment - Ecological Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	No Data
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	NA

Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Receptor Factor		
Identified	Identified receptors to have access to sediment to which contamination has moved or can move.	H
Potential	potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF

Sample comments:
No bodies of water on/near MRS. No sediment to sample.

Reference (Section, Page #):
3.3,3-28/8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 26

HHE Module: Soil - Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
Lead	26	400	0.1
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**0.1**
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**L**

Evident	Analytical data or observable evidence indicates that contamination in the soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the soil to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors to have access to soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to soil to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:
Only lead with detections below USEPA RSL.

Rationale for Selection of RF:
Only lead with detections below USEPA RSL.

Sample comments:
Lead at low concentrations - below the USEPA RSL of 400ppm.

Reference (Section, Page #):
5.6.3.1, 5-11 /5.6.3.2.1, 5-16 to 5-19

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 27
Determining the HHE Module Rating

Media Source	Contaminant Hazard Factor	Migratory Pathway Factor Value	Receptor Factor Value	3-Letter Ratings (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)	NA	NA	NA	NA	NA
Surface Water/Human Endpoint (Table 22)	NA			NA	NA
Sediment/Human Endpoint (Table 23)	NA	NA	NA	NA	NA
Surface Water/Ecological Endpoint (Table 24)	NA			NA	NA
Sediment/Ecological Endpoint (Table 25)	NA	NA	NA	NA	NA
Soil (Table 26)	L	L	L	LLL	G

HHE Ratings (for reference only)	
HHH	A
HHM	B
HHL HMM	C
HML MMM	D
HLL MML	E
MLL	F
LLL	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected MC Hazard
	Evaluation Pending
HHE Module Ratings	G

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835a
FFID: NM7572124454

Table 28
MRS Priority

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Prioritization No Longer Required		Prioritization No Longer Required		Prioritization No Longer Required	
No Known or Suspected Hazard		No Known or Suspected Hazard		No Known or Suspected Hazard	
Evaluation Pending		Evaluation Pending		Evaluation Pending	
			MRS Priority	8	

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table A
MRS Background Information

Munitions Response Site Name: 1940s Skeet Range - TS835b
Component: Air Force
Installation/Property Name: CANNON AIR FORCE BASE
Location (City, County, State): Clovis, Curry County, NM
Site Name/Project name (Project No.): 1940s Skeet Range - TS835b

Date Information Entered\Updated: 8/2/2012 9:29:51 AM
Point of Contact Name: Mathew Higginbotham **Point of Contact Phone:** (575) 784-1092
Project Phase (check only one):

PA	✔ SI	RI	FS	RD
RA	RIP	RC		

Media Evaluated (check all that apply):

Groundwater	Sediment (human receptor)
Surface soil	Surface Water (ecological receptor)
Sediment (ecological receptor)	Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

MRS TS835b is located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area. MRS TS835b is the off-base portion of MRA TS835, which belongs to the Rajen Dairy. The MRS range was oriented to the northeast. The soil type at the MRS was generally fine sandy loam.

Description of Pathways for Human and Ecological Receptors:

There is no historical or physical evidence of explosive MEC associated with the MRS. Therefore, exposure to MEC is not applicable for this MRA. Only military munitions use identified at this MRA are associated with small arms. Once fired, these may result in release of MC. No sensitive ecological populations, habitat, or natural resources are at or adjacent to the site. Consequently, a biological assessment for impact from munitions-related activities is not warranted. Human and ecological receptors are not likely to come into contact with the groundwater medium at Cannon AFB. However, as previously stated, there is no historical or physical evidence of MEC at the Cannon AFB MRA; therefore, the potential pathways associated with the above listed receptors are considered incomplete with respect to MEC. The Modified CSE Phase I (USACE,2009) found that there is a there are no wetlands in the vicinity of the MRA, and the depth to groundwater is approximately 250 ft (CH2M Hill, 1983).

Description of Receptors (Human and Ecological):

The MRS is located amidst an active airfield, operational buildings, and recreational areas, in an area of maintained grasses. Cannon AFB is located approximately 8 miles west of the city of Clovis, in Curry County, New Mexico. It had a population estimate of 32,863 people in 2009 (U.S. Census, 2011). In 2009, the population density of Curry County was 32 persons per square mile (U.S. Census, 2011). The off-base portion of the MRA extending onto the Rajen Dairy Property contains four buildings. Numerous buildings are located within a one-mile radius of the MRA. There are more than 26 buildings within a 2-mile radius of the MRS.
The receptors that were considered for Cannon AFB were: authorized installation personnel, authorized contractors and visitors, trespassers, and biota.
Most of the vegetation at the site is grass typical of semiarid short grass prairies (CH2M Hill, 1983). The black-tailed prairie dog is a Federal Endangered Species Act candidate animal that has been found at the Base, however, according to the CSE Phase I, no black-tailed prairie dogs were found to be present at the MRS (USACE, 2009). Most biota would not likely find suitable habitat in the grassy areas with limited cover. The current land use of the MRS is private property mainly used for storage. Therefore, no ecological receptors are considered for the SR

Reference (Section, Page #):

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

GENERAL - 2.1,2-1/2.3.1-2.3.2,2-5/2.4,2-6,8.0, 8-1 to 8-6/9.2,9-1/10.2,10-1,10.3,10-1, LOCATION - 5.1, 5-1, POC - N/A, CONTRACTOR - N/A

Table 1

EHE Module: Munitions Type Data Element Worksheet

Classification	Description	Score
Sensitive	- All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. - All hand grenades containing energetic filler. - Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30

High explosive (used or damaged)	- All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive."
	- All DMM containing a high-explosive filler that have:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		25

Pyrotechnic (used or damaged)	- All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades).
	- All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		20

High explosive (unused)	- All DMM containing a high explosive filler that:
	  - Have not been damaged by burning or detonation
	  - Are not deteriorated to the point of instability.
		15

Propellant	- All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor).
	- All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are:
	  - Damaged by burning or detonation
	  - Deteriorated to the point of instability.
		15

Bulk secondary high explosives, pyrotechnics, or propellant	- All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. - Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10

Pyrotechnic (not used or damaged)	- All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that:
	  - Have not been damaged by burning or detonation
	  - Are not deteriorated to the point of instability.
		10

Practice	- All UXO that are practice munitions that are not associated with a sensitive fuze.
	- All DMM that are practice munitions that are not associated with a sensitive fuze and that have not:
	  - Been damaged by burning or detonation
	  - Deteriorated to the point of instability.
		5

Riot control	- All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	- All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 30).**	2

Site-specific data used in selection MUNITIONS TYPE classification:

CSE Phase I described area as small arms use only - former skeet range. No munitions debris noted near MRS fence line.

Reference (Section, Page #): 5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 2

EHE Module: Source of Hazard Data Element Worksheet

Classification	Description	Score
Former Range	- The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former Munitions treatment (i.e., OB/OD unit)	- The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	- The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	- The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	- The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	- The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	- The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	- The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	- The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	- The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
Source of Hazard	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 10).**	1

Site-specific data characteristics used to select the SOURCE OF HAZARD classification:

CSE Phase I described area as small arms use only - former skeet range. No munitions debris noted near MRS fence line.

Reference (Section, Page #):	5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 3

EHE Module: Information on the Location of Munitions Data Element Worksheet

Classification	Description	Score
Confirmed surface	- Physical evidence indicates that there are UXO or DMM on the surface of the MRS - Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	- Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. - Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	- Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. - Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	- There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	- There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	- There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms range (regardless of location	- The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
Evidence of no munitions	- Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
Location of Munitions	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 25).**	1

Site-specific data characteristics used to select the LOCATION OF MUNITIONS classification:

CSE Phase I described area as small arms use only - former skeet range. No munitions debris noted near MRS fence line.

Reference (Section, Page #): 5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 4

EHE Module: Ease of Access Data Element Worksheet

Classification	Description	Score
No barrier	- There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	- There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	- There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	- There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
Ease of Access	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 10).**	10

Site-specific characteristics used to select the EASE OF ACCESS classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 5

EHE Module: Status of Property Data Element Worksheet

Classification	Description	Score
Non-DoD control	- The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	5
Scheduled for transfer from DoD control	- The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	- The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
Status of Property	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific characteristics used to select the EASE OF ACCESS classification:

Reference (Section, Page #):	5.2,5-1/6.1,6-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 6

EHE Module: Population Density Data Element Worksheet

Classification	Description	Score
> 500 persons per square mile	- There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	5
100- 500 persons per square mile	- There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	- There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
Population Density	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	1

Site-specific characteristics that helped select the POPULATION DENSITY classification

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 7

EHE Module: Population Near Hazard Data Element Worksheet

Classification	Description	Score
26 or more inhabited structures	- There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	- There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	- There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	- There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	- There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	- There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
Population Near Hazard	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific data characteristics used to select the POPULATION NEAR HAZARD classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 8

EHE Module: Types of Activities/Structures Data Element Worksheet

Classification	Description	Score
Residential. educational, or subsitence	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	- Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	- There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
Types of Activites/Structures	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	5

Site-specific data characteristics used to select the LOCATION OF MUNITIONS classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Worksheet

Classification	Description	Score
Ecological and cultural resources present	- There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	- There are ecological resources present on the MRS.	3
Cultural resources present	- There are cultural resources present on the MRS.	3
No ecological or cultural resources present	- There are no ecological resources or cultural resources present on the MRS.	0
Ecological and/or Cultural Resources	**DIRECTIONS: Record the single highest score from above in the box to the right (maximum score = 5).**	0

Site-specific characteristics used to select the ECOLOGICAL AND/OR CULTURAL RESOURCES classification:

Reference (Section, Page #):	5.4,5-1/2.1,2-1/5.1,5-1

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 10

Determining the EHE Module Rating

	Source	Score
Explosive Hazard Factor Data Elements		
Munitions Type	Table 1	2
Source of Hazard	Table 2	1
Accessibility Factor Data Elements		
Information on Location of Munitions	Table 3	1
Ease of Access	Table 4	10
Status of Property	Table 5	5
Receptors Factor Data Elements		
Population Density	Table 6	1
Population Near Hazard	Table 7	5
Types of Activities/Structures	Table 8	5
Ecological and/or Cultural Resources	Table 9	0
	Sum	30

EHE Module Value	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Explosive Hazard
	Evaluation Pending

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 20

Determining the CHE Module Rating

	Source	Score
CWM Hazard Factor Data Elements		
CWM Configuration	Table 11	N/A
Source of CWM	Table 12	N/A
Accessibility Factor Data Elements		
Information on Location of Munitions	Table 13	N/A
Ease of Access	Table 14	N/A
Status of Property	Table 15	N/A
Receptors Factor Data Elements		
Population Density	Table 16	N/A
Population Near Hazard	Table 17	N/A
Types of Activities/Structures	Table 18	N/A
Ecological and/or Cultural Resources	Table 19	N/A
	Sum	N/A

CHE Module Value	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected CWM Hazard
	Evaluation Pending

Tables 11-19 were not generated because there is no known or suspected CWM hazard at the MRS.

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 21

HHE Module: Groundwater Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	[illegible]
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	[illegible]

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:

No groundwater samples were collected because no significant impact to groundwater was expected. Groundwater at 250ft bgs.

Reference (Section, Page #):

8.2.3,8-6

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 22

HHE Module: Surface Water - Human Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	

Identified	Identified receptors to have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No surface water on/near MRS.

Reference (Section, Page #):
3.3,3-2/8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 23

HHE Module: Sediment - Human Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	NA
Identified	Identified receptors to have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	NA

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No bodies of water on/near MRS.

Reference (Section, Page #):
3.3,3-28/8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 24

HHE Module: Surface Water - Ecological Data Element Worksheet

Contaminant	Maximum Concentration (ug/L)	Comparison Value (ug/L)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No surface water on/near MRS.

Reference (Section, Page #):
3.3,3-2/8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 25

HHE Module: Sediment - Ecological Endpoint Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	CHF Value	Contamination Hazard Factor (CHF)	No Data
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		CHF VALUE	NA

Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	
Identified	Identified receptors to have access to sediment to which contamination has moved or can move.	H
Potential	potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF

Sample comments:

No bodies of water on/near MRS.

Reference (Section, Page #):

3.3,3-28/8.2.2,8-5

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 26

HHE Module: Soil - Data Element Worksheet

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Contamination Hazard Factor (CHF)**	**No Data**
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CHF Value		**CHF VALUE**	**NA**

Evident	Analytical data or observable evidence indicates that contamination in the soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the soil to a potential point of exposure (possibly due to geological structures or physical controls).	L
Migratory Pathway Factor	The single highest value from above in the box to the right (maximum value = H).	

Identified	Identified receptors to have access to soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to soil to which contamination has moved or can move.	L
Receptor Factor	The single highest value from above in the box to the right (maximum value = H).	

Alternative Module Ratings	Prioritization No Longer Required
	No Known or Suspected Hazard

Rationale for Selection of MPF:

Rationale for Selection of RF:

Sample comments:
No evidence of munitions debris near edge of MRA bordering off-site portion of MRA. No samples collected due to no evidence of munitions debris in vicinity.

Reference (Section, Page #):
5.6.3.1, 5-11 /5.6.3.2.1, 5-16 to 5-19

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 27

Determining the HHE Module Rating

Media Source	Contaminant Hazard Factor	Migratory Pathway Factor Value	Receptor Factor Value	3-Letter Ratings (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)	NA	NA	NA	NA	NA
Surface Water/Human Endpoint (Table 22)	NA	NA	NA	NA	NA
Sediment/Human Endpoint (Table 23)	NA	NA	NA	NA	NA
Surface Water/Ecological Endpoint (Table 24)	NA	NA	NA	NA	NA
Sediment/Ecological Endpoint (Table 25)	NA	NA	NA	NA	NA
Soil (Table 26)	NA	NA	NA	NA	NA

HHE Ratings (for reference only)	
HHH	A
HHM	B
HHL HMM	C
HML MMM	D
HLL MML	E
MLL	F
LLL	G
Alternative Module Ratings	Prioritization No Longer Required No Known or Suspected MC Hazard Evaluation Pending
HHE Module Ratings	N/A

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

Table 28
MRS Priority

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E HHE_EVALUATION_PENDING	6
F	7	G	7	F	7
G	8			G	8
Prioritization No Longer Required		Prioritization No Longer Required		Prioritization No Longer Required	
No Known or Suspected Hazard		No Known or Suspected Hazard		No Known or Suspected Hazard	
Evaluation Pending		Evaluation Pending		Evaluation Pending	
			MRS Priority	8	

Installation: CANNON AIR FORCE BASE
MAJCOM: AFSOC **MRAID:** TS835 **MRS:** TS835b
FFID: NM7572124454

APPENDIX K

RACER Data Input Worksheets

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COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

Installation: CANNON AIR FORCE BASE

City: Clovis State: NM County: Curry County

Site Name: 1940s Skeet Range - TS835

SITE DIMENSIONS:

Acreage: 2.45 Length (Feet): 490 Width (Feet): 550 Perimeter (Feet): 1881.67

SITE DIMENSIONS REFERENCES:

Section, Page #: 2.6, 2-12

CONTAMINANTS OF CONCERN:

- [ ] Acids/caustics
- [ ] Asbestos
- [ ] Fuels
- [ ] SVOCs
- [ ] VOCs
- [ ] PCBs
- [ ] Ordnance (not residual)
- [ ] Ordnance (residual)
- [ ] Pesticides
- [x] Metals
- [ ] Low Level Radioactive
- [x] Other*

*Description of other: Polynuclear Aromatic Hydrocarbons (PAHs)

CONTAMINANTS OF CONCERN REFERENCES:

Section:

5.6.3.1,5-11 to 5-13/5.6.3.2.1,5-15 to 5-19

Page:

RANGE TYPES:

- [ ] Air to Air
- [ ] Air to Ground
- [ ] Artillery
- [ ] Bombing
- [ ] Burial Pits
- [ ] Guided Missiles
- [ ] Hand Grenade
- [ ] OB/OD
- [ ] Mortar
- [ ] Multiple/combined Use
- [ ] Rifle Grenade, Anti-tank Rocket
- [x] Small Arm
- [ ] Other

*Description of other:

RANGE TYPES REFERENCES:

Section:

5.2,5-1

Page:

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

ORDNANCE TYPES:

- [ ] Bombs, high explosive
- [ ] Bombs (WP, Incendiary, Photoflash)
- [ ] Bombs, Practice
- [ ] Hand Grenades, Live
- [ ] Hand Grenades, Practice
- [ ] Ground Rockets, Rifle Grenades, Live
- [ ] Ground Rockets, Rifle Grenades, Practice
- [ ] Medium Caliber (20mm, 25mm, 30mm)
- [ ] Large Caliber (37mm and larger)
- [ ] Mortars
- [ ] Aerial Rockets (Live)
- [ ] Aerial Rockets, Practice
- [ ] Guided missil
- [ ] Pyrotechnics
- [x] Small Arms
- [ ] Landmines
- [ ] Demolition Materials
- [ ] Other*

*Description of other:

ORDNANCE TYPES REFERENCES:

Section, Page #: *5.2,5-1*

ANOMALY DENSITY: LOW

ANOMALY DENSITY REFERENCES:

Section, Page #: *4.3.2,4-9*

AREA OF CONTAMINATION:

Depth to base of contamination (feet): 1

Depth to groundwater contamination (feet):

Depth to water table (feet): 250

AREA OF CONTAMINATION REFERENCES:

Section, Page #: *5.6.3.2.1,5-16/8.2.3.1,8-6*

TYPE OF AQUIFER:
UNCONFINED

SOIL TYPE:
Silt/Silty-Clay Mixture

TOPOGRAPHY:
Flat

VEGETATION TYPE:
Low grass or few shrubs

AQUIFER, SOIL, TOPOGRAPHY, VEGETATION INFORMATION REFERENCES:

Section, Page #: *3.2,3-1/ 3.4,3-2*

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

IMPACTED MEDIA:

- [x] Surface soil
- [ ] Surface water
- [x] Subsurface
- [ ] Sediments
- [ ] Groundwater

IMPACTED MEDIA REFERENCES:

Section, Page #: *5.6.3.2.1,5-6*

TYPICAL SAFETY LEVEL USED AT THE SITE:

SAFETY LEVEL REFERENCES:

Section, Page #:

ADDITIONAL INFORMATION THAT MAY INFLUENCE COST:

ADDITIONAL INFORMATION REFERENCES:

Section, Page #:

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

Installation: CANNON AIR FORCE BASE

City: Clovis State: NM County: Curry County

Site Name: 1940s Skeet Range - TS835a

SITE DIMENSIONS:

Acreage: 15.72 Length (Feet): 490 Width (Feet): 550 Perimeter (Feet): 1881.67

SITE DIMENSIONS REFERENCES:

Section, Page #: *2.6, 2-12*

CONTAMINANTS OF CONCERN:

- [ ] Acids/caustics
- [ ] Asbestos
- [ ] Fuels
- [ ] SVOCs
- [ ] VOCs
- [ ] PCBs
- [ ] Ordnance (not residual)
- [ ] Ordnance (residual)
- [ ] Pesticides
- [x] Metals
- [ ] Low Level Radioactive
- [x] Other*

*Description of other: Polynuclear Aromatic Hydrocarbons (PAHs)

CONTAMINANTS OF CONCERN REFERENCES:

Section:

5.6.3.1,5-11 to 5-13/5.6.3.2.1,5-15 to 5-19

Page:

RANGE TYPES:

- [ ] Air to Air
- [ ] Air to Ground
- [ ] Artillery
- [ ] Bombing
- [ ] Burial Pits
- [ ] Guided Missiles
- [ ] Hand Grenade
- [ ] OB/OD
- [ ] Mortar
- [ ] Multiple/combined Use
- [ ] Rifle Grenade, Anti-tank Rocket
- [x] Small Arm
- [ ] Other

*Description of other:

RANGE TYPES REFERENCES:

Section:

5.2,5-1

Page:

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

ORDNANCE TYPES:

- [ ] Bombs, high explosive
- [ ] Bombs (WP, Incendiary, Photoflash)
- [ ] Bombs, Practice
- [ ] Hand Grenades, Live
- [ ] Hand Grenades, Practice
- [ ] Ground Rockets, Rifle Grenades, Live
- [ ] Ground Rockets, Rifle Grenades, Practice
- [ ] Medium Caliber (20mm, 25mm, 30mm)
- [ ] Large Caliber (37mm and larger)
- [ ] Mortars
- [ ] Aerial Rockets (Live)
- [ ] Aerial Rockets, Practice
- [ ] Guided missil
- [ ] Pyrotechnics
- [x] Small Arms
- [ ] Landmines
- [ ] Demolition Materials
- [ ] Other*

*Description of other:

ORDNANCE TYPES REFERENCES:
Section, Page #: *5.2,5-1*

ANOMALY DENSITY: LOW

ANOMALY DENSITY REFERENCES:
Section, Page #: *4.3.2,4-9*

AREA OF CONTAMINATION:

Depth to base of contamination (feet): 1

Depth to groundwater contamination (feet):

Depth to water table (feet): 250

AREA OF CONTAMINATION REFERENCES:
Section, Page #: *5.6.3.2.1,5-16/8.2.3.1,8-6*

TYPE OF AQUIFER:
UNCONFINED

SOIL TYPE:
Silt/Silty-Clay Mixture

TOPOGRAPHY:
Flat

VEGETATION TYPE:
Low grass or few shrubs

AQUIFER, SOIL, TOPOGRAPHY, VEGETATION INFORMATION REFERENCES:
Section, Page #: *3.2,3-1/ 3.4,3-2*

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

IMPACTED MEDIA:

- [x] Surface soil
- [ ] Surface water
- [x] Subsurface
- [ ] Sediments
- [ ] Groundwater

IMPACTED MEDIA REFERENCES:

Section, Page #: 5.6.3.2.1,5-6

TYPICAL SAFETY LEVEL USED AT THE SITE:

SAFETY LEVEL REFERENCES:

Section, Page #:

ADDITIONAL INFORMATION THAT MAY INFLUENCE COST:

ADDITIONAL INFORMATION REFERENCES:

Section, Page #:

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

Installation: CANNON AIR FORCE BASE

City: Clovis State: NM County: Curry County

Site Name: 1940s Skeet Range - TS835b

SITE DIMENSIONS:

Acreage: 6.32 Length (Feet): 490 Width (Feet): 550 Perimeter (Feet): 1881.67

SITE DIMENSIONS REFERENCES:

Section, Page #: 2.6, 2-12

CONTAMINANTS OF CONCERN:

- [ ] Acids/caustics
- [ ] Asbestos
- [ ] Fuels
- [ ] SVOCs
- [ ] VOCs
- [ ] PCBs
- [ ] Ordnance (not residual)
- [ ] Ordnance (residual)
- [ ] Pesticides
- [x] Metals
- [ ] Low Level Radioactive
- [x] Other*

*Description of other: Polynuclear Aromatic Hydrocarbons (PAHs)

CONTAMINANTS OF CONCERN REFERENCES:

Section:

5.6.3.1,5-11 to 5-13/5.6.3.2.1,5-15 to 5-19

Page:

RANGE TYPES:

- [ ] Air to Air
- [ ] Air to Ground
- [ ] Artillery
- [ ] Bombing
- [ ] Burial Pits
- [ ] Guided Missiles
- [ ] Hand Grenade
- [ ] OB/OD
- [ ] Mortar
- [ ] Multiple/combined Use
- [ ] Rifle Grenade, Anti-tank Rocket
- [x] Small Arm
- [ ] Other

*Description of other:

RANGE TYPES REFERENCES:

Section:

5.2,5-1

Page:

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

ORDNANCE TYPES:

- [ ] Bombs, high explosive
- [ ] Bombs (WP, Incendiary, Photoflash)
- [ ] Bombs, Practice
- [ ] Hand Grenades, Live
- [ ] Hand Grenades, Practice
- [ ] Ground Rockets, Rifle Grenades, Live
- [ ] Ground Rockets, Rifle Grenades, Practice
- [ ] Medium Caliber (20mm, 25mm, 30mm)
- [ ] Large Caliber (37mm and larger)
- [ ] Mortars
- [ ] Aerial Rockets (Live)
- [ ] Aerial Rockets, Practice
- [ ] Guided missil
- [ ] Pyrotechnics
- [x] Small Arms
- [ ] Landmines
- [ ] Demolition Materials
- [ ] Other*

*Description of other:

ORDNANCE TYPES REFERENCES:

Section, Page #: *5.2,5-1*

ANOMALY DENSITY: LOW

ANOMALY DENSITY REFERENCES:

Section, Page #: *4.3.2,4-9*

AREA OF CONTAMINATION:

Depth to base of contamination (feet):

Depth to groundwater contamination (feet):

Depth to water table (feet): 250

AREA OF CONTAMINATION REFERENCES:

Section, Page #: *5.6.3.2.1,5-16/8.2.3.1,8-6*

TYPE OF AQUIFER:
UNCONFINED

SOIL TYPE:
Sand-Silt Mixture/Sand-Clay Mixture

TOPOGRAPHY:
Flat

VEGETATION TYPE:
Low grass or few shrubs

AQUIFER, SOIL, TOPOGRAPHY, VEGETATION INFORMATION REFERENCES:

Section, Page #: *3.2,3-1/ 3.4,3-2*

COMPREHENSIVE SITE EVALUATION: RACER DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

IMPACTED MEDIA:

- [x] Surface soil
- [ ] Surface water
- [x] Subsurface
- [ ] Sediments
- [ ] Groundwater

IMPACTED MEDIA REFERENCES:

Section, Page #: *5.6.3.2.1,5-6*

TYPICAL SAFETY LEVEL USED AT THE SITE:

SAFETY LEVEL REFERENCES:

Section, Page #: *N/A*

ADDITIONAL INFORMATION THAT MAY INFLUENCE COST:

ADDITIONAL INFORMATION REFERENCES:

Section, Page #: *N/A*

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APPENDIX L

EESOH-MIS Data Input Worksheet

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COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

Installation: CANNON AIR FORCE BASE

City: Clovis State: NM County: Curry County

Site Name: 1940s Skeet Range - TS835

Site Description:

MRS TS835 is located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area. MRS TS835 is the portion of MRA TS835 where munitions debris was found during the Comprehensive Site Evaluation Phase II visual survey. The MRA range was oriented to the northeast. MRS TS835 does not contain any structures. The area generally consists of an open field with a sparse vegetative cover of low grasses. The only remnants of the range observed on-base include clay target debris and several slabs of concrete. The topography is relatively flat, sloping gently to the southeast. The soil type at the MRS was generally fine sandy loam.

GENERAL INFORMATION REFERENCES:

Section, Page #: *2.1,2-1/2.3.1-2.3.2,2-5/2.4,2-6,8.0, 8-1 to 8-6/9.2,9-1/10.2,10-1,10.3,10-1*

POINT OF CONTACT INFORMATION

Last Name: Higginbotham
First Name: Mathew
Organization: 27 SOCES/CEAN
Phone #: (575) 784-1092
Email: matthew.higginbotham@cannon.af.

Address: 506 N DL Ingram Blvd
City: Cannon AFB
State: NM
Zip: 88103-5003

POINT OF CONTACT REFERENCES:

Section, Page #: *N/A*

LOCATION:

City: Clovis
State: NM
County: Curry County

Latitude: 34.3978279583
Longitude: -103.29952967

LOCATION REFERENCES:

Section, Page #: *5.1, 5-1*

AREA:

Total Acreage: 2.45

Acreage confirmed as containing UXO:
Acreage suspected or potentially containing UXO:
Acreage confirmed as NOT containing UXO: 2.45

AREA REFERENCES:

Section, Page #: *4.1,4-1 to 4-2*

CLASSIFICATION:

CLASSIFICATION REFERENCES:

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

Installation: CANNON AIR FORCE BASE

- [ ] Testing
- [ ] Training
- [ ] Treatment OBOD RCRA
- [ ] Disposal RCRA
- [ ] Buffer Area
- [x] Small Arms Range
- [ ] Skeet Range
- [ ] Waste Military Munitions
- [ ] Other*

Section: 5.2, 5-1

Page:

*Description of other:

RANGE TYPES:

- [ ] Air to Air
- [ ] Air to water
- [ ] Air to land
- [ ] Land to air
- [x] Land to land
- [ ] Land to water
- [ ] Other*

*Description of other: 5.1,5.2, 5-

RANGE/SITE TYPES REFERENCES:

Section, Page #: 5.1,5.2, 5-1

ORDNANCE TYPES AND RELATED ANOMALY DENSITY:

Ordnance Types (check all that apply)		Contaminant is a Chemical residue of munitions?	Density
Medium/Large Caliber (20 mm and larger)	[ ]	[ ]	
Explosive grenades (hand or rifle)	[ ]	[ ]	
Explosive landmine	[ ]	[ ]	
Explosive rockets	[ ]	[ ]	
Guided Missiles	[ ]	[ ]	
Explosive detonators	[ ]	[ ]	
Blasting caps	[ ]	[ ]	
Practice grenades (with spotting charges)	[ ]	[ ]	
Practice landmines (with spotting charges)	[ ]	[ ]	
Small arms complete round (.22-.50 cal)	[ ]	[ ]	
Small arms, expended	[x]	[ ]	LOW
Practice ordnance (without spotting charges)	[ ]	[ ]	
White phosphorous	[ ]	[ ]	
Incendiary material	[ ]	[ ]	
Primary or initiating explosives	[ ]	[ ]	

Ordnance Types (check all that apply)		Contaminant is a Chemical residue of munitions?	Density
Demolition charges	[ ]	[ ]	
Military dynamite	[ ]	[ ]	
Less sensitive explosives (Ammonium Nitrate, etc.)	[ ]	[ ]	
Solid or liquid propellants	[ ]	[ ]	
Toxic chem. agents (choking, nerve, blood, blister)	[ ]	[ ]	
War gas identification sets	[ ]	[ ]	
Radiological ordnance (e.g., depleted Uranium)	[ ]	[ ]	
Riot control agents (vomiting, tear)	[ ]	[ ]	
Bombs (explosive)	[ ]	[ ]	
Bombs (practice)	[ ]	[ ]	
Fuses, Boosters, Bursters	[ ]	[ ]	
Flares, signals, & simulators (other than white phos.)	[ ]	[ ]	
Torpedoes/Sea Mines	[ ]	[ ]	
Secondary explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	[ ]	[ ]	

ORDNANCE TYPES REFERENCES:

Section, Page #: 5.2, 5-1

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

Installation: CANNON AIR FORCE BASE

ANOMALY DENSITY REFERENCES:

Section, Page #: *5.6.1, 5-2*

GENERAL MEDIA:

Predominant Soil Type: Sand-Silt/Sand-Clay Predominant Topography: Flat

Predominant Vegetation: Low grass and few shrubs

GENERAL MEDIA REFERENCES:

Section, Page #: *5.1,5-1*

GROUNDWATER:

Potential for contamination of drinking water: NO POTENTIAL

Depth to Groundwater (feet): 250

Is the MRS located above a drinking water aquifer? YES

Sole source aquifer? No

GROUNDWATER REFERENCES:

Section, Page #: *8.2.3.2, 8-6*

ARCHAEOLOGICAL/ECOLOGICAL:

Threatened or endangered species present? Yes • N

Archaeological or cultural sites present? Yes • N

ARCHEOLOGICAL/ECOLOGICAL REFERENCES:

Section: *5.8.2,5.8.3,5-30*

WETLANDS:

Are there any wetland areas associated with this site? NO If yes, please list acreage:

WETLANDS REFERENCES:

Section, Page #: *5.8.1,5-30*

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

Installation: CANNON AIR FORCE BASE

ENVIRONMENTAL RESPONSE:

Have environmental response activities been initiated/conducted on this MRS? ☐ Yes ☒ No

If yes, what is the scope of the response activities? ☐ Past practices ☐ Chemical contamination ☐ Current practices ☐ Ordnance and explosives, including UXO

If yes, what is the status of the response activities? ☐ Data collection ☐ Investigation ☐ Response/remedial action ☐ Monitoring ☐ Close out ☐ Operation and maintenance

If yes, is contamination monitoring (i.e., groundwater sampling and analysis) needed?

If yes, under what authority were/are response actions conducted?

ENVIRONMENTAL RESPONSE REFERENCES:

Section, Page #: 2.6,2-9

UXO RESPONSE:

What types of UXO response actions have been initiated/conducted on the site?

☑ None ☐ Emergency response actions ☐ UXO response actions associated with ERP activities

☐ Unknown ☐ Routine range clearance/maintenance ☑ Non-time-critical removal actions with Engineering Evaluation/Cost Analysis

☐ Other* ☐ Time-critical removal actions

*Please specify other:

UXO RESPONSE REFERENCES:

Section: 2.6, 2-11 *Page:*

LAND USE RESTRICTIONS: ☐ No public access ☐ Unrestricted public access ☐ Limited public access ☑ Restricted public access

ACCESS CONTROLS: ☑ No controls ☐ Locked gates ☐ Access signs ☐ Log book ☐ Fencing ☐ Security patrol

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835

Installation: CANNON AIR FORCE BASE

TRANSFERRED OR TRANSFERRING RANGES:

For transferred and transferring ranges, what is the nature of the transfer?

Lease to:	Ownership transfer to:	Additional reasons:
☐ Federal agency	☐ Federal agency	☐ Lease termination
☐ State government	☐ State government	☐ Revocation of withdrawn land
☐ Local government	☐ Local government	☐ Other***
☐ Private entity	☐ Private entity	
☐ Tribal	☐ Tribal	

***Please specify:

LAND USE, ACCESS CONTROL, TRANSFERRED/TRANSFERRING RANGES REFERENCES:

Section, Page #: *5.4, 5-1*

LAND USE INTEREST:

☑ DOD	☐ Public sector
☐ Federal agency	☐ Tribal
☐ State government	☐ Other****
☐ Local government	

****Please specify:

LAND USE INTEREST REFERENCES:

Section, Page #: *2.1,2-1*

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

Installation: CANNON AIR FORCE BASE

City: Clovis State: NM County: Curry County

Site Name: 1940s Skeet Range - TS835a

Site Description:

MRS TS835a is located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area. MRS TS835a is the on-base portion of MRA TS835 where no munitions debris was discovered during the Comprehensive Site Evaluation Phase II visual survey. The MRA range was oriented to the northeast. MRS TS835a does not contain any structures. The area generally consists of an open field with a sparse vegetative cover of low grasses. The topography is relatively flat, sloping gently to the southeast. The soil type at the MRS was generally fine sandy loam.

GENERAL INFORMATION REFERENCES:

Section, Page #: *2.1,2-1/2.3.1-2.3.2,2-5/2.4,2-6/8.0, 8-1 to 8-6/9.2,9-1/10.2,10-1,10.3,10-1*

POINT OF CONTACT INFORMATION

Last Name: HIGGINBOTHAM
First Name: MATHEW
Organization: 27 SOCES/CEAN
Phone #: (575) 784-1092
Email: matthew.higginbotham@cannon.af.

Address: 506 N DL INGRAM BLVD
City: CANNON AFB
State: NM
Zip: 88103-5003

POINT OF CONTACT REFERENCES:

Section, Page #: *N/A*

LOCATION: City: Clovis
State: NM
County: Curry County

Latitude: 34.3978279583
Longitude: -103.29952967

LOCATION REFERENCES:

Section, Page #: *5.1, 5-1*

AREA:

Total Acreage: 15.72

Acreage confirmed as containing UXO: 0
Acreage suspected or potentially containing UXO: 0
Acreage confirmed as NOT containing UXO: 15.72

AREA REFERENCES:

Section, Page #: *4.1,4-1 to 4-2*

CLASSIFICATION:

CLASSIFICATION REFERENCES:

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

Installation: CANNON AIR FORCE BASE

- [ ] Testing
- [ ] Training
- [ ] Treatment OBOD RCRA
- [ ] Disposal RCRA
- [ ] Buffer Area
- [x] Small Arms Range
- [ ] Skeet Range
- [ ] Waste Military Munitions
- [ ] Other*

Section: 5.2, 5-1

Page:

*Description of other:

RANGE TYPES:

- [ ] Air to Air
- [ ] Air to water
- [ ] Air to land
- [ ] Land to air
- [x] Land to land
- [ ] Land to water
- [ ] Other*

*Description of other:

RANGE/SITE TYPES REFERENCES:

Section, Page #: 5.1,5.2, 5-1

ORDNANCE TYPES AND RELATED ANOMALY DENSITY:

Ordnance Types (check all that apply)		Contaminant is a Chemical residue of munitions?	Density
Medium/Large Caliber (20 mm and larger)	[ ]	[ ]	
Explosive grenades (hand or rifle)	[ ]	[ ]	
Explosive landmine	[ ]	[ ]	
Explosive rockets	[ ]	[ ]	
Guided Missiles	[ ]	[ ]	
Explosive detonators	[ ]	[ ]	
Blasting caps	[ ]	[ ]	
Practice grenades (with spotting charges)	[ ]	[ ]	
Practice landmines (with spotting charges)	[ ]	[ ]	
Small arms complete round (.22-.50 cal)	[ ]	[ ]	
Small arms, expended	[x]	[ ]	LOW
Practice ordnance (without spotting charges)	[ ]	[ ]	
White phosphorous	[ ]	[ ]	
Incendiary material	[ ]	[ ]	
Primary or initiating explosives	[ ]	[ ]	

Ordnance Types (check all that apply)		Contaminant is a Chemical residue of munitions?	Density
Demolition charges	[ ]	[ ]	
Military dynamite	[ ]	[ ]	
Less sensitive explosives (Ammonium Nitrate, etc.)	[ ]	[ ]	
Solid or liquid propellants	[ ]	[ ]	
Toxic chem. agents (choking, nerve, blood, blister)	[ ]	[ ]	
War gas identification sets	[ ]	[ ]	
Radiological ordnance (e.g., depleted Uranium)	[ ]	[ ]	
Riot control agents (vomiting, tear)	[ ]	[ ]	
Bombs (explosive)	[ ]	[ ]	
Bombs (practice)	[ ]	[ ]	
Fuses, Boosters, Bursters	[ ]	[ ]	
Flares, signals, & simulators (other than white phos.)	[ ]	[ ]	
Torpedoes/Sea Mines	[ ]	[ ]	
Secondary explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	[ ]	[ ]	

ORDNANCE TYPES REFERENCES:

Section, Page #: 5.2, 5-1

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

Installation: CANNON AIR FORCE BASE

ANOMALY DENSITY REFERENCES:

Section, Page #: *5.6.1, 5-2*

GENERAL MEDIA:

Predominant Soil Type: Sand-Silt/Sand-Clay Predominant Topography: Flat

Predominant Vegetation: Low grass and few shrubs

GENERAL MEDIA REFERENCES:

Section, Page #: *5.1,5-1*

GROUNDWATER:

Potential for contamination of drinking water: NO POTENTIAL

Depth to Groundwater (feet): 250

Is the MRS located above a drinking water aquifer? YES

Sole source aquifer? No

GROUNDWATER REFERENCES:

Section, Page #: *8.2.3.2, 8-6*

ARCHAEOLOGICAL/ECOLOGICAL:

Threatened or endangered species present? ○ Yes ● N

Archaeological or cultural sites present? ○ Yes ● N

ARCHEOLOGICAL/ECOLOGICAL REFERENCES:

Section: *5.8.2,5.8.3,5-30*

WETLANDS:

Are there any wetland areas associated with this site? NO If yes, please list acreage:

WETLANDS REFERENCES:

Section, Page #: *5.8.1,5-30*

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

Installation: CANNON AIR FORCE BASE

ENVIRONMENTAL RESPONSE:

Have environmental response activities been initiated/conducted on this MRS? ○ Yes ● No

If yes, what is the scope of the response activities?
- ☐ Past practices
- ☐ Chemical contamination
- ☐ Current practices
- ☐ Ordnance and explosives, including UXO

If yes, what is the status of the response activities?
- ☐ Data collection
- ☐ Investigation
- ☐ Response/remedial action
- ☐ Monitoring
- ☐ Close out
- ☐ Operation and maintenance

If yes, is contamination monitoring (i.e., groundwater sampling and analysis) needed?

If yes, under what authority were/are response actions conducted?

ENVIRONMENTAL RESPONSE REFERENCES:

Section, Page #: 2.6,2-9

UXO RESPONSE:

What types of UXO response actions have been initiated/conducted on the site?

- ☑ None
- ☐ Unknown
- ☐ Other*
- ☐ Emergency response actions
- ☐ Routine range clearance/maintenance
- ☐ Time-critical removal actions
- ☐ UXO response actions associated with ERP activities
- ☑ Non-time-critical removal actions with Engineering Evaluation/Cost Analysis

*Please specify other:

UXO RESPONSE REFERENCES:

Section: 2.6, 2-11 *Page:*

LAND USE RESTRICTIONS:
- ☐ No public access
- ☐ Unrestricted public access
- ☐ Limited public access
- ☑ Restricted public access

ACCESS CONTROLS:
- ☑ No controls
- ☐ Locked gates
- ☐ Access signs
- ☐ Log book
- ☐ Fencing
- ☐ Security patrol

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835a

Installation: CANNON AIR FORCE BASE

TRANSFERRED OR TRANSFERRING RANGES:

For transferred and transferring ranges, what is the nature of the transfer?

Lease to:	Ownership transfer to:	Additional reasons:
☐ Federal agency	☐ Federal agency	☐ Lease termination
☐ State government	☐ State government	☐ Revocation of withdrawn land
☐ Local government	☐ Local government	☐ Other***
☐ Private entity	☐ Private entity	
☐ Tribal	☐ Tribal	

***Please specify:

LAND USE, ACCESS CONTROL, TRANSFERRED/TRANSFERRING RANGES REFERENCES:

Section, Page #: *5.4, 5-1*

LAND USE INTEREST:

☑ DOD	☐ Public sector
☐ Federal agency	☐ Tribal
☐ State government	☐ Other****
☐ Local government	

****Please specify:

LAND USE INTEREST REFERENCES:

Section, Page #:

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

Installation: CANNON AIR FORCE BASE

City: Clovis State: NM County: Curry County

Site Name: 1940s Skeet Range - TS835b

Site Description:

MRS TS835b is located in the northeast portion of the Base, just north of the Former Ordnance/Current Munitions Storage Area. MRS TS835b is the off-base portion of MRA TS835, which belongs to the Rajen Dairy. The MRS range was oriented to the northeast. The soil type at the MRS was generally fine sandy loam.

GENERAL INFORMATION REFERENCES:

Section, Page #: *2.1,2-1/2.3.1-2.3.2,2-5/2.4,2-6,8.0, 8-1 to 8-6/9.2,9-1/10.2,10-1,10.3,10-1*

POINT OF CONTACT INFORMATION

Last Name: Higginbotham
First Name: Mathew
Organization: 27 SOCES/CEAN
Phone #: (575) 784-1092
Email: matthew.higginbotham@cannon.af.

Address: 506 N DL Ingram Blvd
City: Cannon AFB
State: NM
Zip: 88103-5003

POINT OF CONTACT REFERENCES:

Section, Page #: *N/A*

LOCATION:

City: Clovis
State: NM
County: Curry County

Latitude: 34.3978279583
Longitude: -103.29952967

LOCATION REFERENCES:

Section, Page #: *5.1, 5-1*

AREA:

Total Acreage: 6.32

Acreage confirmed as containing UXO:
Acreage suspected or potentially containing UXO:
Acreage confirmed as NOT containing UXO: 6.32

AREA REFERENCES:

Section, Page #: *4.1,4-1 to 4-2*

CLASSIFICATION:

- [ ] Testing
- [ ] Training
- [ ] Treatment OBOD RCRA
- [ ] Disposal RCRA
- [ ] Buffer Area
- [x] Small Arms Range
- [ ] Skeet Range
- [ ] Waste Military Munitions
- [ ] Other*

*Description of other:

CLASSIFICATION REFERENCES:

Section: *5.2, 5-1*

Page:

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

Installation: CANNON AIR FORCE BASE

RANGE TYPES:

☐ Air to Air ☐ Air to land ☑ Land to land ☐ Other*

☐ Air to water ☐ Land to air ☐ Land to water

*Description of other:

RANGE/SITE TYPES REFERENCES:

Section, Page #: 5.1,5.2, 5-1

ORDNANCE TYPES AND RELATED ANOMALY DENSITY:

Ordnance Types (check all that apply)		Contaminant is a Chemical residue of munitions?	Density
Medium/Large Caliber (20 mm and larger)	☐	☐	
Explosive grenades (hand or rifle)	☐	☐	
Explosive landmine	☐	☐	
Explosive rockets	☐	☐	
Guided Missiles	☐	☐	
Explosive detonators	☐	☐	
Blasting caps	☐	☐	
Practice grenades (with spotting charges)	☐	☐	
Practice landmines (with spotting charges)	☐	☐	
Small arms complete round (.22-.50 cal)	☐	☐	
Small arms, expended	☑	☐	LOW
Practice ordnance (without spotting charges)	☐	☐	
White phosphorous	☐	☐	
Incendiary material	☐	☐	
Primary or initiating explosives	☐	☐	

Ordnance Types (check all that apply)		Contaminant is a Chemical residue of munitions?	Density
Demolition charges	☐	☐	
Military dynamite	☐	☐	
Less sensitive explosives (Ammonium Nitrate, etc.)	☐	☐	
Solid or liquid propellants	☐	☐	
Toxic chem. agents (choking, nerve, blood, blister)	☐	☐	
War gas identification sets	☐	☐	
Radiological ordnance (e.g., depleted Uranium)	☐	☐	
Riot control agents (vomiting, tear)	☐	☐	
Bombs (explosive)	☐	☐	
Bombs (practice)	☐	☐	
Fuses, Boosters, Bursters	☐	☐	
Flares, signals, & simulators (other than white phos.)	☐	☐	
Torpedoes/Sea Mines	☐	☐	
Secondary explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	☐	☐	

ORDNANCE TYPES REFERENCES:

Section, Page #: 5.2, 5-1

ANOMALY DENSITY REFERENCES:

Section, Page #: 5.6.1, 5-2

GENERAL MEDIA:

Predominant Soil Type: Silt/Silty Clay Predominant Topography: Flat

Predominant Vegetation: Low grass and few shrubs

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

Installation: CANNON AIR FORCE BASE

GENERAL MEDIA REFERENCES:

Section, Page #: *5.1,5-1*

GROUNDWATER:

Potential for contamination of drinking water: NO POTENTIAL

Depth to Groundwater (feet): 250

Is the MRS located above a drinking water aquifer? YES

Sole source aquifer? No

GROUNDWATER REFERENCES:

Section, Page #: *8.2.3.2, 8-6*

ARCHAEOLOGICAL/ECOLOGICAL:

Threatened or endangered species present? ○ Yes ● N

Archaeological or cultural sites present? ○ Yes ● N

ARCHEOLOGICAL/ECOLOGICAL REFERENCES:

Section: *5.8.2,5.8.3,5-30/5.8.1,5-30*

WETLANDS:

Are there any wetland areas associated with this site? NO If yes, please list acreage:

WETLANDS REFERENCES:

Section, Page #: *5.8.1,5-30*

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

Installation: CANNON AIR FORCE BASE

ENVIRONMENTAL RESPONSE:

Have environmental response activities been initiated/conducted on this MRS? ○ Yes ● No

If yes, what is the scope of the response activities?
- ☐ Past practices
- ☐ Chemical contamination
- ☐ Current practices
- ☐ Ordnance and explosives, including UXO

If yes, what is the status of the response activities?
- ☐ Data collection
- ☐ Investigation
- ☐ Response/remedial action
- ☐ Monitoring
- ☐ Close out
- ☐ Operation and maintenance

If yes, is contamination monitoring (i.e., groundwater sampling and analysis) needed?

If yes, under what authority were/are response actions conducted?

ENVIRONMENTAL RESPONSE REFERENCES:

Section, Page #: 2.6,2-9

UXO RESPONSE:

What types of UXO response actions have been initiated/conducted on the site?

- ☑ None
- ☐ Unknown
- ☐ Other*
- ☐ Emergency response actions
- ☐ Routine range clearance/maintenance
- ☐ Time-critical removal actions
- ☐ UXO response actions associated with ERP activities
- ☑ Non-time-critical removal actions with Engineering Evaluation/Cost Analysis

*Please specify other:

UXO RESPONSE REFERENCES:

Section: 2.6, 2-11 *Page:*

LAND USE RESTRICTIONS:
- ☐ No public access
- ☐ Unrestricted public access
- ☑ Limited public access
- ☐ Restricted public access

ACCESS CONTROLS:
- ☑ No controls
- ☐ Locked gates
- ☐ Access signs
- ☐ Log book
- ☐ Fencing
- ☐ Security patrol

COMPREHENSIVE SITE EVALUATION: AFRIMS DATA

MAJCOM: AFSOC FFID: NM7572124454 MRAID: TS835 MRS: TS835b

Installation: CANNON AIR FORCE BASE

TRANSFERRED OR TRANSFERRING RANGES:

For transferred and transferring ranges, what is the nature of the transfer?

Lease to:	Ownership transfer to:	Additional reasons:
☐ Federal agency	☐ Federal agency	☐ Lease termination
☐ State government	☐ State government	☐ Revocation of withdrawn land
☐ Local government	☐ Local government	☐ Other***
☐ Private entity	☐ Private entity	
☐ Tribal	☐ Tribal	

***Please specify:

LAND USE, ACCESS CONTROL, TRANSFERRED/TRANSFERRING RANGES REFERENCES:

Section, Page #: *5.4, 5-1*

LAND USE INTEREST:

☐ DOD	☐ Public sector
☐ Federal agency	☐ Tribal
☐ State government	☑ Other****
☐ Local government	

****Please specify: Owned by Rajen Dairy. Primary use as storage.

LAND USE INTEREST REFERENCES:

Section, Page #: *2.1,2-1*

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APPENDIX M

Documentation of Public Participation Support

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USAF Military Munitions Response Program Comprehensive Site Evaluation Phase II

1st FACT SHEET

Cannon Air Force Base

February 2011

THE AIR FORCE

- Is dedicated to protecting human health and the environment by making MRAs ***safe to reuse***.
- Is developing the MMRP by ***maximizing efficiencies*** and lessons learned from 20 years of environmental restoration experience.
- Will ***prioritize MRAs*** according to environmental, health, and safety considerations; current and future planned resource use; and site attributes.

FOR MORE INFORMATION
Please contact the Cannon AFB Public Affairs Office:

27 SOW Public Affairs
110 E. Sextant, Suite 1150
Cannon AFB, NM 88103
Phone: 575-784-1110
Email: 27SOWPublicAffairs@cannon.af.mil

The Air Force developed the Comprehensive Site Evaluation (CSE) Phase I and Phase II to serve as the initial munitions response action of its Military Munitions Response Program (MMRP). The goal of the CSE is to obtain sufficient data to support decision-making with regard to effectively managing its munitions response areas (MRAs), while protecting human health and the environment. The CSE Phase I is analogous to a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment, and the CSE Phase II is analogous to a CERCLA Site Inspection.

The CSE is an inclusive approach that investigates explosive safety issues created by the potential presence of munitions and explosives of concern (MEC), as well as the environmental hazards posed by the potential presence of munitions constituents (MC).

The Air Force views the CSE as the first step in a performance-based, knowledge-driven approach for the Air Force MMRP. This approach focuses on achieving end results as opposed to meeting artificial milestones. The Air Force will continue to solicit stakeholder participation throughout the CSE process.

The Cannon Air Force Base (AFB) CSE Phase I Final Report was issued in December 2009. The CSE Phase II was initiated shortly thereafter. CSE Phase II activities at Cannon AFB include work plan preparation, visual surveying, X-ray fluorescence (XRF) sampling, MC sampling, report preparation, public participation support, and administrative record updates. Geophysical surveys are not being performed. The CSE Phase II field activities will be completed in March 2011.

For further information regarding Cannon AFB CSE Phase I and II activities, contact the 27th SOW Public Affairs Office at 575-784-1110.

CANNON AFB FORMER 1940s SKEET RANGE MUNITIONS RESPONSE AREA

Cannon AFB Military Munitions Response Program

1st FACT SHEET

ACRONYMS

- AFB: Air Force Base
- CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
- CSE: Comprehensive Site Evaluation
- MC: Munitions Constituents
- MEC: Munitions and Explosives of Concern
- MMRP: Military Munitions Response Program
- MRA: Munitions Response Area
- MRSPP: Munitions Response Site Prioritization Protocol
- PAH: Polycyclic Aromatic Hydrocarbon
- XRF: X-ray Fluorescence

Visual Surveys and Observations

Visual surveys will be completed at the Former 1940s Skeet Range, located near the northeast corner of CAFB. The visual surveys will be completed to identify evidence of MEC as well as significant site features related to historical munitions activities or environmental characteristics. Survey transects will be spaced approximately 20 feet apart, with closer spaced transects near potential features of interest. Visual Observations will be completed prior to XRF sampling at the Former 1940s Skeet Range so that sample locations can be adjusted as necessary based on findings of the visual survey.

XRF Sampling

XRF sampling and analysis for lead will be completed at the Former 1940s Skeet Range at a frequency of approximately one XRF every 160-feet spacing in undeveloped areas for a total of approximately 40 XRF samples on CAFB property to define the extent of lead-contaminated soils.

The density of sampling may be adjusted based on observations in the field. The XRF sample results will be compared to the residential lead screening level of 400 parts per million. Twelve correlation samples will be collected and sent to an off-site laboratory for analysis.

Clay Target Constituent Sampling

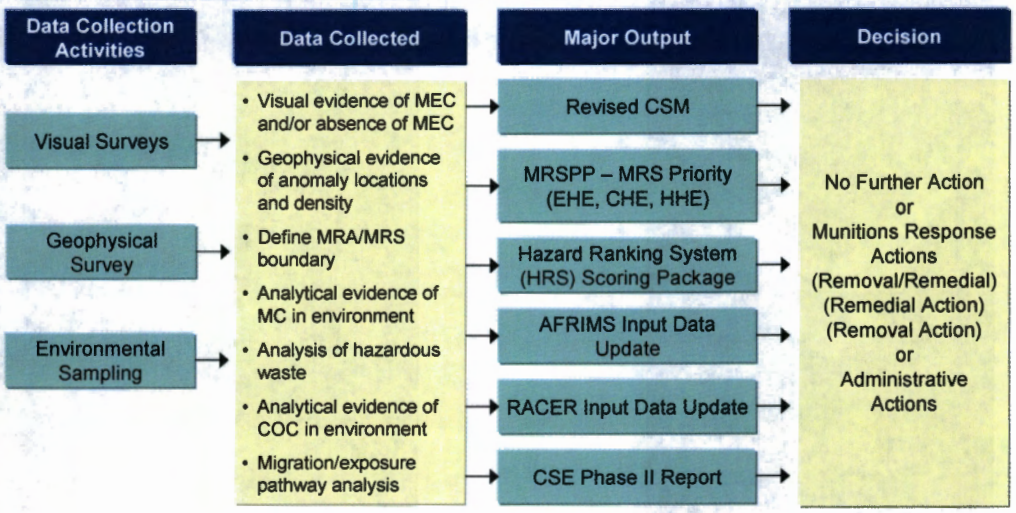
Surface soil may be sampled and analyzed for polycyclic aromatic hydrocarbons (PAH) from clay targets used at the Former 1940s Skeet Range. Samples will be collected for PAHs only in areas where clay target fragments are observed during the visual survey.

CSE Phase II Report

The CSE Phase II Report will include:

- Summaries of the MRAs;
- XRF and laboratory analytical sample results;
- Human Health and Ecological Risk Screening evaluations;
- Conceptual Site Models that document the potential hazards, pathways, and receptors;
- Munitions Response Site Prioritization Protocol (MRSPP) ratings to prioritize the MRAs for future actions;
- Data for cost estimating and other required program management functions; and
- Recommendations for further munitions response actions or closure under the Air Force MMRP.

A summary of the CSE Phase II process is presented below.



Cannon Air Force Base

FACT SHEET #2
DRAFT

Military Munitions Response Program Comprehensive Site Evaluation Phase II

August 2012

DATA COLLECTED FOR CSE PHASE II AT LAUGHLIN AFB:

- Visual Survey Observations
- Lead Concentrations in MRA Soil by On-site XRF Analysis
- Munitions Constituent Concentrations in MRA Soil by Off-Site Analyses – Lead and PAH
- Background Soil Analyses - PAH

FOR MORE INFORMATION
Please contact the Cannon AFB Public Affairs Office:

27 SOW Public Affairs
110 E. Sextant
Suite 1150
Cannon AFB, NM 88103
575-784-4131
27SOWPublicAffairs@cannon.af.mil

Introduction

Under the Military Munitions Response Program (MMRP), the Air Force completed a Comprehensive Site Evaluation (CSE) Phase I at Cannon Air Force Base (AFB), New Mexico, in 2009. This investigation indicated past military munitions activities took place at two locations on the installation, and munitions constituents (MC) were potentially present at these locations. These areas were identified as the Former Chemical Warfare Area and the 1940s Skeet Range (TS835). The Former Chemical Warfare area was not retained for further evaluation under the CSE Phase II because no evidence of munitions and explosives of concern (MEC) or Chemical Warfare Materiel (CWM) was observed during the CSE Phase I and the site had been redeveloped as a parking lot. Based on the CSE Phase I information and subsequent evaluation, a CSE Phase II investigation was performed at the Munitions Response Area [MRA (Figure 1)] in March 2011. The CSE Phase II process and the approach for the Cannon AFB investigation were presented in a February 2011 Fact Sheet, which is included in the CSE Phase II Report (Appendix M) and is available upon request.

CSE Phase II Investigation Results

The CSE Phase II field work consisted of a visual survey, and soil sampling and analysis for MC. The primary MCs that were expected to be present were lead (from shot) and polynuclear aromatic hydrocarbons (PAHs) (from coal tar binding material in clay targets).

Visual Survey

During the visual survey, the field team walked at a designated spacing across the MRA, searching for evidence of range use, including spent cartridges, shot, and clay target debris. Clay target fragments were observed at the MRA in an area of the range where most target fragments were expected to be present. These locations were documented using a hand-held Global Positioning System (GPS) unit.

Figure 1. MRATS870 at Cannon AFB Investigated under CSE Phase II

ACRONYMS:

AFB – Air Force Base

CSE – Comprehensive Site Evaluation

GPS – Global Positioning System

IRP – Installation Restoration Program

MC – Munitions Constituents

MMRP – Military Munitions Response Program

MRA – Munitions Response Area

MRSPP – Munitions Response Site Prioritization Protocol

NFA – No Further Action

PAH – Polynuclear Aromatic Hydrocarbon

XRF – X-Ray Fluorescence

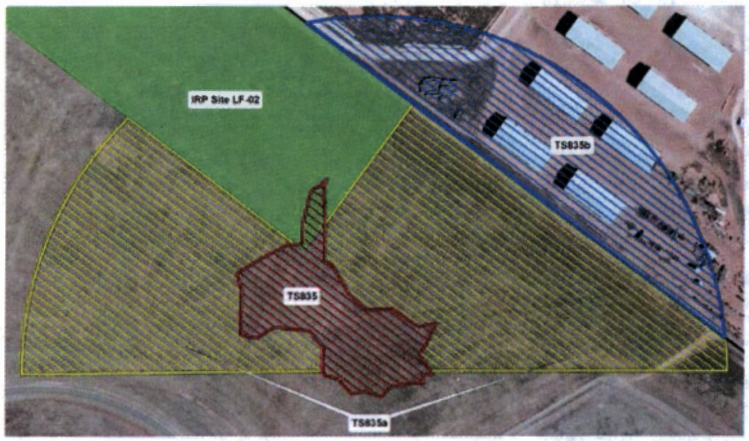
Sampling and Analysis for Munitions Constituents

Sampling at Cannon AFB was conducted at the MRA during the CSE Phase II field effort. No samples were collected from within the Installation Restoration Program (IRP) site LF-02 or from the off-base portion of the MRA. Sampling included collection of soil samples from the surface to a depth of 2 feet. A portable X-ray fluorescence (XRF) instrument was used to analyze the samples for lead content; a subset of these samples was also submitted to a commercial off-site laboratory for lead analysis. Soil samples were also collected from the clay target fragment areas at the MRA and analyzed at the off-site laboratory for PAHs. Finally, surface soil samples were collected from a background area on Cannon AFB and analyzed for PAHs.

Lead Results - Lead concentrations in all samples were low and below human health screening levels, indicating no unacceptable risk from former range activities.

PAH Results – Concentrations of PAHs were above background and human health screening levels in surface soil at several locations where clay target fragments were observed. Since the source of the elevated PAH concentrations in soil was identified as the clay target fragments at the MRA, the MRA was divided into three Munition Response Sites (MRSs); TS835a represents the area within the former skeet range not impacted by elevated PAH concentrations, TS835b represents the area within the former skeet range not impacted by elevated PAH concentrations but which exists off-base, and TS835 represents the area containing elevated concentrations of PAHs (Figure 2).

Figure 2. PAH-Impacted Portion of the MRS TS835



Munitions Response Site Prioritization Protocol (MRSPP)

The CSE Phase II data from the investigations at the MRA was evaluated using the MRSPP to assess further munitions response actions. The data from the Cannon AFB CSE Phase II investigation were incorporated into the Air Force database tools used to consistently evaluate all MMRP sites. The MRSs TS835a and TS835b scored an 8, which is the lowest funding priority. This score is based on the use of only small arms and no explosive hazards at this MRA, and MC concentrations that are below residential screening levels and similar to background concentrations. The PAH-impacted MRS TS835 scored a 4, due to the fact that several PAH compounds exceeded the USEPA Regional Screening Levels (Figure 2).

CSE Phase II Conclusions

No Further Action (NFA) is recommended for the portions of the former skeet range not impacted by elevated PAH concentrations (TS835a and TS835b) because there is no remaining evidence of munitions activities and concentrations of MCs are below residential screening levels. Further investigation and/or removal is recommended for the portion of the former skeet range currently impacted by elevated PAH concentrations (TS835).

Public Notice

Request for public document review for Cannon Air Force Base

Recently, the U.S. Air Force completed a Comprehensive Site Evaluation (CSE) Phase II at one former small arms firing range at Cannon Air Force Base (AFB), New Mexico. The Air Force developed the CSE process to serve as the initial munitions response action of its Military Munitions Response Program (referred to as "the MMRP"). The goal of the CSE is to obtain sufficient data to support Air Force decision-making with regards to effectively managing its munitions response sites, while protecting human health and the environment. Cannon AFB is located in northeastern New Mexico in Curry County, approximately 8 miles west of the city of Clovis, and 12 miles north of the city of Portales. Originally known as Portair Field, the installation was transferred to the Army Air Corps in 1942. Today, Cannon AFB is home to the Air Force's 27th Special Operations Wing.

Cannon AFB is one of many military installations throughout the United States that are being reviewed under the Department of Defense's MMRP. This program was developed to address historical sites known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents. The CSE Phase II identified one site at Cannon AFB which was used for target training with small arms. Under the MMRP the Air Force must complete the Military Munitions Response Site Prioritization Protocol (referred to as "the Protocol"). The Protocol is used to assign priorities for any additional investigation or munitions removal that may be required, and it assigns a relative priority to each historical training area based on an assessment of the overall conditions at the site. The Protocol is not a risk assessment tool nor is it the sole mechanism used for making response decisions at sites. Generally, a site with a higher priority will be addressed before one with a lower priority; however, other factors, such as mission-driven requirements or community input may influence the Air Force sequencing decisions.

All munitions response sites investigated under the Cannon AFB CSE Phase II were reviewed under the Protocol and received moderate to low priority scores; however, you are encouraged to review and comment on the Protocol and sequencing processes used for Cannon AFB. You can get involved by providing comments in writing (via email or regular mail). You may also request a public meeting to discuss the results of the Protocol scoring at Cannon AFB. As members of the local community, you provide valuable insight into cultural, environmental, economic, or social factors that should be considered. The Air Force uses your input to understand any potential impacts and ensure a comprehensive decision making process is followed.

The evaluation criteria, including types of munitions that may be present, ease of access to the site and number of people living near the site, are available for public review from August 19, 2013 through September 18, 2013.. The Protocol is located in Appendix J of the Draft Final *Comprehensive Site Evaluation Phase II Report*, which is available for public review at the Clovis Carver Public Library, 701 North Main Street, Clovis, New Mexico.

To request more information please contact:

Cannon AFB Public Affairs

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AFFIDAVIT OF LEGAL PUBLICATION

Copy of Publication

LEGAL # 1518

STATE OF NEW MEXICO
COUNTY OF CURRY:

The undersigned, being duly sworn, says:
That she is a Legal Clerk of
The Clovis News Journal, a daily
Newspaper of general circulation,
published in English at Clovis,
said county and state, and that the
hereto attached

PUBLIC NOTICE-
CAFB DOCUMENT REVIEW

was published in said Clovis News Journal,
a daily newspaper duly
qualified for that purpose within
the meaning of Chapter 167 of the
1937 Session Laws of the State of
New Mexico for 1 consecutive
days/weeks on the same days as follows:

First Publication: August 21, 2013
Second Publication:
Third Publication:
Fourth Publication:

Legal Clerk

Subscribed and sworn to before me
August 21, 2013

Notary Public

OFFICIAL SEAL
LESLIE NAGY
NOTARY PUBLIC - STATE OF NEW MEXICO
My commission expires: May 24, 2015

Legal 1518
August 21, 2013

Public Notice

Request for public document review for Cannon Air Force Base

Purpose
To notify the public of the opportunity to review the Munitions Response Site Prioritization Protocol (Protocol) that has been prepared for one site at Cannon Air Force Base (AFB). The Protocol is located in Appendix J of the Draft Final *Comprehensive Site Evaluation Phase II Report*, which is has been placed on file at the Clovis Carver Public Library, 701 North Main Street, Clovis, New Mexico. The Protocol is available for review from August 21, 2013 through September 20, 2013

Background Information
Recently, the U.S. Air Force completed a Comprehensive Site Evaluation (CSE) Phase II at one former small arms firing range at Cannon Air Force Base (AFB), New Mexico. The CSE is the initial response action under the Military Munitions Response Program (referred to as "the MMRP"). The goal of the CSE is to obtain sufficient data to determine how the former range was used, determine if any range related contamination is present, and to complete the Protocol.

The MMRP is a Department of Defense program developed to address historical sites known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents. The site evaluated in the CSE Phase II was found to have a small area of munitions constituents related to skeet training. This contamination will be further investigated and cleaned up as part of the contract scheduled for award in the fall of 2013.

Under the MMRP the Air Force must complete the Protocol and provide the public an opportunity to review the scores. The Protocol is used to assign priorities for any additional investigation or munitions removal that may be required. The score that is generated from the Protocol is used to assign a relative priority to each Air Force historical training area. The Protocol is not a risk assessment tool nor is it the sole mechanism used for making response decisions at sites. Generally, a site with a higher priority will be addressed before one with a lower priority; however, other factors, such as mission-driven requirements or community input may influence the Air Force sequencing decisions. The munitions response site investigated under the Cannon AFB CSE Phase II received a moderate to low priority score; however, this site has already been approved for funding in the fall of 2013. If you wish to review and comment on the Protocol score and sequencing processes, you may do so by providing comments in writing (via email or regular mail). You may also request a public meeting to discuss the results of the Protocol at Cannon AFB. As members of the local community, you provide valuable insight into cultural, environmental, economic, or social factors that should be considered. The Air Force uses your input to understand any potential impacts and ensure a comprehensive decision making process is followed.

The complete Protocol is available for public review from August 21, 2013 through September 20, 2013. The Protocol is located in Appendix J of the Draft Final *Comprehensive Site Evaluation Phase II Report*, which is on file at the Clovis Carver Public Library, 701 North Main Street, Clovis, New Mexico.

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Public Notice

Request for public document review for Cannon Air Force Base

Recently, the U.S. Air Force completed a Comprehensive Site Evaluation (CSE) Phase II at one former small arms firing range at Cannon Air Force Base (AFB), New Mexico. The Air Force developed the CSE process to serve as the initial munitions response action of its Military Munitions Response Program. The goal of the CSE is to obtain sufficient data to support Air Force decision-making with regards to effectively managing its munitions response sites, while protecting human health and the environment. Cannon AFB is located in northeastern New Mexico in Curry County, approximately 8 miles west of the city of Clovis, and 12 miles north of the city of Portales. Originally known as Portair Field, the installation was transferred to the Army Air Corps in 1942. Today, Cannon AFB is home to the Air Force's 27th Special Operations Wing.

Cannon AFB is one of many military installations throughout the United States that are being reviewed under the Department of Defense's Munitions Response Site Prioritization Protocol (referred to as "the Protocol"). The Protocol is used to assess sites that may have unexploded ordnance, discarded military munitions or munitions constituents, none of which were discovered at Cannon AFB. The Protocol is used to assign priorities for any additional investigation or munitions removal that may be required, and it assigns a relative priority to each historical training area based on an assessment of the overall conditions at the site. The Protocol is not a risk assessment tool nor is it the sole mechanism used for making response decisions at sites. Generally, a site with a higher priority will be addressed before one with a lower priority; however, other factors, such as mission-driven requirements or community input may influence the Air Force sequencing decisions.

All munitions response sites investigated under the Cannon AFB CSE Phase II were reviewed under the Protocol and received moderate to low priority scores; however, you are encouraged to review and comment on the Protocol and sequencing processes used for Cannon AFB. You can get involved by providing comments in writing (via email or regular mail). You may also request a public meeting to discuss the results of the Protocol scoring at Cannon AFB. As members of the local community, you provide valuable insight into cultural, environmental, economic, or social factors that should be Force uses your input to understand any potential impacts and ensure a comprehensive decision making process is followed.

The evaluation criteria, including types of munitions that may be present, ease of access to the site and number of people living near the site, are available for public review from _____, 2012 through _____, 2012. The Protocol is located at the Clovis Carver Public Library, 701 North Main Street, Clovis, New Mexico.

To request more information please contact:

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