



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS 49TH WING (ACC)  
HOLLOMAN AIR FORCE BASE, NEW MEXICO

 ENTERED

19 October 2015

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OCT 23 2015

USEPA, Region 6 (6PD-F)  
Attn: Mr. Chuck Hendrickson, Project Manager  
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**NMED  
Hazardous Waste Bureau**

Dear Mr. Hendrickson,

Holloman AFB is pleased to submit the Final Engineering Evaluation / Cost Analysis Action Memorandum for TS851a Former Skeet Range Munitions Response Site, Holloman Air Force Base, NM.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions regarding this submittal, please contact me at (575) 572-3931.

Sincerely,

DEANNA ROTHHAUPT, GS-12, DAFC

Attachment:

Final Engineering Evaluation / Cost Analysis Action Memorandum for TS851a Former Skeet Range Munition Response Site, Holloman Air Force Base, New Mexico. August 2015.

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**FINAL**  
**ENGINEERING EVALUATION/COST ANALYSIS**  
**ACTION MEMORANDUM**

**TS851a - FORMER SKEET RANGE**  
**HOLLOMAN AIR FORCE BASE**  
**NEW MEXICO**

**Contract Number: FA8903-13-C-0008**

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*Prepared for:*



**AIR FORCE CIVIL ENGINEER CENTER**  
**2261 Hughes Ave., Suite 163**  
**Joint Base San Antonio Lackland, Texas 78236-9853**

**August 2015**

*Prepared by:*

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**ENGINEERING EVALUATION / COST ANALYSIS  
ACTION MEMORANDUM**

**TS851a - FORMER SKEET RANGE**

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# **ENGINEERING EVALUATION / COST ANALYSIS ACTION MEMORANDUM**

## **TS851a – FORMER SKEET RANGE**

### **HOLLOMAN AIR FORCE BASE NEW MEXICO**

Contract Number: FA8903-13-C-0008

Reviewed and Approved by:

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FPM Remediations, Inc. prepared this document under the direction of the United States Air Force (USAF). This document should be used only with the approval of the USAF. This document is based, in part, on information provided in other documents and is subject to the limitations and qualifications presented in the referenced documents.

August 2015

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**TABLE OF CONTENTS**

<b>SECTION</b>	<b>PAGE</b>
<b>1.0 PURPOSE.....</b>	<b>1-1</b>
<b>2.0 SITE BACKGROUND AND CURRENT CONDITIONS.....</b>	<b>2-1</b>
2.1 Site Location.....	2-1
2.1.1 TS851a Skeet Range Site Description and Operational History.....	2-1
2.2 Site Characteristics .....	2-2
2.3 Previous Investigations.....	2-2
2.3.1 Modified Comprehensive Site Evaluation Phase I .....	2-2
2.3.2 Comprehensive Site Evaluation Phase II.....	2-3
2.4 Nature and Extent of Contamination.....	2-3
2.5 National Priority List Status .....	2-6
2.6 Other Removal Actions .....	2-6
<b>3.0 THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES .....</b>	<b>3-1</b>
<b>4.0 ENDANGERMENT DETERMINATION.....</b>	<b>4-1</b>
<b>5.0 PROPOSED ACTIONS AND ESTIMATED COST .....</b>	<b>5-1</b>
5.1 Criteria and Evaluation of Alternatives.....	5-1
5.2 Description of Proposed Action .....	5-2
5.2.1 Preliminary Activities, Excavation, and Soil Sampling and Analysis Activities ....	5-3
5.2.2 Site Restoration/Demobilization.....	5-5
5.2.3 Project Reporting .....	5-5
5.3 Technical and Administrative Feasibility of the Proposed Action.....	5-5
5.4 Applicable or Relevant and Appropriate Requirements.....	5-6
5.4.1 Chemical-Specific ARARs .....	5-7
5.4.2 Location-Specific ARARs .....	5-8
5.4.3 Action-Specific ARARs.....	5-8
5.5 Non-Time-Critical Removal Action Schedule .....	5-8
<b>6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN.....</b>	<b>6-1</b>
<b>7.0 OUTSTANDING POLICY ISSUES .....</b>	<b>7-1</b>
<b>8.0 ENFORCEMENT .....</b>	<b>8-1</b>
<b>9.0 RECOMMENDATIONS.....</b>	<b>9-1</b>
<b>10.0 AUTHORIZING SIGNATURES .....</b>	<b>10-1</b>
<b>11.0 REFERENCES.....</b>	<b>11-1</b>

**LIST OF FIGURES**

(Located in Appendix A)

- Figure 1      Holloman Air Force Base Location
- Figure 2      Former Skeet Range MRSs
- Figure 3      Former Skeet Range Lead Sample Locations
- Figure 4      Former Skeet Range PAH Sample Locations
- Figure 5      Proposed Removal Area at TS851a MRS

**LIST OF TABLES**

<b>TABLE</b>	<b>PAGE</b>
Table 2-1 CSE Phase II XRF Lead Sampling Results .....	2-5
Table 2-2 Surface Soil PAH Exceedances .....	2-6
Table 2-3 Subsurface Soil PAH Exceedances .....	2-6
Table 5-1 Potential ARARs and TBCs .....	5-7
Table 5-2 Cost Estimate for Selected Alternative.....	5-9

**LIST OF APPENDICES**

- Appendix A**    Figures
- Appendix B**    Responsiveness Summary

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**LIST OF ABBREVIATIONS AND ACRONYMS**

AAR	After Action Report
AFB	Air Force Base
ARAR	Applicable or Relevant and Appropriate Requirements
BCY	Bank Cubic Yard
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSE	Comprehensive Site Evaluation
EE/CA	Engineering Evaluation/Cost Analysis
ERPIMS	Environmental Restoration Program Information Management System
FPM	FPM Remediations, Inc.
ft	feet
GIS	Geographic Information System
GPS	Global Positioning System
MEC	Munitions and Explosives of Concern
MC	Munitions Constituents
mg/kg	milligram per kilogram
µg/kg	microgram per kilogram
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NMED	New Mexico Environment Department
NTCRA	Non-Time-Critical Removal Action
O&M	Operations and Maintenance
PAH	Polycyclic Aromatic Hydrocarbon
RAO	Remedial Action Objective
ROD	Record of Decision
RSL	Regional Screening Levels
SARA	Superfund Amendments and Reauthorization Act

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**LIST OF ABBREVIATIONS AND ACRONYMS (CONTINUED)**

SSL	Soil Screening Level
TBC	To be considered
TCLP	Toxicity Characteristic Leaching Procedure
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plan
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
WSMR	White Sands Missile Range
XRF	X-ray fluorescence

## 1.0 PURPOSE

The purpose of this Action Memorandum is to request and document the approval of the selected Non-Time Critical Removal Action (NTCRA) addressing mitigation of hazards to human health associated with polycyclic aromatic hydrocarbon (PAHs)-impacted soils present within the TS851a - Former Skeet Range Munitions Response Site (MRS) at Holloman Air Force Base (AFB), New Mexico. The NTCRA proposed in this Action Memorandum includes 100% removal of PAH-impacted soils (surface soils down to 2 feet below ground surface [bgs]) estimated at 5,000 bank cubic yards (BCY) from the TS851a – Former Skeet Range MRS. A Comprehensive Site Evaluation Phase II (CSE Phase II) (USACE, 2013), delineated PAH-impacted soils present at levels above United States Environmental Protection Agency (USEPA) residential Regional Screening Levels (RSLs). The USEPA RSL levels were also selected as the Remedial Action Objective (RAO) as they are more stringent than the New Mexico Environment Department (NMED) soil screening levels (SSLs). The removal of PAH-contaminated soils will prevent potential human and ecological exposure associated with PAH-contaminated soils, which are present due to past site use.

This Action Memorandum was prepared according to the guidelines provided in the Superfund Removal Guidance for Preparing Action Memoranda (United States Environmental Protection Agency [USEPA], 2009). The approved Final Engineering Evaluation/Cost Analysis (EE/CA) supports this document for the TS851a – Skeet Range MRS (FPM, 2014). The Action Memorandum presents the justification, scope, and costs for the proposed NTCRA.

FPM is performing this NTCRA under the direction of the United States Air Force (USAF). Participation of and cooperation with federal, state, and local authorities and the local public will be solicited for the duration of proposed activities and for all environmental restoration activities at Holloman AFB. Participation by these entities is required for the environmental restoration process and aids in ensuring the protection of human health and the environment. Federal, state, and local authorities will have input into the actions implemented at Holloman AFB through planning meetings, plan review, and the public comment process. Federal, state, and local authorities concerns will be solicited and provisions of federal, state, and local regulations will be given full consideration for all actions taken at Holloman AFB.

The remaining sections of this Action Memorandum are organized as follows.

**Section 2:** Site Background and Current Conditions - This section provides an overview of the site's history, its current characteristics, and the nature of contamination at the site.

**Section 3:** Threats to Public Health, Welfare, or the Environment, and Statutory and Regulatory Authorities - This section describes the nature of potential threats to public health or welfare, or threats to the environment that necessitated the removal action and will be addressed by it as related to appropriate statutory and regulatory authorities.

**Section 4:** Endangerment Determination - This section provides a statement characterizing the threat from hazardous substances.

**Section 5:** Proposed Actions and Estimated Costs - This section describes the proposed actions, estimated costs, and project schedule. It also identifies the Applicable or Relevant and Appropriate Requirements (ARARs).

**Section 6:** Expected Change in the Situation, Should Action Be Delayed or Not Taken - This section describes any expected changes in the situation.

**Section 7:** Outstanding Policy Issues - This section discusses any outstanding policy issues not discussed previously, or specifies “None” if there were no other policy issues associated with the site.

**Section 8:** Enforcement - The enforcement strategy is described for administrative purposes in this section.

**Section 9:** Recommendation - This section includes recommendation for approval of selected removal action.

**Section 10:** Authorizing Signatures - Includes spaces for approval or disapproval signatures and dates.

**Section 11:** Provides a list of references used to develop this Action Memorandum.

## 2.0 SITE BACKGROUND AND CURRENT CONDITIONS

This section provides an overview of the site history and current conditions, and summarizes the results from previous investigations. This information constitutes the background information used to identify and analyze the removal action alternative for the site.

Holloman AFB is located in south-central New Mexico, seven miles west of the city of Alamogordo in Otero County. It is adjacent to the White Sands Missile Range (WSMR). A portion of the Base to the south is bordered by Route 70, which also runs roughly north-south and parallel to the eastern boundary of the Base. Holloman AFB occupies approximately 50,763 acres of land. It is contiguous to the much larger (2.2 million acre) WSMR, and located to the southeast of WSMR. The southern portion of Holloman AFB contains the flight line, composed of a series of runways running north-south, east-west, and northeast southwest. The Main Base is located at the southeast corner of the installation, where Route 70 runs adjacent to the boundary (**Figure 1**). The Main Base contains housing and administrative buildings. The West Area and the North Area refer to the improved areas around the original airfield (southeastern triangle formed by the runways). High Speed Test Track runs north-south and is located northwest of the airfield. The track is the world's longest of its kind at 9.5 miles and has been used for an array of missile testing for decades and is still in use today (USACE, 2013).

### 2.1 Site Location

The TS851a – Former Skeet Range MRS consists of approximately 3.1 acres of open desert scrubland in the southeastern portion of the base adjacent to the Fourth Space Command Complex (located to the northwest of the MRS) (**Figure 2**). The firing direction at the range was oriented to the northeast. The historical range fan from the Munitions Response Area (MRA) extended into the adjacent Fourth Space Command Complex to the northwest and is covered entirely by buildings or pavement and also secured by additional fencing. The historical range fan also extended to the east into a parcel of land which is at present a contaminated soil remediation area.

#### 2.1.1 TS851a Skeet Range Site Description and Operational History

The Former Skeet Range MRA (MRA 851) (comprised of the TS851, TS851a, and TS851b MRSs) consists of 33.9 acres. Based on the Modified CSE Phase I report, the outline of what appeared to be a two-position skeet range was visible at this location in an historical US Army Corps of Engineers aerial photograph from 1972. The skeet range was used for small arms training and practice with moving targets. Typically, skeet ranges were used for training and/or recreational target shooting. Information collected during the Modified CSE Phase I indicated that there is no potential for munitions impacts from the Former Skeet Range to be located beyond the installation boundary, due in part because the area lies completely within the boundary of Holloman AFB. No further documentation has been found regarding the history of munitions-related activities in the Former Skeet Range MRA.

During the CSE Phase II visual reconnaissance surveys, small arms debris associated with 12-gauge shotgun, 9mm, .38-caliber, and .45-caliber weapons were observed. Small arms debris associated with 9mm, .38-caliber, and .45-caliber are not typical to skeet range activity. Areas with dense clay target debris were also documented within the typical target fall-out zone for the skeet range. The Final Modified CSE Phase I and CSE Phase II reports documented that lead

shot was observed on the ground surface during the visual survey for the Modified CSE Phase I, and the highest concentration was noted within 500 feet (ft) of the firing points. There was no indication that Munitions and Explosives of Concern (MEC) larger than small arms were present, and the CSE Phase II X-ray fluorescence (XRF) results for lead in the soil were all <400 milligram per kilogram (mg/kg). During the active time period for the MRA, clay targets contained various PAH compounds. It was found during the CSE Phase II that the PAH concentrations in soils exceeded USEPA RSLs in nine of the 28 samples.

Based on the CSE Phase II findings, it was recommended that the Former Skeet Range MRA be split into three MRSs (**Figure 2**). TS851 Former Skeet Range MRS (30.5 acres) was recommended for no further action (NFA) due to the lack of MEC and munitions constituents (MC) exceeding USEPA RSLs. TS851a Former Skeet Range MRS (3.1 acres) was recommended for further munitions response action based on elevated PAH concentrations and visual confirmation of clay target debris. The MRA boundary was also slightly extended to the southwest due to identified PAH contamination beyond the originally identified MRA boundary. This additional acreage is accounted for in the TS851a MRS. TS851b Former Skeet Range MRS (0.3 acres) was not accessed during the CSE Phase II since the site was occupied by a contaminated soil remediation area and recommended to be administratively closed from the Military Munitions Response Program (MMRP). The soil remediation land farm was used to treat petroleum, oil, and lubricant-contaminated soils and is being closed under a different program.

## **2.2 Site Characteristics**

### **TS851a – Former Skeet Range MRS**

Located in the southeastern portion of Holloman Air Force Base the TS851a – Former Skeet Range MRS is currently situated on the active base property and consists of open desert scrubland. The MRS does not contain any structures or buildings. Remnants of the range that were observed during previous investigations included clay target debris, shotgun casings, lead shot, and small arms projectiles (USACE, 2010).

## **2.3 PREVIOUS INVESTIGATIONS**

Two previous investigations, a Modified CSE Phase I Report (USACE, 2010) and a CSE Phase II (USACE, 2013) have been completed under the MMRP, at the former Skeet Range MRA (MRA 851) (and subsequently the TS851a Former Skeet Range MRS).

### **2.3.1 Modified Comprehensive Site Evaluation Phase I**

In support of the MMRP at Holloman AFB, the CSE Phase I was performed to characterize the site; evaluate actual or potential release(s) of hazardous substance(s), pollutant(s), or contaminant(s) to migration/exposure pathways (groundwater, soil, and air) from MRAs; and evaluate associated targets of concern. The Modified CSE Phase I accumulated and evaluated information on Holloman AFB relating to the possible presence of MEC, site physical conditions, and current and future land uses and activities. Information sources included archival records from Holloman AFB, interviews with Holloman AFB personnel, additional archival information collected from public sources, and observations made during the visual surveys. This information was reviewed and used to evaluate the extent of MEC and/or potential for MC exposure at the site.

The Former Skeet Range MRA (MRA 851) was identified using an aerial photograph from 1972, and a visual survey revealed lead shot from small arms, clay target debris typical to the time period, and the remains of at least one firing point. Based on the Phase I findings, a CSE Phase II was recommended (USACE, 2010).

### **2.3.2 Comprehensive Site Evaluation Phase II**

The CSE Phase II (USACE, 2013) activities compiled and evaluated information on Holloman AFB relating to the possible presence of MEC and associated soil contamination from MC. The CSE Phase II field investigation occurred from October 2011 to March 2012. During the field investigation visual survey transects were completed at the Former Skeet Range MRA. The northwestern portion of the MRA was not surveyed due to the Fourth Space Command Complex which is entirely paved and fenced-in (**Figure 2**). A controlled 30-foot buffer zone was maintained around the fenced area. Additionally, a small portion of the MRA on the eastern range fan was not surveyed due to a fenced petroleum contaminated soil remediation area (USACE, 2013).

Clay target debris was observed within 300 feet of the historical firing points. Two firing points were still discernible; however, all other range infrastructure has been removed. Lead shot was also observed within the area (USACE, 2013). The lead shot and clay target debris observed are consistent with historical skeet range usage. In addition to the aforementioned debris, pistol bullets of 9mm, .38, and .45 calibers were also documented, these are not typically associated with skeet range activities.

Surface and subsurface soil sampling was also performed to evaluate potentially impacted environmental media from range related MC. The CSE Phase II Report recommended splitting the MRA into the three following MRSs which were scored individually utilizing the Munitions Response Site Prioritization Protocol (MRSP) The AF Quality Assurance Panel which includes the regulatory agencies approved the Final CSE Phase II Report and recommendations. TS851 MRS (30.5 acres) encompasses the portion of the MRA not impacted by PAH or lead contamination. The TS851 MRS received a Priority of 8 (Priority 1 being the highest potential hazard and Priority 8 being the lowest potential hazard). This MRS was recommended for NFA and concurred with by the Department of Defense Explosive Safety Board in March 2014. The TS851a MRS (3.1 acres) was delineated based on the collection of soil samples and the visual extent of clay target debris. This MRS is defined as the portion of the MRA which has been impacted by MC contamination. TS851a was given a Priority of 5, and is the only MRS that was recommended for further munitions response action. The MRSP score for the TS851a MRS has not been revised since the CSE Phase II. TS851b MRS (0.3 acres) was not investigated during the CSE Phase II due to access restrictions and an ongoing petroleum contaminated soil staging area (**Figure 3**). Furthermore, the TS851b MRS is also unlikely to contain MC contamination based on sampling results conducted in the area and proximity to the historic firing point. The TS851b - Former Skeet Range MRS was administratively closed out of the USAF MMRP (USACE, 2013).

## **2.4 Nature and Extent of Contamination**

Land associated with the TS851a Skeet Range MRS was used as a skeet range. During the use of the site, lead shot, small arms bullets and debris, and clay target fragments were deposited on the surface of the skeet range. The primary range-related contaminants are PAH compounds

which may have been released directly to the soil during the initial deposition activity or through weathering.

The CSE Phase II field activities included XRF field analysis of surface soil at the entire Former Skeet Range MRA to evaluate and define the nature and extent of any lead contamination. A total of 68 samples were collected and screened. The concentration of lead was significantly below the NMED SSL of 400 mg/kg and USEPA residential RSL also 400 mg/kg for unrestricted/residential land use in all samples collected. Due to no surface soil lead levels exceeding the human health screening level of 400 mg/kg, no subsurface samples were collected. XRF results ranged from below the limit of detection (12 mg/kg) to a maximum of 154 mg/kg (USACE, 2013).

Surface soil XRF lead results collected during the CSE Phase II activities are summarized in **Table 2-1**. XRF sample locations and results are shown on **Figure 3**. Based on the results from the CSE Phase II, lead from small arms ammunition is not considered to pose a risk under any potential land use scenario.

Previous studies report that the upper limit for background lead concentration at Holloman AFB is 10.87 mg/kg, and the statewide background lead concentrations for New Mexico soils ranges from 7.0 to 21 mg/kg. Of the 68 samples analyzed by the XRF screening: 12 samples yielded results below the limit of detection (12 mg/kg); 23 samples yielded results within the state background range, and all other samples (33 samples) yielded results above background screening limits. The highest reported XRF value was 154 mg/kg. All samples analyzed were below the NMED SSL and USEPA RSL of 400 mg/kg (USACE, 2013).

Based on visual locations within the clay target debris area, a total of twenty-eight soil samples were collected for laboratory analysis of PAHs at a fixed-base laboratory. Samples included 20 surface soil, two subsurface soil from the 6-12 inch depth interval, two subsurface soil samples from the 12-18 inch depth interval, and four background surface soil samples. PAHs in soils exceeded the USEPA human health screening levels for at least one of the following analytes; benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene, in nine of the 28 samples analyzed. The PAH sample locations are presented on **Figure 4** (USACE, 2013).

A background PAH study was also conducted as part of the CSE Phase II activities. Samples were collected from similar soil type and human impact as the Former Skeet Range (with the exception of range related impacts). The maximum background concentrations were initially used to screen the data from the site to assess whether the concentrations were elevated, potentially representing contamination from range related activities. It was determined that PAH concentrations in soil collected from the TS851a – Former Skeet Range MRS were higher than the background concentrations for several compounds (USACE, 2013). Concentrations exceeding both (NMED SSLs and USEPA residential RSLs) were reported in the surface soils collected at the MRS. **Table 2-2** illustrates the surface soil findings, and **Table 2-3** indicates that detected PAHs in subsurface soils did not exceed either NMED SSLs or USEPA residential RSLs.

**Table 2-1**  
**CSE Phase II XRF Lead Sampling Results**

<b>Sample ID*</b>	<b>Lead (mg/kg)</b>	<b>Sample ID*</b>	<b>Lead (mg/kg)</b>
C-XR-HL-02-SS-001	32	C-XR-HL-02-SS-035	17
C-XR-HL-02-SS-002	71	C-XR-HL-02-SS-036	15
C-XR-HL-02-SS-003	154	C-XR-HL-02-SS-037	12
C-XR-HL-02-SS-004	22	C-XR-HL-02-SS-038	47
C-XR-HL-02-SS-005	< LOD	C-XR-HL-02-SS-039	19
C-XR-HL-02-SS-006	28	C-XR-HL-02-SS-040	53
C-XR-HL-02-SS-007	< LOD	C-XR-HL-02-SS-041	24
C-XR-HL-02-SS-008	42	C-XR-HL-02-SS-042	55
C-XR-HL-02-SS-009	30	C-XR-HL-02-SS-043	22
C-XR-HL-02-SS-010	13	C-XR-HL-02-SS-044	23
C-XR-HL-02-SS-011	35	C-XR-HL-02-SS-045	37
C-XR-HL-02-SS-012	< LOD	C-XR-HL-02-SS-046	22
C-XR-HL-02-SS-013	14	C-XR-HL-02-SS-047	< LOD
C-XR-HL-02-SS-014	56	C-XR-HL-02-SS-048	12
C-XR-HL-02-SS-015	14	C-XR-HL-02-SS-049	18
C-XR-HL-02-SS-016	14	C-XR-HL-02-SS-050	17
C-XR-HL-02-SS-017	24	C-XR-HL-02-SS-051	16
C-XR-HL-02-SS-018	42	C-XR-HL-02-SS-052	19
C-XR-HL-02-SS-019	15	C-XR-HL-02-SS-053	14
C-XR-HL-02-SS-020	55	C-XR-HL-02-SS-054	26
C-XR-HL-02-SS-021	< LOD	C-XR-HL-02-SS-055	< LOD
C-XR-HL-02-SS-022	21	C-XR-HL-02-SS-056	24
C-XR-HL-02-SS-023	13	C-XR-HL-02-SS-057	13
C-XR-HL-02-SS-024	108	C-XR-HL-02-SS-058	16
C-XR-HL-02-SS-025	56	C-XR-HL-02-SS-059	19
C-XR-HL-02-SS-026	19	C-XR-HL-02-SS-060	< LOD
C-XR-HL-02-SS-027	31	C-XR-HL-02-SS-061	< LOD
C-XR-HL-02-SS-028	26	C-XR-HL-02-SS-062	21
C-XR-HL-02-SS-029	30	C-XR-HL-02-SS-063	18
C-XR-HL-02-SS-030	17	C-XR-HL-02-SS-064	16
C-XR-HL-02-SS-031	52	C-XR-HL-02-SS-065	14
C-XR-HL-02-SS-032	< LOD	C-XR-HL-02-SS-066	< LOD
C-XR-HL-02-SS-033	56	C-XR-HL-02-SS-067	< LOD
C-XR-HL-02-SS-034	30	C-XR-HL-02-SS-068	< LOD

(USACE, 2013)

## Notes:

&lt; LOD = below limit of detection (12 mg/kg)

mg/kg = milligrams per kilogram

\* All samples were collected at the surface interval of 0 - 6 inches

**Table 2-2**  
**Surface Soil PAH Exceedances**

PAH	NMED SSL (µg/kg)	Frequency of Exceedance of NMED SSL <sup>1</sup>	USEPA RSL (µg/kg) <sup>2</sup>	Frequency of Exceedance of USEPA RSL	Maximum Detected Concentration (µg/kg)
Benz(a)anthracene	1,480	4 / 28	150	6 / 28	9,900
Benzo(a)pyrene	148	8 / 28	15	9 / 28	13,000
Benzo(b)fluoranthene	1,480	4 / 28	150	8 / 28	9,500
Benzo(k)fluoranthene	14,800	0 / 28	1,500	4 / 28	6,700
Dibenz(a,h)anthracene	148	4 / 28	15	9 / 28	2,800
Indeno(1,2,3-cd)pyrene	1,480	4 / 28	150	7 / 28	6,400

(USACE, 2013)

<sup>1</sup> NMED SSLs obtained from Risk Assessment Guidance for Investigations and Remediation Volume I Feb. 2012 updated June 2012.

<sup>2</sup> USEPA Residential Soil Screening Levels Regional Screening Level Summary Table May 2013

**Table 2-3**  
**Subsurface Soil PAH Exceedances**

PAH	NMED SSL (µg/kg)	Frequency of Exceedance of NMED SSL	USEPA RSL (µg/kg)	Frequency of Exceedance of USEPA RSL	Maximum Detected Concentration (µg/kg)
Benzo(a)anthracene	1,480	0 / 4	150	0 / 4	0.0043
Benzo(a)pyrene	148	0 / 4	15	0 / 4	0.0086
Benzo(b)fluoranthene	1,480	0 / 4	150	0 / 4	Non-detect
Benzo(k)fluoranthene	14,800	0 / 4	1500	0 / 4	Non-detect
Dibenz(a,h)anthracene	148	0 / 4	15	0 / 4	Non-detect
Indeno(1,2,3-cd)pyrene	1,480	0 / 4	150	0 / 4	0.0038

(USACE, 2013)

<sup>1</sup> NMED SSLs obtained from Risk Assessment Guidance for Investigations and Remediation Volume I Feb. 2012 updated June 2012.

<sup>2</sup> USEPA Residential Soil Screening Levels Regional Screening Level Summary Table May 2013

## 2.5 National Priority List Status

The USAF is complying with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The TS851a MRS is not identified on the National Priority List.

## 2.6 Other Removal Actions

To date, no removal actions have been conducted at the TS851a – Former Skeet Range MRS. However, a portion of the original range fan from the MRA has been altered by construction of the Fourth Space Command Complex.

### **3.0 THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

As previously discussed, PAH contaminated soils are present in surface/near surface soils at the TS851a – Skest Range MRS. Threats to human health or the environment due to impacted soils that indicate PAH contamination above the NMED SSLs and USEPA RSLs for unrestricted use and have sufficient conditions to meet the USEPA 40 Code of Federal Regulations (CFR) § 300.415(b)(2)(i) criterion for initiating a removal action. Specifically, the NCP lists 8 potential criteria when determining the appropriateness of a removal action. The two removal action criteria applicable to this MRS include “actual or potential exposure to human populations, animals, or the food chain from hazardous substances or pollutants or contaminants [40 CFR 300.415(b)(2)(i)] and high levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate [40 CFR 300.415(b)(2)(iv)]”.

Human receptors include military personnel, authorized non-military personnel, administrative staff, and potential future users through dermal contact, ingestion and inhalation (dust) of surface soils. During the CSE Phase II the ecological risk assessment concluded that for all low molecular weight PAHs no unacceptable risk is present. However, maximum concentrations of high molecular weight PAHs exceeded the Ecological Soil Screening Levels (EcoSSLs) for three of the four receptor categories in the expanded ecological screening. Average concentrations of high molecular weight PAHs exceeded the EcoSSLs for only the most sensitive receptor category. The potential for adverse effects for those exposed to high molecular weight PAHs is possible, though any such risk is likely limited due in part to the fact that PAH sampling was biased toward areas where clay target debris was observed, and thus PAH concentrations were highest (USACE, 2013). Although elevated levels of PAHs were identified in surface soils, the pathway for ecological receptors is considered potentially complete. Habitat constraints also limit the potential for adverse effects. Most of the vegetation at the site is grass typical of semiarid short grass scrubland and as such most biota would not likely find suitable habitat in the grassy areas with limited cover. Furthermore, the MRS does not support suitable habitat for ecologically sensitive species and there are no known ecologically sensitive areas identified within the MRS. PAH contamination identified at the MRS does not pose a risk to ecological receptors (USACE, 2013).

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#### 4.0 ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances (PAH contaminated soils) from this site may present an imminent and substantial endangerment to public health, or welfare, or the environment if this response action (NTCRA) is not performed.

The potential for exposure to PAHs results from clay target debris in the surface soil. Based on the CSE Phase II findings of elevated PAH concentrations in surface soils, complete exposure pathways exist whereby current and future installation personnel, current and future contractors, future recreational users, and future potential residents may be exposed to PAH-impacted surface soil (where present) at the TS851a Former Skeet Range MRS. Current land use is not anticipated to change, however, exposure to future residents was included due to the objective of site closeout and unlimited use/unrestricted exposure. Incomplete pathways exist for current Base residents and current visitors/trespasser due to restricted access and/or security at the adjacent site (USACE, 2013).

During the CSE Phase II the ecological risk assessment concluded that for all low molecular weight PAHs no unacceptable risk is present. However, maximum concentrations of high molecular weight PAHs exceeded the Ecological Soil Screening Levels for three of the four receptor categories in the expanded ecological screening. Average concentrations of high molecular weight PAHs exceeded the Ecological Soil Screening Levels for only the most sensitive receptor category. The potential for adverse effects for those exposed to high molecular weight PAHs is possible, though any such risk is likely limited due in part to the fact that PAH sampling was biased toward areas where clay target debris was observed, and thus PAH concentrations were highest (USACE, 2013). Although elevated levels of PAHs were identified in surface soils, the pathway for ecological receptors is considered potentially complete for ecological receptors at the TS851a Skeet Range MRS. Habitat constraints also limit the potential for adverse effects. Most of the vegetation at the site is grass typical of semiarid short grass scrubland and as such most biota would not likely find suitable habitat in the grassy areas with limited cover. Furthermore, the MRS does not support suitable habitat for ecologically sensitive species and there are no known ecologically sensitive areas identified within the MRS. PAH contamination identified at the MRS does not pose a risk to ecological receptors (USACE, 2013).

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## **5.0 PROPOSED ACTIONS AND ESTIMATED COST**

The EE/CA for the TS851a – Former Skeet Range MRS contains identification and analysis of response action objectives, comparative analysis of response action alternatives, and response action recommendation. Based on the EE/CA assessment, the alternative recommended for the TS851a – Former Skeet Range MRS is Excavation with Off-Site Disposal.

### **5.1 Criteria and Evaluation of Alternatives**

The three general categories, effectiveness, implementability, and costs, established by the NCP, were used in the EE/CA for the MRS to evaluate different response action alternatives. The three alternatives considered are listed below.

#### **Alternative One - No Action**

The No Further Action alternative involves no action to be performed under current or future land use scenarios and is included in accordance with the NCP while also providing a baseline for comparison. Under this alternative, PAH-contaminated soil would remain in place. The advantages of this alternative include no cost and no implementation. The limitations of this alternative include: the source is not being mitigated; the contaminated soil would remain and no land use controls or monitoring would be implemented under this alternative; and in addition, there is no reduction in mobility, toxicity, or volume of chemicals.

#### **Alternative Two – Land Use Controls**

The Land Use Controls alternative includes engineering controls (e.g., installing fencing and warning signs) and institutional controls (e.g., establishing military orders preventing access to the MRS). A Land Use Controls Plan would be developed to document engineering and institutional controls. The TS851a – Former Skeet Range MRS would be surrounded by fencing to prevent unauthorized access. Warning signage would be posted around the perimeter of the fence to restrict unauthorized personnel from entering. The fencing and warning signage would be maintained indefinitely under this alternative. Transferees will be notified regarding the requirement to maintain and enforce Land Use Controls. Land use controls do not address contamination but rather restrict access to and development of the affected area. The advantages of this alternative are that direct exposure through inadvertent site access is reduced, the costs are generally lower than other response actions, and time to implement the action (i.e., response time) is short. The limitations of this alternative include: five year reviews; the source is not mitigated; there is no reduction in mobility, toxicity, or volume of chemicals; potential exposure through inhalation is not mitigated; and engineering controls would require maintenance costs until the contamination is mitigated.

#### **Alternative Three – Excavation with Off-Site Disposal**

An estimated 5,000 BCY of soil would be excavated from the TS851a - Former Skeet Range MRS and disposed at an approved off-base landfill. A conservative approach was used to estimate removal quantity due to the site not being fully delineated. Soil would initially be excavated by heavy equipment to depths ranging from the surface up to 2 ft bgs within the proposed excavation boundaries. Delineation for PAH soil contamination would be conducted utilizing a fixed-base laboratory and completed prior to the excavation to assist with the lateral and vertical delineation. This work will be described in detail in the NTCRA Work Plan. Post excavation confirmatory soil sampling will be conducted to ensure removal of all contaminated

soil. If confirmatory sampling results indicate PAHs concentrations are above the cleanup levels, then additional soil would be excavated before collecting and submitting additional confirmation samples. An After Action Report (AAR) and closure documentation including, a No Action Proposed Plan and a No Action Record of Decision (ROD) will also be completed to document the removal action. The limitations of this alternative include: if remediation becomes necessary at the off-site disposal facility, generators could be liable for cleanup of that facility; excavations remain open until backfill material is placed, which creates potential short-term exposure risk via airborne chemicals unless backfilling is performed daily; and the cost can be high.

### **Evaluation Summary**

Alternative 1, No Action, is not acceptable as it leaves the PAH contamination in-place and provides a complete pathway for contaminated soil to reach receptors. It is not protective of human health or the environment. There is no reduction of toxicity, mobility, or volume of the contaminated soil. It does not comply with ARARs as there is no action taken. There is no long term or short term effectiveness since there is no action, and unacceptable risk to human health and the environment remains under this alternative. The cost of this alternative is \$0.00.

Alternative 2, Land Use Controls, is more acceptable than Alternative 1 but less acceptable than Alternative 3 as it places control on the PAH-contaminated soil by restricting access to the contamination but contamination is still left in place. While protective of human health, there is still a potentially complete pathway for the PAH-contaminated soil to reach receptors. There is no reduction of toxicity, mobility, or volume of the contaminated soil. This alternative is an effective short term and long term alternative in removing the human health pathway through direct contact. It does not comply with ARARs as the contamination is still in place. The cost of this alternative is \$291,932.

Alternative 3, Excavation with Off-Site Disposal, is the most acceptable alternative. It removes exposure pathways by removal of the contaminated soil. It is protective of human health and the environment. There is a reduction of toxicity, mobility, and volume of the PAH contaminated soil to acceptable levels. It does comply with the ARARs. It provides long term and short term effectiveness by removal of the PAH-contaminated soil above the RSLs to allow for Unlimited Use and Unrestricted Exposure. The cost of this alternative is \$738,058.

Alternative 1, No Action, is not acceptable to the goal of site closure with unlimited use/unrestricted exposure. Alternative 2, Land Use Controls, will require indefinite maintenance, and this also does not meet the goal of site closure with unlimited use/unrestricted exposure. Alternative 3, Excavation with Off-Site Disposal, meets the goal for closure although at a higher cost. Therefore, Alternative 3 – Excavation with Off-Site Disposal of PAH-impacted soil is recommended as the preferred alternative for achieving the RAOs for the TS851a – Former Skeet Range MRS in accordance with CERCLA as amended and consistent with the NCP.

### **5.2 Description of Proposed Action**

A phased approach planned for the NTCRA will be comprised of:

- 1) Preliminary activities;
- 2) Excavation Activities;

- 3) Confirmatory Analytical Laboratory Sampling and Analysis;
- 4) Site Restoration/Demobilization; and
- 5) Project Reporting.

All site activities will be performed in accordance with the approved NTCRA Work Plan. More detailed description of the NTCRA alternative is provided below. Further details concerning operating procedures will be provided in the TS851a – Former Skeet Range MRS NTCRA Work Plan.

### **5.2.1 Preliminary Activities, Excavation, and Soil Sampling and Analysis Activities**

Preliminary activities that will be performed to enable the startup of the NTCRA include:

- Preparation of technical planning documents including the NTCRA WP;
- Personnel training;
- Mobilization;
- Setting up Live Loading or Staging Area, and Decontamination Area
- Site preparation including site delineation, soil excavation delineation, and equipment staging (if needed).

#### **Preparation of Technical Planning Documents**

The contractor, FPM, has prepared site-specific planning documents, which includes a Quality Control component; health and safety, sampling and analysis plan component; NTCRA Work Plan including a Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP); and field procedures. These documents will be reviewed by the USAF and USEPA with a courtesy copy to be provided to NMED, and will be finalized prior to conducting the NTCRA.

#### **Personnel Training**

FPM will ensure that only qualified and properly trained personnel are assigned to positions on project sites. Personnel working onsite will follow FPM and Holloman Air Force Base access and fieldwork protocols.

#### **Mobilization**

Mobilization of field staff (management, technical, subcontractors), equipment (vehicles, detection instruments, Global Positioning System [GPS], etc.), and material (safety supplies, flagging, stakes, etc.) at the TS851a – 1940's Skeet Range MRS will follow project planning documentation and Action Memorandum approval.

## **Temporary Soil Stockpiling/Staging Area and Decontamination Area**

Personnel will report to the MRS at the beginning of each workday for the daily health and safety briefing. The temporary soil stockpiling/staging area will be delineated and the decontamination area will be established.

### **Site Preparation**

**Site Delineation:** The FPM field team will perform initial reconnaissance of the site upon mobilization to determine and delineate the boundaries based on previous investigation results.

During the initial reconnaissance, the survey team will examine the site to determine the amount of vegetation that must be removed, if any, to accomplish the scope of work. It is anticipated that the density of vegetated areas will be light and if needed, personnel will perform minimal brush clearing activities.

**Soil Removal Delineation:** The FPM survey team will establish semi-permanent site control as required across the site. Following setup of the site control network, the survey team will stakeout the pre-designated excavation area as shown in **Figure 5**.

Following completion of preparatory activities, the surface and near subsurface soil removal will be conducted across the determined excavation area. The following activities describe the proposed NTCRA:

- Establishment of an Exclusion Zone whereby all unauthorized personnel will be prohibited from entering when clearance activities are underway.
- Collection of soil samples to be analyzed at a fixed-based analytical laboratory by Toxicity Characteristic Leaching Procedure (TCLP) disposal characteristics.
- Any soil determined to be hazardous will be loaded and appropriately staged in a roll-off container prior to commencing further excavation activities, and all equipment will be decontaminated prior to excavation of any residual non-hazardous PAH-contaminated soils.
- An estimated 5,000 BCYs of soil will be excavated from the TS851a – Former Skeet Range MRS and disposed of at an approved off-site landfill.
- Soil will initially be excavated by heavy equipment to depths ranging from the surface to 2-ft bgs within the proposed excavation boundaries. Visual field screening for clay target debris will assist with the lateral and vertical extent of the impacted soil removal.
- Confirmation soil samples (grab samples) will be collected and submitted to an off-site fixed-based analytical laboratory and analyzed for PAHs.
- If the laboratory results indicate PAH concentrations are above the cleanup levels, then additional soil will be excavated and the area will again be sampled by end-point confirmation samples.
- The excavated soil will be disposed of off-site at an approved landfill.

### **5.2.2 Site Restoration/Demobilization**

Prior to demobilization, and with the pre-approval of the Project Manager and the USAF, all flagging, and other materials used during the course of NTCRA operations will be removed from the project site and disposed of through proper waste handling procedures defined by the NTCRA Work Plan.

The excavated area will then be backfilled with clean soil and graded to pre-excavation conditions. Once all site restoration activities are completed, the field teams and equipment will be demobilized from the site.

Equipment and excess materials will be demobilized from the project site as tasks are completed. Required personnel will remain onsite until Quality Assurance / Quality Control procedures have been implemented and approved, and restoration activities have been completed.

### **5.2.3 Project Reporting**

The AAR and subsequent closure documents including a No Action Proposed Plan and a No Action ROD will be completed to document the removal action. This report will summarize the results from the soil excavation and soil sampling and analysis activities in the form of text, tables, photographs, and detailed figures. The AAR will include Geographic Information System (GIS) information, copies of all manifests, and a detailed narrative of the NTCRA. The completed Draft AAR will be submitted to the USAF, and USEPA for review and comment with a courtesy copy to be provided to NMED. Once all regulatory agency comments have either been resolved or incorporated into the report, the Final AAR will be issued.

The final reporting for this project will be the preparation of a No Action Proposed Plan and a No Action ROD, and miscellaneous reports such as Environmental Restoration Program Information Management System (ERPIMS) submittals. The AAR, No Action Proposed Plan, and ROD will be produced in accordance with the Task Order Contract Data Requirements List, as will all other data deliverables.

### **5.3 Technical and Administrative Feasibility of the Proposed Action**

The proposed removal action is technically and administratively feasible, and the services and materials necessary to implement the alternative are readily available.

The USAF, concurs with the proposed alternative. Comments on the EE/CA were received and resolved. The comments and responses (if any are received on the EE/CA) are summarized in the Responsiveness Summary presented in **Appendix B**. These comments did not result in a change to the recommended NTCRA described in the EE/CA.

## 5.4 Applicable or Relevant and Appropriate Requirements

The ARARs addressing contaminated environmental media are identified in the following subsections. The NCP (40 CFR 300.5) defines “applicable” requirements as: “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site.” Only those promulgated state standards identified by a state in a timely manner that are substantive and equally or more stringent than federal requirements may be applicable. The NCP (40 CFR 300.5) further defines “relevant and appropriate” requirements as: “those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that, while not ‘applicable’ to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.” Like “applicable” requirements, the NCP also provides that only those promulgated state requirements identified in a timely manner and are more stringent than corresponding federal requirements may be relevant and appropriate. USEPA identifies three basic types of ARARs. They include chemical-specific, location-specific, and action-specific, as described below:

- Chemical-specific ARARs are based on health- or risk-based concentration limits or discharge limitations in environmental media (i.e., air, soil, or water) for specific hazardous chemicals. These requirements may be used to set cleanup levels for the chemicals of concern in the designated media.
- Action-specific ARARs generally set performance, design, or other similar operational controls or restrictions on particular activities related to management of hazardous substances or pollutants. These requirements address specific activities that are used to accomplish a remedy. Action-specific requirements do not in themselves determine the remedial action; rather, they indicate how a selected remedial action alternative must be designed, operated, or managed.
- Location-specific ARARs are restrictions placed on the types of activities that may occur in particular locations. The location of a site may be an important characteristic in determining its impact on human health and the environment.

Identification and evaluation of additional ARARs will be an iterative process, which will be performed throughout the term of the project, and particularly when evaluating and recommending an appropriate removal/remedial response.

In addition to ARARs, “to be considered” (TBC) guidance are non-promulgated advisories, proposed rules, criteria, or guidance documents issued by federal or state governments that do not have the status of potential ARARs. This TBC guidance is utilized when determining protective cleanup levels where no ARAR exists, or where ARARs are not sufficiently protective of human health and the environment.

The chemical-specific, location-specific, and action-specific ARARs for this NTCRA are discussed in the following sections (**Table 5-1**).

**Table 5-1**  
**Potential ARARs and TBCs**

Law/Regulation	Description	ARAR/TBC Status
<b>Chemical-Specific</b>		
SSLs/NMED (Risk Assessment Guidance for Investigations and Remediation Volume I Feb. 2012 updated June 2012.)	Provides SSLs for chemicals in soil that NMED considers to be below thresholds of concern for risks to human health. Provides maximum contaminant concentrations for specific site uses.	ARAR. COC (PAHs) comparison values for soil left in place at the MRS will be evaluated in with regard to compound specific screening values.
RSLs/USEPA (Residential Soil Screening Levels Regional Screening Level Summary Table June 2015)	Provides RSLs of chemicals in soil that USEPA considers being protective for humans over a lifetime. Used for soil analytical screening.	ARAR. COC (PAHs) comparison values for soil left in place at the MRS will be evaluated in with regard to compound specific screening values.
<b>Action-Specific</b>		
Solid Waste Disposal Act, as amended by Resource Conservation and Recovery Act of 1976 (42 U.S.C. Sect. 6901-6992K)  Standards Applicable to Generators of Hazardous Waste (Subtitle C) (40 CFR Part 262.11)	Establishes standards for generators of hazardous waste. Characterize waste by using prescribed testing methods or applying generator knowledge based on information regarding material. If waste is determined to be hazardous, it must be managed in accordance with appropriate sections of 40 CFR 260-272.	ARAR. Applicable as removal action involves disposal characterization and off-site disposal or treatment of waste.
New Mexico Administrative Code Environmental Protection Statewide Ambient Air Quality Standards (20.2.3.109 – Total Suspended Particulates)	This state regulation addresses the maximum allowable concentrations of total suspended particulate in the ambient air. All activities resulting in the generation of emissions or dust at a site will conform to the regulations of this code.	ARAR. Applicable as the excavation activities for the planned remedial actions will involve particulate dust emissions.

#### 5.4.1 Chemical-Specific ARARs

Chemical-specific ARARs are health- or risk-based concentration limits for specific hazardous chemicals that may be used to set cleanup levels for the contaminants in a designated media. Guidance was obtained from the NMED Risk Assessment Guidance for Site Investigations and Remediation Volume I, February 2012 (updated June 2012) (NMED, 2012). Chemical-specific ARAR guidance also includes USEPA RSLs. In addition, a PAH in soil background study from the CSE Phase II is included in the chemical-specific guidance. The residential NMED SSLs and USEPA RSLs for PAHs in soil are proposed for the NTCRA, which should facilitate unrestricted use and unlimited exposure of the property (i.e., no land use controls required) residential NMED SSLs are presented for comparison. The chemical-specific ARARs and TBCs for soil are presented in **Table 5-1**. Final chemical-specific ARARs (statutes and regulations) will be determined in consultation with the USEPA, NMED, and other appropriate federal and state agencies. These agencies are responsible for the administration of programs that implement the potential chemical-specific ARARs.

### 5.4.2 Location-Specific ARARs

Location-specific ARARs set restrictions on the types of activities that can be performed based on site-specific characteristics or location. Alternative actions may be restricted or precluded based on proximity to wetlands or floodplains, presence of natural or cultural resources, or to man-made features such as existing disposal areas and local historic buildings. No location-specific ARARs/TBC guidance was identified.

### 5.4.3 Action-Specific ARARs

Based on the NTCRA alternatives developed to address PAH contamination at the TS851a - Former Skeet Range MRS, certain action-specific ARARs will be considered. The action-specific ARARs are presented in **Table 5-1**. At present, New Mexico regulates military munitions through CERCLA. In addition, an approved NTCRA Work Plan must incorporate all substantive requirements of state law, including public participation and review, compliance with New Mexico laws and regulations, and all other technical elements to ensure protection of public health and the environment.

### 5.5 Non-Time-Critical Removal Action Schedule

The dates of the NTCRA as follows, includes all documents, fieldwork, and reporting, following the commencement of remedy implementation:

- EE/CA and Action Memorandum (with public comment period) for TS851a MRS preparation, review, and approval (EE/CA: 15 November 2013 to 28 July 2015, AM: 5 May 2014 to 23 November 2015)
- NTCRA Work Plan for TS851a MRS preparation, review, and approval (20 October 2015 to 21 September 2016)
- Removal Action field activities for TS851a MRS (27 May 2016 to 21 September 2016)
- AAR for TS851a – Former Skeet Range MRS preparation, review, and approval (21 July 2016 to 27 March 2017)
- No Further Action Proposed Plan (with public Comment Period) for TS851a – Former Skeet Range MRS preparation, review, and approval (4 May 2017 to 8 January 2018)
- No Further Action Record of Decision preparation, review, and approval (6 February 2018 to 18 October 2019)

These dates may be adjusted pending completion of the regulatory and public review and commenting process.

**Table 5-2** details the costs associated with the NTCRA alternative.

**Table 5-2**  
**Cost Estimate for Selected Alternative**

<b>ITEM DESCRIPTION</b>	<b>PRICE</b>
<b>Capital Costs</b>	
NTCRA Work Plan, After Action Report and Final Closure Documentation	\$ 37,498
Mobilization and Excavation Activities	\$ 621,973
Analytical Laboratory Analysis	\$ 8,962
Site Restoration	\$ 10,616
Escalation	\$ 59,009
<b>Total Capital Cost</b>	<b>\$ 738,058</b>
<b>Annual Operations and Maintenance (O&amp;M) Costs</b>	
<b>Total Annual O&amp;M Costs</b>	<b>\$0</b>

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**6.0 EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

A delay in implementation of the proposed removal action or taking no action at all could potentially result in unnecessary exposure to PAH- contaminated soils by human receptors. A “no action” response would not include any specific response actions for preventing exposure to PAH- contaminated soils and it would not meet the identified ARARs. In addition, a “no action” response would not provide a long-term remedy that would be effective at protecting human health and the environment.

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## **7.0 OUTSTANDING POLICY ISSUES**

The scope of the proposed removal action addresses the surface and shallow subsurface PAH-impacted soils at the TS851a – Skeet Range; therefore, no other policy issues are associated with the MRS.

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## **8.0 ENFORCEMENT**

This Action Memorandum and NTCRA is being completed in accordance with the USAF MMRP cleanup process that follows the requirements of the NCP as promulgated under the CERCLA as amended by SARA.

The USAF is the acting lead agency for this NTCRA. Participation of and cooperation with federal, state, and local authorities and the local public will be solicited for the duration of proposed activities and for all environmental restoration activities at Holloman AFB. Participation by these entities is required for the environmental restoration process and aids in ensuring the protection of human health and the environment. Federal, state, and local authorities will have input into the actions implemented at Holloman AFB through planning meetings, plan review, and the public comment process. Federal, state, and local authorities concerns will be solicited and provisions of federal, state, and local regulations will be given full consideration for all actions taken at Holloman AFB.

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## 9.0 RECOMMENDATIONS

This Action Memorandum presents the selected removal action for the TS851a – Former Skeet Range MRS at Holloman Air Force Base, developed in accordance with CERCLA as amended, and also in a manner consistent with the NCP. This decision is based on the information gathered during the previous investigations completed at the site and included in the Administrative Record for the site.

Based on the individual and comparative analysis presented in the EE/CA for this MRS, Alternative 3, Excavation with Off-Site Disposal will achieve the remedial action objective with a certainty of success than the other two alternatives and is consistent with what is anticipated to be the overall final remedy for the sites. Results from confirmatory sampling conducted post-excavation, will be used to certify that surface and subsurface soil removal of PAH-contaminated soils has been achieved in all areas where the NTCRA occurs.

Conditions at the site meet the NCP Section 300.415(b)(2)(i) criterion for an NTCRA and approval of the proposed NTCRA is recommended. The total project ceiling, if approved, is estimated to be \$738,058 and would result in a final remedy with no following O&M costs.

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**10.0 AUTHORIZING SIGNATURES**

**APPROVED BY:**

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Signature

Date

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Agency: Holloman Air Force Base

---

Signature

Date

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Agency: United States Environmental Protection Agency

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## 11.0 REFERENCES

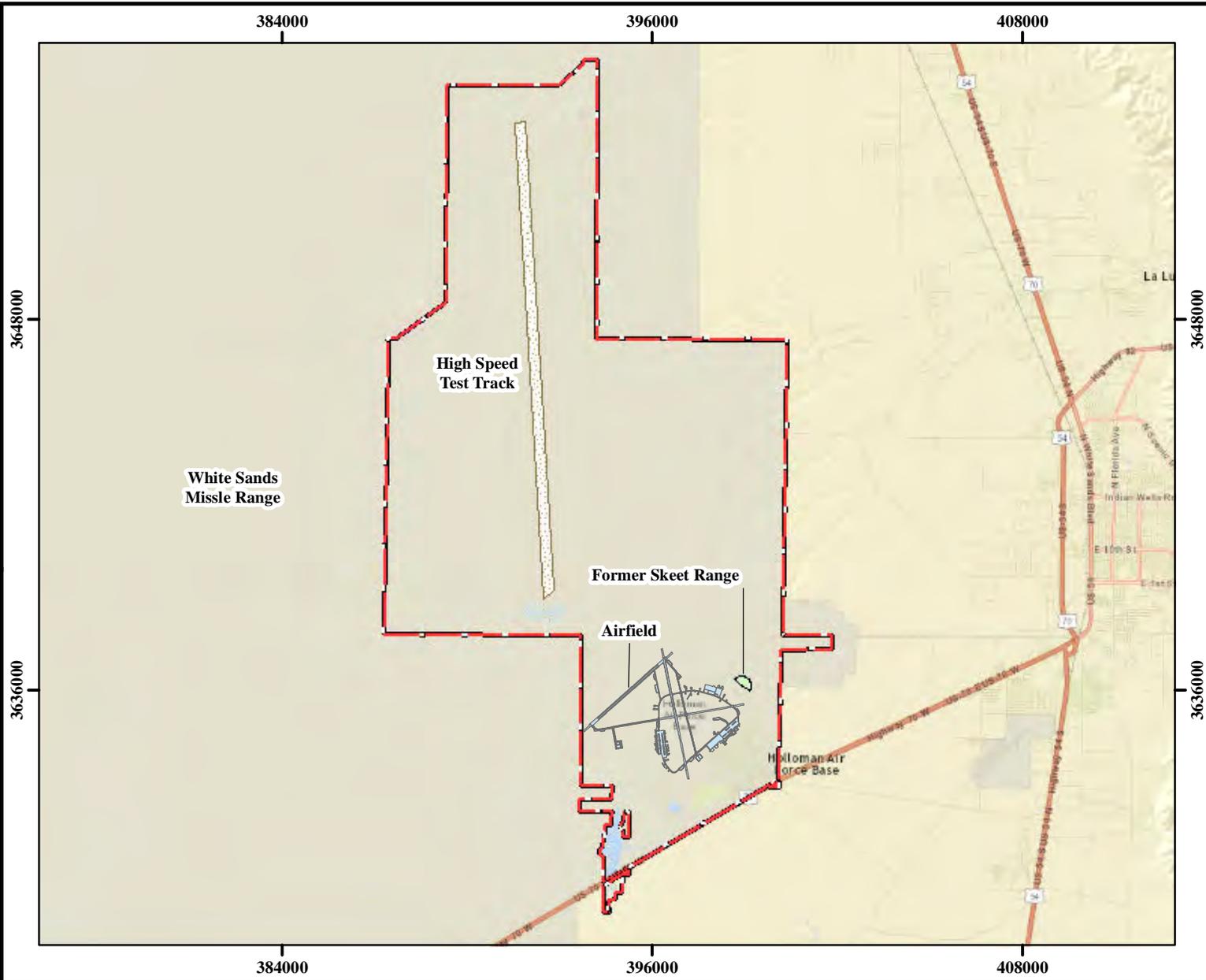
- Code of Federal Regulations (CFR). 2003. Title 40 – Protection of the Environment, Part 300 - National Oil and Hazardous Substances Pollution Contingency Plan.
- HydroGeoLogic, Inc (HGL). 2007. Supplemental RCRA Facility Investigation LF-10 (SWMUS 101 & 109) and LF-29 (SWMU 104) Holloman Air Force Base Alomogordo, New Mexico. July.
- New Mexico Environment Department (NMED). 2012. Risk Assessment Guidance for Site Investigations and Remediation February. Updated June 2012.
- Radian Corporation, 1992b. RI, Report, Volume II of III, Appendices A, B, C, and D, Investigation, Study and Recommendation for 29 Waste Sites.
- United States Army Corps of Engineers (USACE), ITSI, Shaw. 2010. Holloman Air Force Base Modified Comprehensive Site Evaluation Phase I Report. May.
- United States Army Corps of Engineers (USACE), HDR Environmental, Operations and Construction, Inc. 2013. Comprehensive Site Evaluation Phase II Final Report Military Munitions Response Program (MMRP) Holloman Air Force Base, New Mexico. September.
- United States Environmental Protection Agency (USEPA) 1970. Summary of the Clean Air Act. 42 U.S.C. 7401 et seq. <http://www.epa.gov/lawsregs/laws/caa.html>
- USEPA. 1993. Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA. OSWER Directive Number 9360.0-32, EPA/540-R-93-057. August.
- USEPA. 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. July.
- USEPA. 2014. Regional Screening Level (RSL) Summary Table. May.

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**APPENDIX A**  
**FIGURES**

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Path: Y:\GIS\_Projects\Holloman\_AFB\Projects\Action\_Memos\Fig\_1\_Site\_TSR81A\_Loc.mxd



- Legend**
- MRA 851
  - Installation Boundary

**Performance Based Remediation**  
 New Mexico-Arizona  
 Holloman Air Force Base  
 Alamogordo, NM  
 AFCEC

**FIGURE 1**

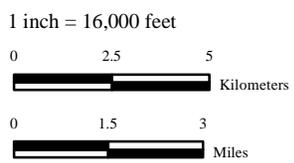
Holloman AFB



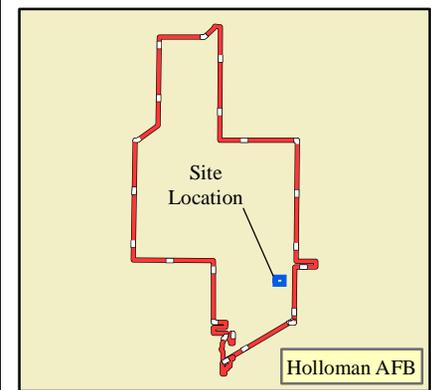
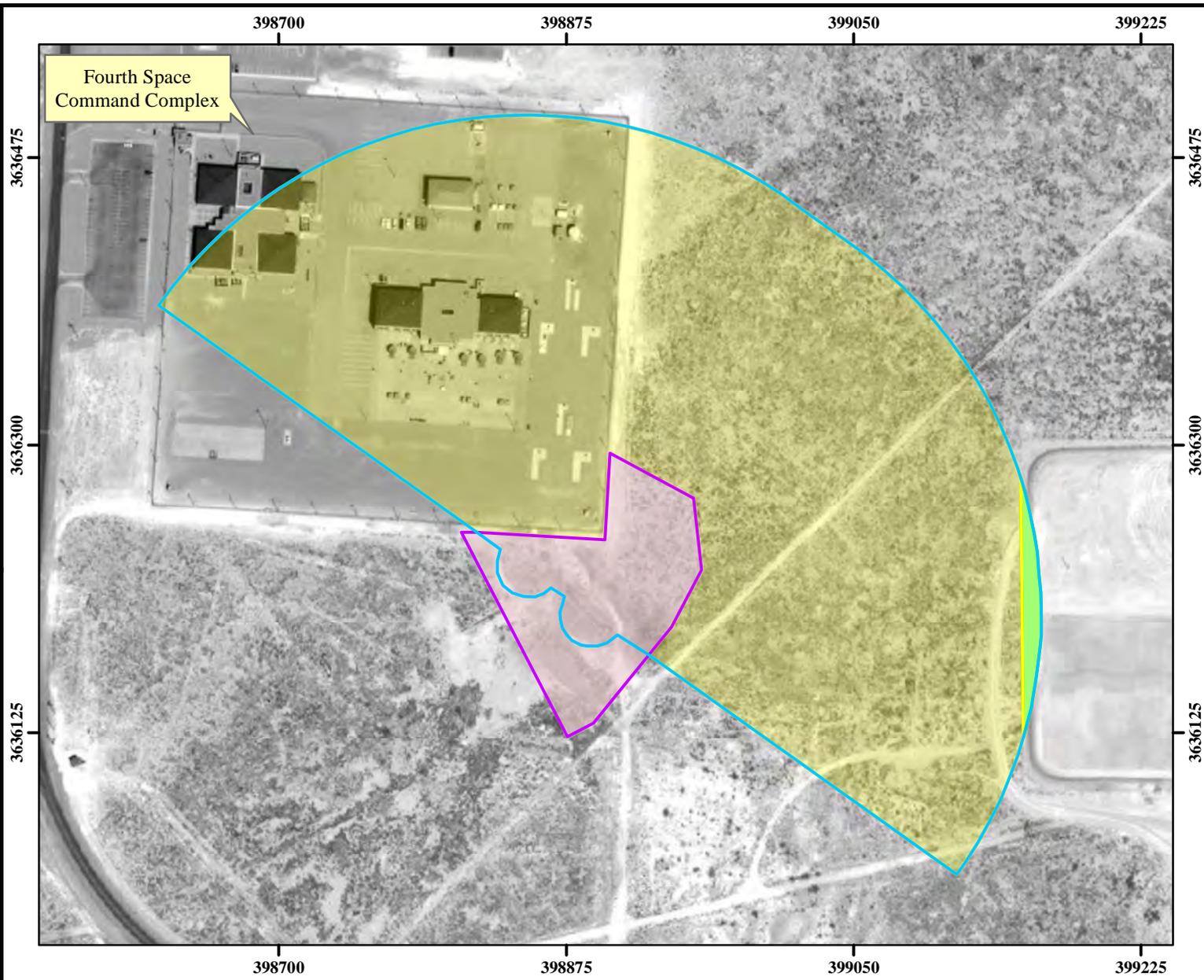
2014

**NOTES:**  
 Revision Date: 10/24/2014

Coordinate System: NAD 1983 UTM Zone 13N  
 Projection: Transverse Mercator  
 False Easting: 500,000.0000  
 Central Meridian: -105.0000  
 Latitude Of Origin: 0.0000  
 Horizontal Datum: North American 1983  
 False Northing: 0.0000  
 Scale Factor: 0.9996  
 Units: Meter



Path: Y:\GIS\_Projects\Holloman\_AFB\Projects\Action\_Memos\Fig\_2\_TS851A\_FSR\_MRS.mxd



**Legend**

- Former Skeet Range (TS851)
- Former Skeet Range (TS851a) - EE/CA
- Former Skeet Range (TS851b)
- Former Skeet Range (MRA 851)
- Installation Boundary

**Performance Based Remediation**  
 New Mexico-Arizona  
 Holloman Air Force Base  
 Alamogordo, NM  
 AFCEC

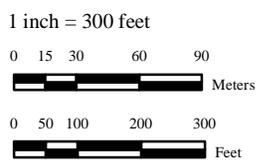
**FIGURE 2**

Former Skeet Range MRSs

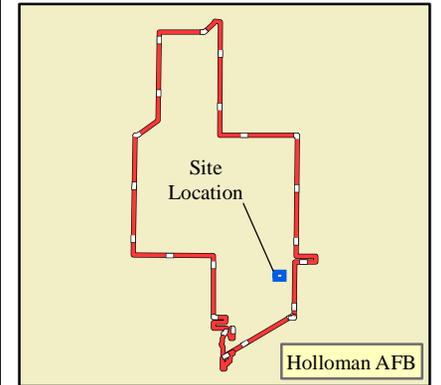
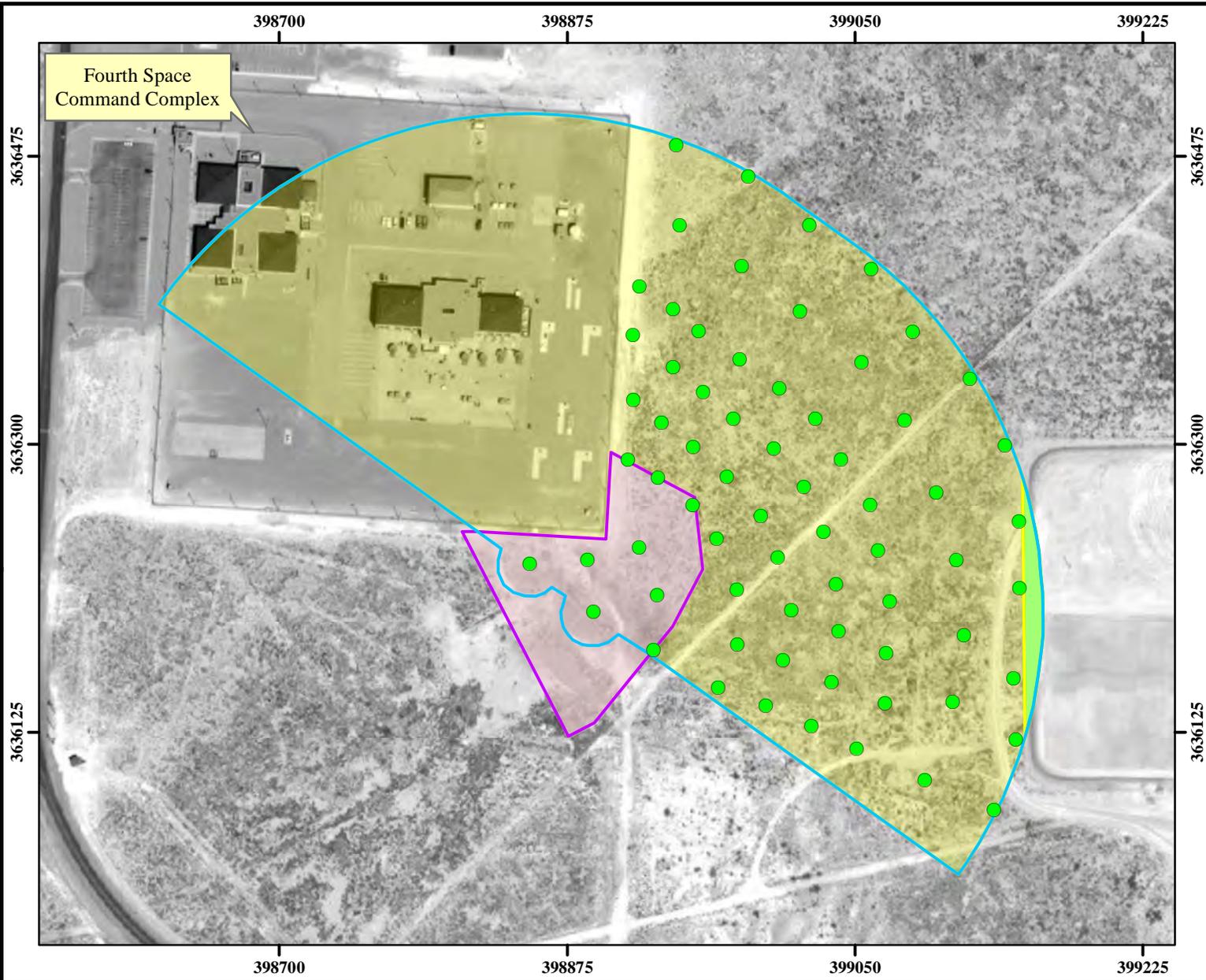
- NOTES:**
1. Boundary based on CSE Phase II findings.
  2. Revision Date: 6/27/2014

Coordinate System: NAD 1983 UTM Zone 13N  
 Projection: Transverse Mercator  
 False Easting: 500,000.0000  
 Central Meridian: -105.0000  
 Latitude Of Origin: 0.0000

Horizontal Datum: North American 1983  
 False Northing: 0.0000  
 Scale Factor: 0.9996  
 Units: Meter



Path: Y:\GIS\_Projects\Holloman\_AFB\Projects\Action\_Memo\Fig\_3\_TS851A\_FSR\_Ph\_Leads.mxd



- Legend**
- Pb < 400 mg/kg
  - Former Skeet Range (TS851)
  - Former Skeet Range (TS851a) - EE/CA
  - Former Skeet Range (TS851b)
  - Former Skeet Range (MRA 851)
  - Installation Boundary

**Performance Based Remediation**  
 New Mexico-Arizona  
 Holloman Air Force Base  
 Alamogordo, NM  
 AFCEC

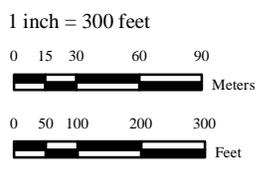
## FIGURE 3

Former Skeet Range  
 Lead Sample Locations

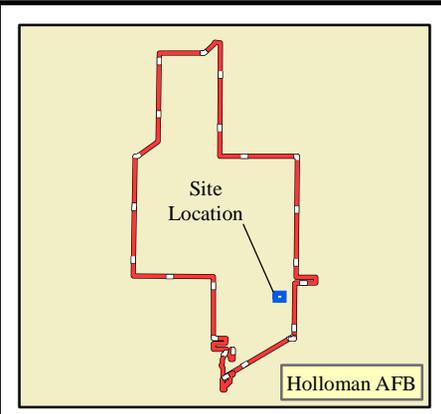
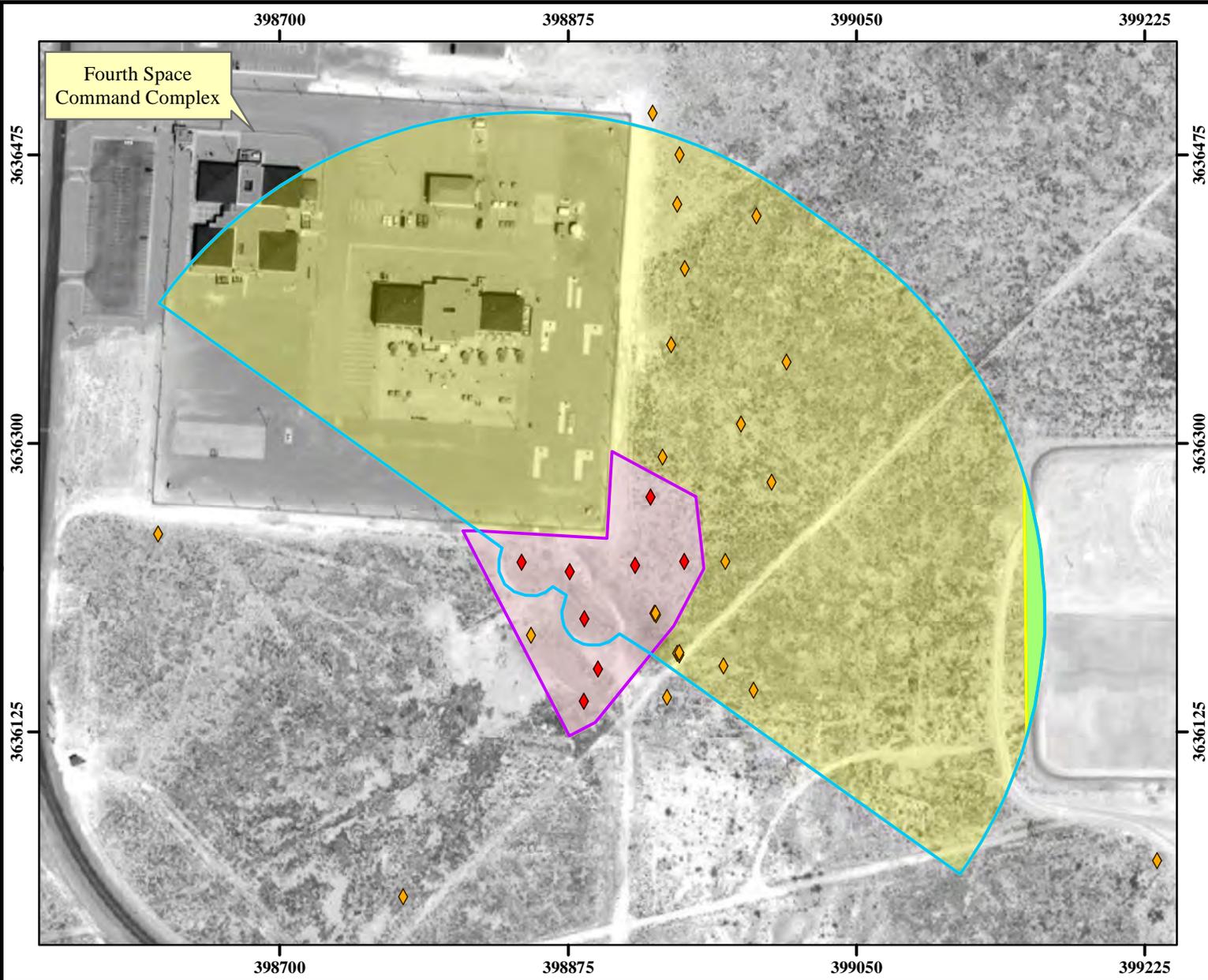
- NOTES:**
1. Boundary based on CSE Phase II findings.
  2. Revision Date: 6/27/2014

Coordinate System: NAD 1983 UTM Zone 13N  
 Projection: Transverse Mercator  
 False Easting: 500,000.0000  
 Central Meridian: -105.0000  
 Latitude Of Origin: 0.0000

Horizontal Datum: North American 1983  
 False Northing: 0.0000  
 Scale Factor: 0.9996  
 Units: Meter



Path: Y:\GIS\_Projects\Holloman\_AFB\Projects\Action\_Memos\Fig\_4\_TS851A\_FSR\_PAH\_Results.mxd



- Legend**
- ◆ PAH Sample Location Below HHSL
  - ◆ PAH Sample Location Above HHSL
  - Former Skeet Range (TS851)
  - Former Skeet Range (TS851a) - EE/CA
  - Former Skeet Range (TS851b)
  - Former Skeet Range (MRA 851)
  - Installation Boundary

**Performance Based Remediation**  
 New Mexico-Arizona  
 Holloman Air Force Base  
 Alamogordo, NM  
 AFCEC

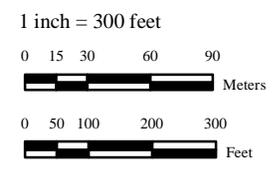
**FIGURE 4**

Former Skeet Range  
 PAH Sample Locations

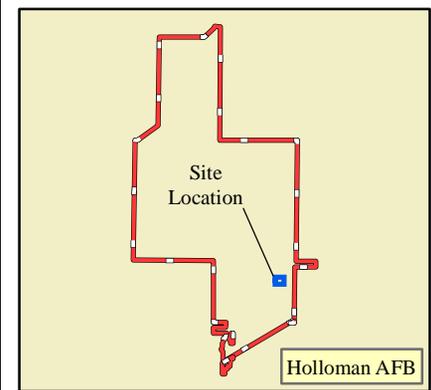
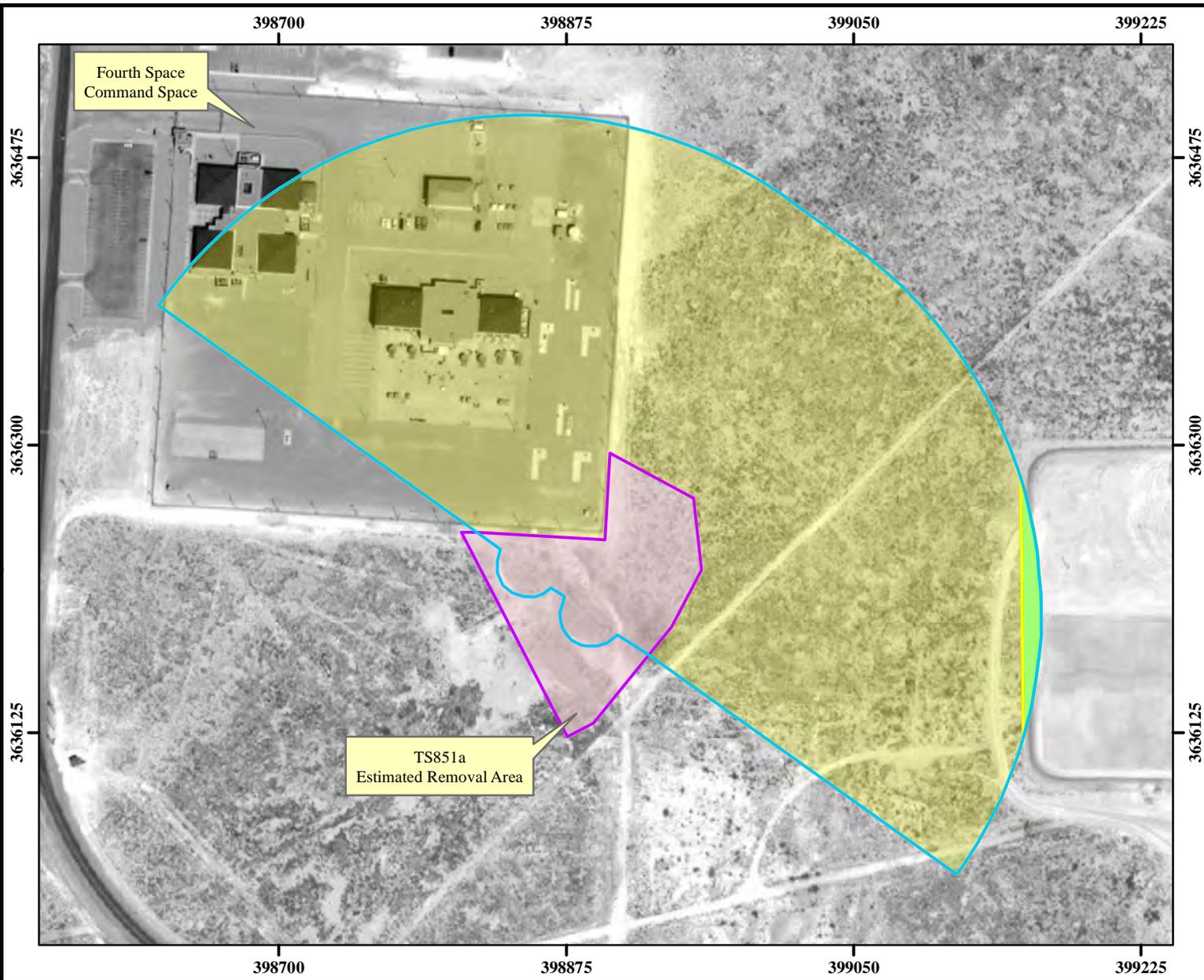
- NOTES:**
1. Boundary based on CSE Phase II findings.
  2. Revision Date: 6/27/2014

Coordinate System: NAD 1983 UTM Zone 13N  
 Projection: Transverse Mercator  
 False Easting: 500,000.0000  
 Central Meridian: -105.0000  
 Latitude Of Origin: 0.0000

Horizontal Datum: North American 1983  
 False Northing: 0.0000  
 Scale Factor: 0.9996  
 Units: Meter



Path: Y:\GIS\_Projects\Holloman\_AFB\Projects\Action\_Memo\Fig\_5\_TS851a\_Proposed\_Removal\_Area.mxd



- Legend**
- Former Skeet Range (TS851)
  - Former Skeet Range (TS851a) - EE/CA
  - Former Skeet Range (TS851b)
  - Former Skeet Range (MRA 851)
  - Installation Boundary

**Performance Based Remediation**  
 New Mexico-Arizona  
 Holloman Air Force Base  
 Alamogordo, NM  
 AFCEC

**FIGURE 5**

Proposed  
 Removal Area at TS851a MRS

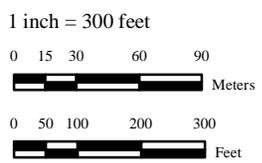


2014

- NOTES:**
1. Boundary based on CSE Phase II findings.
  2. Revision Date: 6/27/2014

Coordinate System: NAD 1983 UTM Zone 13N  
 Projection: Transverse Mercator  
 False Easting: 500,000.0000  
 Central Meridian: -105.0000  
 Latitude Of Origin: 0.0000

Horizontal Datum: North American 1983  
 False Northing: 0.0000  
 Scale Factor: 0.9996  
 Units: Meter



**APPENDIX B**  
**RESPONSIVENESS SUMMARY**

*(No public comment were received on the  
Engineering Evaluation / Cost Analysis)*

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