UNITED STATES AIR FORCE
JOINT BASE ELMENDORF-RICHARDSON, ALASKA

MILITARY Mmunitions RESPONSE PROGRAM

SITE CLOSURE REPORT
Suspected Skeet Range (TS003)

Final

March 2014

TABLE OF CONTENTS

Section			Page
1.0		INTRODUCTION	1
2.0		SUMMARY OF SITE CONDITIONS	3
	2.1	**Site Location and Background Information**	**3**
	2.2	**Previous Investigations**	**7**
		2.2.1 Comprehensive Site Evaluation Phase I: 2006	7
		2.2.2 Comprehensive Site Evaluation Phase II Investigation: 2009	7
		2.2.3 Engineering Evaluation/ Cost Analysis: 2012	11
		2.2.4 Non-Time Critical Removal Action: 2012	11
	2.3	**Conceptual Site Model**	**19**
	2.4	**Justification for Site Closure**	**19**
3.0		SUMMARY OF OPERATIONS AND MAINTENANCE	25
4.0		PROTECTIVENESS DECLARATION	27
5.0		REFERENCES	29

LIST OF FIGURES

Figure		Page
Figure 2-1	MRS TS003 – Site Location Map	5
Figure 2-2	MRS TS003 – CSE Phase II Analytical Sample Locations and Results	9
Figure 2-3	MRS TS003 – Confirmation Sampling Locations	13
Figure 2-4	MRS TS003 – MEC Exposure Pathway Analysis	21
Figure 2-5	MRS TS003 – MC Exposure Pathway Analysis	23

LIST OF TABLES

Table		Page
Table 2-1	MRS TS003 – Comparative Analysis of Alternatives for Contaminant Hazards	11
Table 2-2	MRS TS003 – Analytical Sample Results – Sidewall Samples	15
Table 2-3	MRS TS003 – Analytical Sample Results – Bottom Samples	17

ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSE	Comprehensive Site Evaluation
EPA	United States Environmental Protection Agency
EPC	exposure point concentration
JBER	Joint Base Elmendorf-Richardson
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MRA	munitions response area
MRS	Munitions Response Site
NTCRA	Non-Time Critical Removal Action
PAH	polycyclic aromatic hydrocarbons
RAA	Response Action Alternative
RAO	removal action objective
SSR	Suspected Skeet Range
State	State of Alaska
UCL	upper confidence limit
UFP-QAPP	Uniform Federal Policy – Quality Assurance Project Plan
USAF	United States Air Force
XRF	X-ray fluorescence

1.0 INTRODUCTION

This Site Closure Report has been prepared by the United States Air Force (USAF) to document that Munitions Response Site (MRS) TS003, the Suspected Skeet Range (SSR), located on Joint Base Elmendorf-Richardson (JBER)-Elmendorf, Alaska, meets the criteria for site closure according to State of Alaska (State) and United States Environmental Protection Agency (EPA) regulations and guidance.

Specifically, this report presents the following evidence:

1) MRS TS003 is protective of human health and the environment in accordance with the Alaska Department of Environmental Conservation (ADEC) regulations for Oil and Other Hazardous Substances Pollution Control (18 Alaska Administrative Code [AAC] 75) (ADEC, 2011) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).
2) MRS TS003 meets State and CERCLA applicable or relevant and appropriate requirements.

This is one of 12 USAF sites that are no longer operational; it was investigated under the USAF Military Munitions Response Program and is in the MRS inventory.

The content of this report reflects the final reporting requirements for site closure as per the Department of Defense Environmental Restoration Program protocol, 18 AAC 75.380 (ADEC, 2011), and CERCLA (EPA, 2010 and EPA, 2011).

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2.0 SUMMARY OF SITE CONDITIONS

2.1 Site Location and Background Information

JBER-Elmendorf's Suspected Skeet Range (MRS TS003) is thought to have been used as a skeet range in the 1940s. According to a 1944 plat map, the Hillberg Lake area was designated as a recreation area with a skeet range. It is unknown whether a formal skeet range was ever constructed.

The SSR encompasses about one acre and is located at 6796941 Northing and 348775 Easting (Universal Transverse Mercator, Zone 6 North, World Geodetic System 84 meters). The MRS is located near the ski area on base and is accessed from 41st Street. The site is heavily vegetated with tall grasses and alder and is surrounded by mature trees. A small clearing, which appeared to have been made by a bulldozer, was located in the center of the site. An all-terrain vehicle and horseback riding trail also crosses through the northern portion of the site. The topography of the immediate area of the SSR is gently rolling, transitioning to a hilly and marshy area behind the ski area maintenance facility. The location of the MRS is depicted in **Figure 2-1**. The site is within the boundary of JBER-Elmendorf, which is a fenced and security-patrolled installation with limited public access.

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N
COOK INLET
Suspected Skeet Range (TS003)
Aero-Metric Copyright © 2005
0 0.25 0.5 1
Miles
SUSPECTED SKEET RANGE (TS003)
United States Air Force
Joint Base Elmendorf-Richardson, Alaska
Figure
2-1

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2.2 Previous Investigations

2.2.1 Comprehensive Site Evaluation Phase I: 2006

A Comprehensive Site Evaluation (CSE) Phase I investigation was performed at JBER-Elmendorf in 2006 to compile and evaluate information relating to the historical use, storage, and disposal of munitions, physical and environmental conditions, conceptual site model information, identification of new munitions response sites (MRSs), and eligibility for presumptive remedies, and to gather data to support setting priorities and developing future munitions response action cost estimates. Sources of this information were the archival records from JBER-Elmendorf; interviews with then-current and former Air Force personnel, community members, and the Air Force Remedial Project Manager; archival information collected from public sources; and observations made during field work.

The only physical evidence of the use of this range included a recent vintage (subsequent to September 2002) shotgun shell and clay pigeon debris observed on the surface. There was no evidence of a high or low house or shooting positions. Based on historical evidence and visual inspection, it did not appear that this range was heavily used by the Air Force as a formal skeet range.

2.2.2 Comprehensive Site Evaluation Phase II Investigation: 2009

Field work conducted during the 2009 CSE Phase II investigation included a visual survey, soil sampling for lead using X-ray fluorescence (XRF) analysis, and off-site laboratory analysis to determine the presence of chemicals/contaminants of concern from the former use of the site.

The CSE Phase II visual survey of the SSR was conducted in July, 2009. As during the CSE Phase I, there was no evidence of shooting positions or formal skeet houses observed during the visual survey. The total amount of skeet observed during both the visual survey and the soil sampling effort amounted to less than a handful of clay target fragments. The skeet debris encountered was primarily in the western portion of the site. Based on field observations, it appeared that this skeet range had only minimal use. There was no evidence of unexploded ordnance, discarded military munitions, or munitions debris (MD) noted at the SSR, and no evidence of hazardous waste disposal was observed.

A total of 50 XRF samples for lead and seven analytical samples for polycyclic aromatic hydrocarbons (PAH) were collected. The samples for PAH analysis were collected from the western boundary of the MRS, as this area held the highest amount of skeet debris. Lead concentrations in all XRF samples were below the ADEC Soil Under 40-Inch Zone Cleanup Level, which is the most conservative human health screening criteria at 400 milligrams per kilogram (mg/kg). Polycyclic aromatic hydrocarbons were detected above the most conservative human health screening criteria in six of the seven analytical samples (Figure 2-2). The CSE Phase II report recommended that impacted soil be removed at MRS TS003 and hauled off site.

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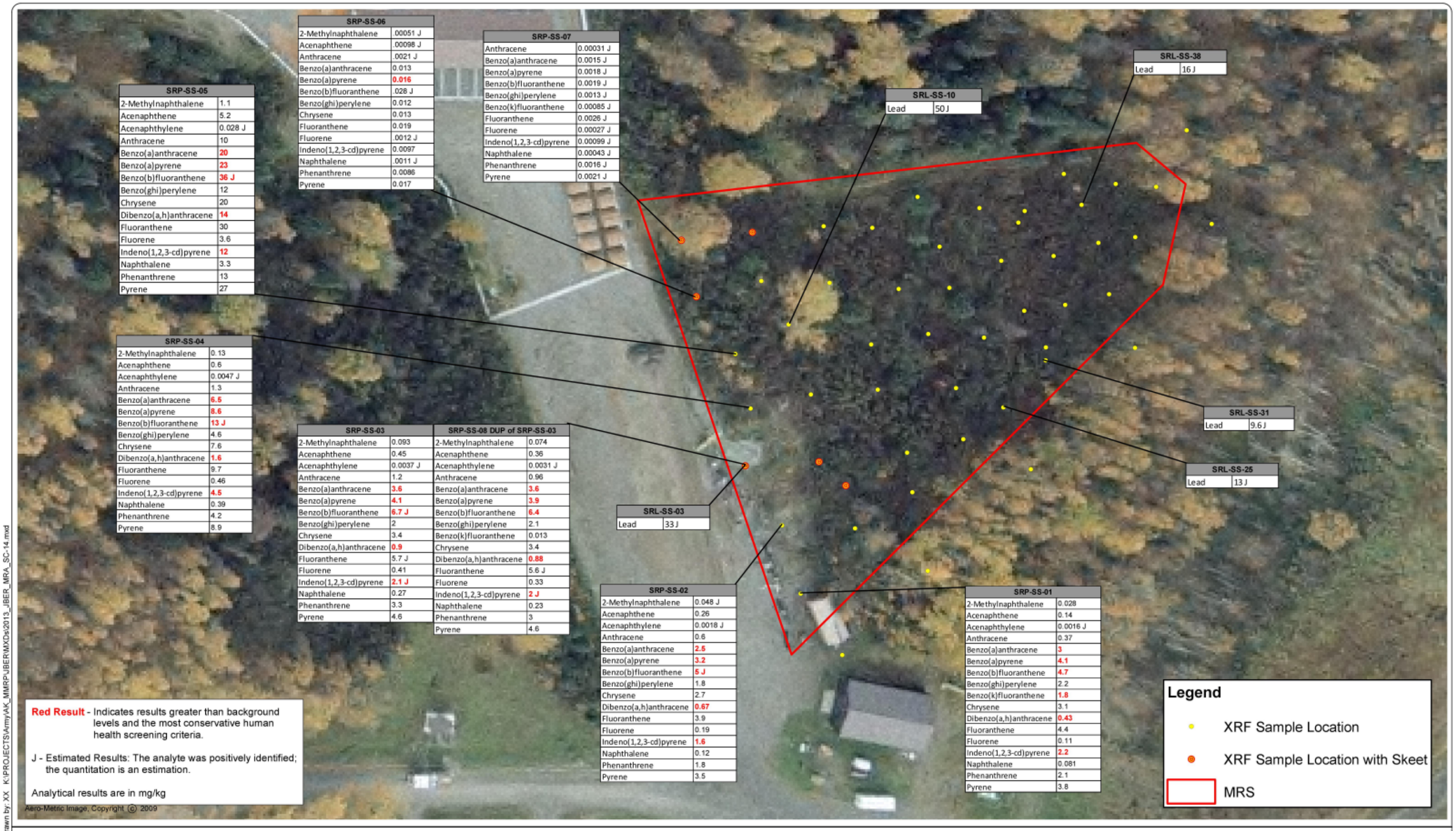

SUSPECTED SKEET RANGE (TS003)
ANALYTICAL SAMPLE LOCATIONS AND RESULTS

United States Air Force
Joint Base Elemendorf-Richardson, Alaska

Figure
2-2

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2.2.3 Engineering Evaluation/ Cost Analysis: 2012

An Engineering Evaluation/Cost Analysis (USAF, 2012) was performed to develop and evaluate alternatives to address the potential contamination at these sites.

Three Response Action Alternatives (RAAs) were developed and evaluated as part of the Engineering Evaluation/Cost Analysis. A comparison of each RAA against the evaluation criteria is presented in **Table 2-1**. Based on this assessment, the recommended alternative was Alternative Three – Impacted Soil Removal and Off-Site Disposal. Soil from MRS TS003 that exceeded ADEC soil cleanup levels (refer to **Tables 2-2 and 2-3** for these levels) was to be excavated and removed to an appropriate disposal facility. Soil removal provided the best balance of features that offered overall protection to human health and the environment. Soil removal reduced the toxicity, mobility, and volume of contamination, was easy to implement, and was effective in both the short and long term.

Table 2-1 MRS TS003 – Comparative Analysis of Alternatives for Contaminant Hazards

Criteria	Alternative One No Action	Alternative Two Institutional Controls	Alternative Three Soil Removal and Off-Site Disposal
1. Protects human health and the environment?	No	Yes	Yes
2. Effective long-term and permanent?	No	Effective, not permanent	Yes
3. Reduces toxicity, mobility, and volume through removal?	No	No	Yes
4. Effective short-term?	N/A	Yes	Yes
5. Implementable?	Yes	Yes	Yes
6. 30-year present value at 5 percent interest	$0	$882,417	$3,012,250
N/A: Not Applicable (Source: USAF, 2012)			

2.2.4 Non-Time Critical Removal Action: 2012

The Final Non-Time Critical Removal Action (NTCRA) work plan and one of the appendices, Uniform Federal Policy–Quality Assurance Project Plan (UFP-QAPP) were approved in July 2012 (USAF, 2012). A UFP-QAPP Addendum #1, Revision #1 was approved in September 2012 (USAF, 2012). The following removal action objectives (RAOs) were developed for the work plan at the SSR:

- Collect analytical samples for PAH at the SSR to further determine the horizontal and vertical extent of PAH in soil.
- Remove PAH-impacted soils to less than ADEC cleanup levels and transport for disposal at a pre-approved facility.
- Collect and analyze analytical samples for PAH from the excavation floor and sidewalls to confirm RAOs have been met.

A total of 2,953 tons of soil were removed from the SSR. As per the work plan, bottom and sidewall confirmation soil samples were collected from the excavation and analyzed. The results

are presented in **Table 2-2 and Table 2-3** and in **Figure 2-3**. One confirmation sample (ELRA-SSR-S42) had a benzo(a)pyrene concentration of 2.7 mg/kg, which is greater than the ADEC soil cleanup level of 0.49 mg/kg. This sample was collected adjacent to a building located in the southwest corner of the MRS (**Figure 2-3**). The excavation was extended to within one foot of this building foundation. Based on this sample result, soil with benzo(a)pyrene concentrations greater than the ADEC soil cleanup criteria may be present under the building foundation. Confirmation soil sample concentrations were less than the ADEC soil cleanup levels for PAH in all other final confirmation samples.

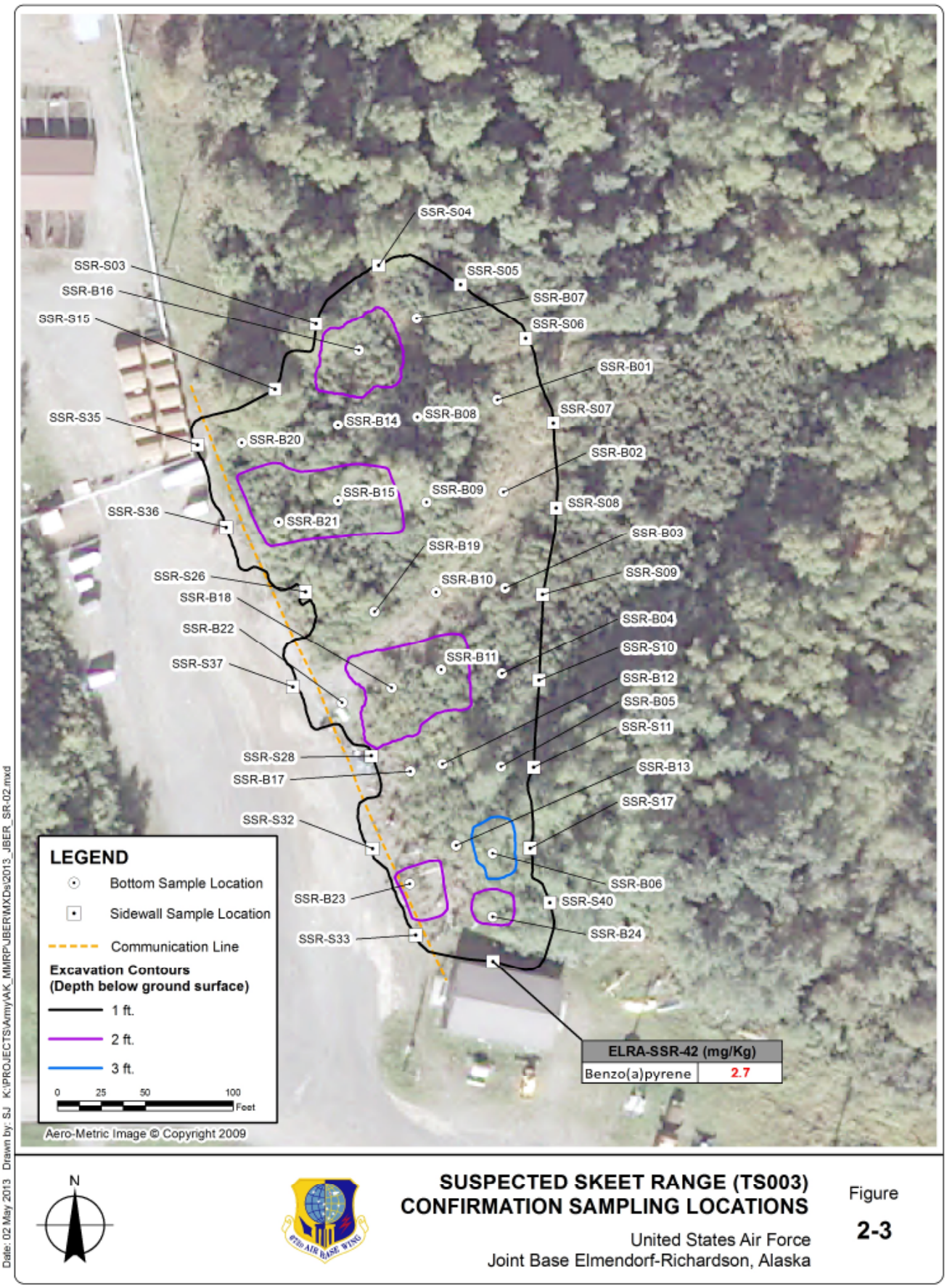
Soil met the Anchorage Soil Recycling and Resource Conservation and Recovery Act requirements and was disposed of at Anchorage Soil Recycling.

2.2.4.1 Potential Human Exposure

To evaluate the potential human exposure within an MRS, the concentration of MC in the exposure medium (soil) must be known or estimated. This concentration, commonly termed the exposure point concentration (EPC) for risk assessment purposes, is a conservative estimate of the average chemical concentration in an environmental medium. The assumption is made that an individual receptor is equally exposed to the soil within all portions of the MRS over the time frame of the risk assessment. The approach used to estimate EPCs in soil follows EPA guidance (EPA, 1989), which recommends that the 95 percent upper confidence limit (UCL) on the mean of the dataset be used when calculating risk at a location. The 95 percent UCL defines a value that equals or exceeds the true mean 95 percent of the time. This EPC was then compared to the ADEC Soil Under 40-Inch Zone Cleanup Level to evaluate sitewide risk from soil chemicals/contaminants of concern.

For the Suspected Skeet Range (MRS TS003), the EPC was calculated for benzo(a)pyrene, which was the only constituent detected above ADEC cleanup criteria following the excavation. Benzo(a)pyrene was detected above the ADEC Under 40-Inch Zone cleanup level within a very limited and inaccessible area of the SSR, which is immediately adjacent to and covered by a building. The EPC was calculated using EPA ProUCL statistical software (EPA, 2007).

For benzo(a)pyrene, all analytical confirmation sample results from the SSR were used in the 95 percent UCL calculation. The resulting EPC, calculated using ProUCL 4.0 Chebyshev, mean Sd approach, is 0.38 mg/kg, which is below the ADEC cleanup criteria of 0.49 mg/kg. Although benzo(a)pyrene was detected above 0.49 mg/kg at one sample located next to the building in the southwest portion of the site, the EPC infers that a human receptor - whether a site visitor, site worker, or future resident - would not likely be exposed to benzo(a)pyrene exceeding 0.49 mg/kg at this site. Based on this analysis, the benzo(a)pyrene detected on a sitewide basis does not pose a risk to human receptors at MRS TS003. Land Use Controls have been placed on building 23392 requiring further investigation if this building is ever demolished.



SUSPECTED SKEET RANGE (TS003)
CONFIRMATION SAMPLING LOCATIONS

United States Air Force
Joint Base Elmendorf-Richardson, Alaska

Figure
2-3

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Table 2-2 MRS TS003 – Analytical Sample Results – Sidewall Samples

Analyte	Background Screening Value	ADEC Soil (Under 40-Inch Zone) Cleanup Level	ADEC Soil (Migration to Groundwater) Cleanup Level	ELRA-SSR-S03-0.5	ELRA-SSR-S04-0.5	ELRA-SSR-S05-0.5	ELRA-SSR-S06-0.5	ELRA-SSR-S07-0.5	ELRA-SSR-S08-0.5 (MS/MSD)	ELRA-SSR-S09-0.5	ELRA-SSR-S10-0.5	ELRA-SSR-S11-0.5	ELRA-SSR-S15-0.5	ELRA-SSR-S17-0.5	ELRA-SSR-S26-.5	ELRA-SSR-S28-.5	ELRA-SSR-S32-.5	ELRA-SSR-S33-.5	ELRA-SSR-S35-.5	ELRA-SSR-S36-1	ELRA-SSR-S37-1	ELRA-SSR-S40-1	ELRA-SSR-S42-1
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Depth (feet)				0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0 to 0.5	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0
SW8270C SIM																							
Anthracene	NA	20,600	3,000	0.0031 U	0.0032 UJ	0.0034 U	0.0026 U	0.0036 U	0.0035 U	0.0036 U	0.0055	0.003 UJ	0.0028 U	0.0034 U	0.0083	0.029	0.028	0.029 J	0.038	0.0025 U	0.0064	0.003 UJ	0.21
Acenaphthene	NA	2,800	180	0.00034 U	0.00034 UJ	0.00036 U	0.0028 U	0.00038 U	0.00038 U	0.00039 U	0.0028 J	0.00032 UJ	0.0003 U	0.00036 U	0.0036 J	0.014	0.011	0.014 J	0.019	0.00022 J	0.0034 J	0.0032 UJ	0.13
Acenaphthylene	NA	2,800	180	0.00084 U	0.00085 UJ	0.00091 U	0.00036 J	0.00096 U	0.00094 U	0.00097 U	0.00041 J	0.0008 UJ	0.00074 U	0.00091 U	0.00069 U	0.00051 J	0.0005 J	0.00052 J	650 U	0.00068 U	0.00066 U	0.0081 UJ	0.0078
Benzo[a]anthracene	NA	4.9	3.6	0.0073 J	0.0011 J	0.0034 U	0.0026 U	0.0015 J	0.0018 J	0.0036 U	0.032	0.0011 J	0.0013 J	0.0053 J	0.04	0.15	0.15	0.16	0.24	0.0033 J	0.045	0.0058 J	1.7
Benzo[b]fluoranthene	NA	4.9	12	0.069 J	0.022 J	0.0089 U	0.0051 J	0.0056 J	0.0028 J	0.0036 U	0.051	0.003 UJ	0.0014 J	0.00034 U	0.064	0.2	0.29 J	0.25 J	0.43	0.007	0.082	0.01 J	2.9
Benzo[k]fluoranthene	NA	49	120	0.027 J	0.0091 J	0.0034 J	0.002 J	0.0022 J	0.0035 U	0.0036 U	0.015	0.003 UJ	0.0028 U	0.0038 J	0.02	0.079	0.11	0.1 J	0.16	0.0025 U	0.032	0.0033 J	1.1
Benzo[a]pyrene	NA	0.49	2.1	0.069 J	0.027 J	0.01	0.0062	0.0055 J	0.0019 J	0.0036 U	0.040	0.003 UJ	0.0012	0.012	0.051	0.16	0.23 J	0.21 J	0.33	0.0051	0.065	0.0065 J	**2.7**
Benzo[g,h,i]perylene	NA	1,400	38,700	0.024 J	0.017 J	0.0094	0.0063	0.0058 J	0.0035 U	0.0036 U	0.026	0.003 UJ	0.0028 U	0.0041 J	0.037	0.13	0.14	0.16	0.24	0.0046 J	0.048	0.0048 J	1.5
Chrysene	NA	490	360	0.012 J	0.0018 J	0.0016 J	0.0026 U	0.0021 J	0.0028 J	0.0036 U	0.037	0.0022 J	0.0017 J	0.0055 J	0.04	0.15	0.19 J	0.19 J	0.28	0.0046 J	0.057	0.0077 J	2.1
Dibenz(a,h)anthracene	NA	0.49	4	0.0077 J	0.0050 J	0.0024 J	0.002 J	0.0036 U	0.0035 U	0.0036 U	0.0068	0.003 UJ	0.0028 U	0.0034 U	0.011	0.036	0.039	0.042 J	0.074	0.0025 U	0.012	0.003 UJ	0.40
Fluoranthene	NA	1,900	1,400	0.0033 J	0.005 UJ	0.0019 J	0.0036 U	0.0024 J	0.0027 J	0.0036 U	0.046	0.0014 J	0.0012 J	0.0042 J	0.05	0.16	0.2 J	0.22	0.28	0.0031 J	0.063	0.0099 J	2.6
Fluorene	NA	2,300	220	0.0032 J	0.000085 UJ	0.0091 U	0.00069 U	0.00096 U	0.00094 U	0.00097 U	0.0021 J	0.000 UJ	0.00074 U	0.00091 U	0.003 J	0.011	0.0072	0.0088	0.012	0.00068 U	0.0023 J	0.00081 UJ	0.074
Indeno[1,2,3-cd]pyrene	NA	4.9	41	0.028 J	0.2 J	0.011	0.0073	0.0059 J	0.0035 U	0.0036 U	0.029	0.003 UJ	0.0028 U	0.0056 J	0.042	0.12	0.16	0.17 J	0.26	0.0044 J	0.053	0.0054 J	1.7
Naphthalene	NA	28	20	0.0035 J	0.00075 J	0.001 J	0.00069 U	0.0018 J	0.0016 J	0.0024 J	0.0019 J	0.0027 J	0.0014 J	0.0054 J	0.0023 J	0.0091	0.0064	0.0077	0.011	0.0068 U	0.0022 J	0.0078 J	0.12
Phenanthrene	NA	20,600	3,000	0.0073 J	0.0031 J	0.0031 J	0.0026 U	0.0037 J	0.0045 J	0.0036 U	0.023	0.0073 J	0.0044 J	0.0065 J	0.028	0.1	0.099	0.1 J	0.14	0.0013 J	0.027	0.016 J	0.83
Pyrene	NA	1,400	1,000	0.0028 J	0.00034 UJ	0.0034 U	0.0026 U	0.0022 J	0.0026 J	0.0036 U	0.044	0.0014 J	0.0012 J	0.0052 J	0.048	0.16	0.2 J	0.22 J	0.3	0.0034 J	0.063	0.0089 J	2.7
1-Methylnaphthalene	NA	280	6.2	0.0011 J	0.00034 UJ	0.00036 U	0.00028 U	0.00042 J	0.00038 U	0.00039 U	0.00044 J	0.00046 J	0.0003 J	0.00087 J	0.00051 J	0.0019 J	0.0015 J	0.0018 J	0.0026 J	0.00027 U	0.0007 J	0.002 J	0.049 J
2-Methylnaphthalene	NA	280	6.1	0.0011 J	0.00053 J	0.00042 J	0.00069 U	0.00096 U	0.00059 J	0.00055 J	0.00068 J	0.00082 J	0.00049 J	0.0013 J	0.00085 J	0.0031 J	0.0023 J	0.0028 J	0.0038 J	0.00068 U	0.00095 J	0.002 J	0.068

Notes:

Bold – indicates the result exceeds cleanup level(s).
mg/kg - All results reported in milligrams per kilograms.
J - Estimated: The analyte was positively identified; the quantitation is an estimate.
U - The constituent was analyzed for but not detected at or above the method detection limit (MDL) concentration.
UJ - The constituent was analyzed for, but not detected at or above the reported concentration. The associated concentration value for the affected constituent is an estimated laboratory reporting limit (RL) due to QC exceedance(s).

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Table 2-3 MRS TS003 – Analytical Sample Results – Bottom Samples

Analyte	Background Screening Value	ADEC Soil (Under 40-Inch Zone) Cleanup Level[1] (mg/kg)	ADEC Soil (Migration to Groundwater) Cleanup Level[2] (mg/kg)	ELRA-SSR-B01-1	ELRA-SSR-B02-1	ELRA-SSR-B03-1	ELRA-SSR-B04-1	ELRA-SSR-B05-1	ELRA-SSR-B06-3	ELRA-SSR-B07-1	ELRA-SSR-B08-1	ELRA-SSR-B09-1	ELRA-SSR-B10-1	ELRA-SSR-B11-2	ELRA-SSR-B12-1	ELRA-SSR-B13-1 (MS/MSD)	ELRA-SSR-B14-1	ELRA-SSR-B15-2	ELRA-SSR-B16-2	ELRA-SSR-B17-1	ELRA-SSR-B18-2 (MS/MSD)	ELRA-SSR-B19-1	ELRA-SSR-B20-1	ELRA-SSR-B21-2	ELRA-SSR-B22-1	ELRA-SSR-B23-2	ELRA-SSR-B24-2
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Depth (feet)									0 to 0.5					0 to 0.5				0 to 0.5	0 to 0.5	0 to 0.5		0 to 0.5	0 to 0.5		0 to 0.5		
SW8270C SIM																											
Anthracene	NA	20,600	3,000	0.00095 J	0.0025 U	0.0032 U	0.0013 J	0.0021 J	0.0071	0.0012 J	0.012	0.013	0.0026 U	0.0012 J	0.0031 J	0.0014 J	0.016 J	0.0028 U	0.0025 U	0.001 J	0.0025 U	0.00090 J	0.0025 J	0.015	0.016 J	0.062	0.0045 J
Acenaphthene	NA	2,800	180	0.00031 J	0.00027 U	0.00035 U	0.00049 J	0.0018 J	0.0022 J	0.00052 J	0.0036 J	0.0057 J	0.00028 U	0.00064 J	0.0016 J	0.00059 J	0.0064 J	0.0003 U	0.00027 U	0.00056 J	0.00026 U	0.00048 J	0.0014 J	0.0052	0.0099	0.031	0.0021 J
Acenaphthylene	NA	2,800	180	0.00071 UJ	0.00068 U	0.00086 U	0.00068 U	0.0066	0.00068 U	0.0003 J	0.00067 U	0.00065 J	0.00023 J	0.00064 U	0.00086 UJ	0.00069 U	0.0063 U	0.00075 U	0.00068 U	0.00056 U	0.00066 U	0.00064 U	0.00075 U	0.038 U	800 J	0.00025 J	0.0007 U
Benzo[a]anthraxcene	NA	4.9	3.6	0.0068 J	0.0038 J	0.0043 J	0.0089	0.0052 J	0.011	0.01	0.06	0.072 J	0.0027 J	0.0076	0.015 J	0.0078	0.056	0.0018	0.0015 J	0.008	0.0018 J	0.0048	0.0099	0.045	0.056 J	0.32	0.041
Benzo[b]fluoranthene	NA	4.9	12	0.012 J	0.0045 J	0.0048 J	0.011	0.0083	0.011	0.015	0.085	0.12 J	0.0056	0.014	0.025 J	0.017	0.098	0.0029	0.0022 J	0.013	0.0038 J	0.0084 J	0.015	0.066	0.075 J	0.54	0.065
Benzo[k]fluoranthene	NA	49	120	0.0046 J	0.0021 J	0.0016J	0.0048 J	0.0034 J	0.0043 J	0.0057	0.036	0.045 J	0.0022 J	0.0044 J	0.01 J	0.0071	0.042 J	0.0011	0.0014 J	0.0039 J	0.0014 J	0.0030 J	0.0058	0.031	0.029 J	0.21	0.024
Benzo[a]pyrene	NA	0.49	2.1	0.011 J	0.0052	0.0041 J	0.0099	0.0062 J	0.009	0.011	0.071	0.09 J	0.0042 J	0.011	0.02 J	0.014	0.084	0.024	0.0018 J	0.0097	0.0028 J	0.0067 J	0.012	0.06	0.058 J	0.49	0.052
Benzo[g,h,i]perilene	NA	1,400	38,700	0.0074 J	0.0045 J	0.0047 J	0.0079	0.0048 J	0.0052	0.0065	0.043	0.057 J	0.0026 J	0.0072	0.011 J	0.0096	0.06	0.0094	0.0014 J	0.0063	0.0028 J	0.0064 J	0.008	0.033	0.03 J	0.27	0.029
Chrysene	NA	490	360	0.0081 J	0.0044 J	0.006 J	0.011	0.0077	0.011	0.012	0.068	0.091 J	0.0035 J	0.0071	0.020	0.011	0.06	0.0018	0.0019 J	0.0093	0.0024 J	0.0051	0.011	0.059	0.068 J	0.37	0.054
Dibenz(a,h)-anthracene	NA	0.49	4	0.0024 J	0.0025 U	0.0032 U	0.0018 J	0.0031 U	0.0017 J	0.0015 J	0.013	0.018 J	0.0026 U	0.0016 J	0.0033 J	0.0027 J	0.018 J	0.0034 J	0.0025 U	0.0018 J	0.0025 U	0.0016 J	0.0022 J	0.011	0.0096	0.074	0.0093
Fluoranthene	NA	1,900	1,400	0.011 J	0.0039 J	0.0039 J	0.0099	0.0085	0.023 J	0.0088	0.082	0.094 J	0.002 J	0.011	0.019	0.012	0.08	0.02	0.0015 J	0.011	0.0014 J	0.006	0.013	0.089	0.093 J	0.47	0.048
Fluorene	NA	2,300	220	0.00071 UJ	0.00068 U	0.00086 U	0.00068 U	0.0031 J	0.0025 J	0.00058 J	0.0029 J	0.0051 J	0.00069 U	0.00046 J	0.0014 J	0.00069 U	0.0055 J	0.00075 U	0.00068 U	0.00068 U	0.00066 U	0.00064 U	0.001 J	0.0029 J	0.0063	0.021	0.0014 J
Indeno[1,2,3-cd]-pyrene	NA	4.9	41	0.0085 J	0.0054	0.0053 J	0.0095	0.005 J	0.0054	0.0064	0.045	0.061 J	0.0026 J	0.0081	0.011	0.010	0.063	0.012	0.0013 J	0.0068	0.0030 J	0.0072 J	0.0087	0.038	0.036 J	0.32	0.034
Naphthalene	NA	28	20	0.00056 J	0.00068 U	0.042	0.00043 J	0.0027 J	0.00041 J	0.0005 J	0.0021 J	0.0044 J	0.00069 U	0.00082 J	0.0045 J	0.00057 J	0.0042 J	0.00058 J	0.00035 J	0.00054 J	0.00066 U	0.00037 J	0.0026 U	0.0048 J	0.0083	0.021	0.0015 J
Phenanthrene	NA	20,600	3,000	0.0041 J	0.0025 U	0.0055 J	0.005 J	0.008	0.023 J	0.0046 J	0.041	0.048 J	0.0013 J	0.0046 J	0.018	0.006	0.051	0.0025 J	0.0025 U	0.0044 J	0.0025 U	0.0033 J	0.0087	0.045	0.067 J	0.22	0.018
Pyrene	NA	1,400	1,000	0.011	0.0042 J	0.0042 J	0.01	0.0084	0.02	0.0086	0.077	0.093 J	0.002 J	0.011	0.018	0.012	0.072	0.02	0.0017 J	0.011	0.0015 J	0.0059	0.013	0.089	0.094 J	0.47	0.051
1-Methylnaphthalene	NA	280	6.2	0.00028 UJ	0.00027 U	0.014	0.00027 U	0.0008 J	0.00027 U	0.00027 U	0.00043 J	0.0012 J	0.00028 U	0.00031 J	0.0009 J	0.00027 U	0.0025 U	0.0003 U	0.00027 U	0.00027 U	0.00026 U	0.00026 U	0.0004 J	0.00091 J	0.0014 J	0.0043 J	0.00042 J
2-Methylnaphthalene	NA	280	6.1	0.00071 UJ	0.00068 U	0.031	0.00068 U	0.00096 J	0.00036 J	0.00068 U	0.00067 J	0.0016 J	0.00069 U	0.00055 J	0.0018 J	0.00069 U	0.0063 U	0.00075 U	0.00068 U	0.00032	0.00064 U	0.00064 U	0.0006 J	0.0014 J	0.0025 J	0.0065	0.00057 J

Notes:

mg/kg - All results reported in milligrams per kilograms.
J - Estimated: The analyte was positively identified; the quantitation is an estimate.
U - The constituent was analyzed for but not detected at or above the method detection limit (MDL) concentration.
UJ - The constituent was analyzed for, but not detected at or above the reported concentration. The associated concentration value for the affected constituent is an estimated laboratory reporting limit (RL) due to QC exceedance(s).

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2.3 Conceptual Site Model

Results of the 2009 CSE Phase II investigation were used to develop a conceptual site model to evaluate potential exposure to munitions and explosives of concern (MEC) and/or MD within the SSR. This section presents a description of potential receptors, contaminant screening, and exposure pathways at TS003.

Human receptors were determined to include current and future site visitors, future construction workers, and future residents. Ecological receptors were identified as mammals, birds, and plants. To elaborate, future construction workers are considered to be future temporary residents. Current and future site visitors include USAF personnel who reside on JBER-Elmendorf, their families, and individuals such as civilian USAF personnel and contractors who have base access. A subsistence hunter/gatherer population is not considered, because this population would have very limited access to JBER-Elmendorf for subsistence purposes.

Reasons to visit the site may be for recreational activities such as hiking, skiing, or horseback riding, or as part of official USAF business such as construction or maintenance of utilities. Land use at this site is not expected to change from its current status (USAF, 2010).

The SSR MRS (TS003) contained PAH from clay pigeon fragments above ADEC residential human health screening levels during the CSE Phase II investigation. However, accessible soils that were observed to be above ADEC residential human health screening levels for PAH constituents were removed during the 2012 removal action. Confirmation sampling completed after the removal action confirmed that most of the PAH-impacted soil previously observed had been removed and analytical results were below ADEC residential human health screening levels. It is suspected that a small amount of soil with benzo(a)pyrene may be present under the building in the southwest portion of the MRS (Section 2.2.3). However, the soil is inaccessible to human receptors and does not represent a complete or potentially complete pathway. The revised conceptual site models for TS003 are depicted in **Figure 2-4** and **Figure 2-5**.

2.4 Justification for Site Closure

After completion of the 2012 NTCRA, there was no MEC hazard or significant MC risk to human health and the environment. Analytical results from confirmation samples collected at the site showed results below ADEC cleanup levels in the remaining soil, with the exception of one sample location, ELRA-SSR-S42-1, which was collected at MRS TS003 where the concentration of one PAH constituent (benzo(a)pyrene) was above the ADEC Under 40-Inch Zone cleanup level of 0.49 mg/kg. It was not possible to excavate further due to its close proximity to an adjacent building. However, based on the preliminary risk screening, using the 95 percent UCL, the concentration of benzo(a)pyrene on a site-wide basis at this site is below the ADEC cleanup level of 0.49 mg/kg. The remaining soil with benzo(a)pyrene is primarily under the building foundation and inaccessible.

Stockpiled soil was transported off site after being characterized to ensure legal compliance in the areas of profiling, transporting, and disposal. Contaminated soil was then transported to the appropriate facility. .However, the 95 percent UCL calculations for benzo(a)pyrene contamination at the site do not account for the unknown concentrations beneath the storage building at TS003. The contamination is currently inaccessible and has not been fully

characterized. Based on this, the ADEC will require that the Air Force note on their land records that benzo(a)pyrene contamination may exist at TS003 near the building foundation, and in the event that the remaining contaminated soil becomes accessible (by the building or other structures being removed), the Air Force will be required under 18 AAC 75.300 to notify ADEC and evaluate the environmental status of the contamination in accordance with applicable laws and regulations; further site characterization and cleanup may be necessary under 18 AAC 75.325-.390.

Figure 2-4 MRS TS003 – MEC Exposure Pathway Analysis

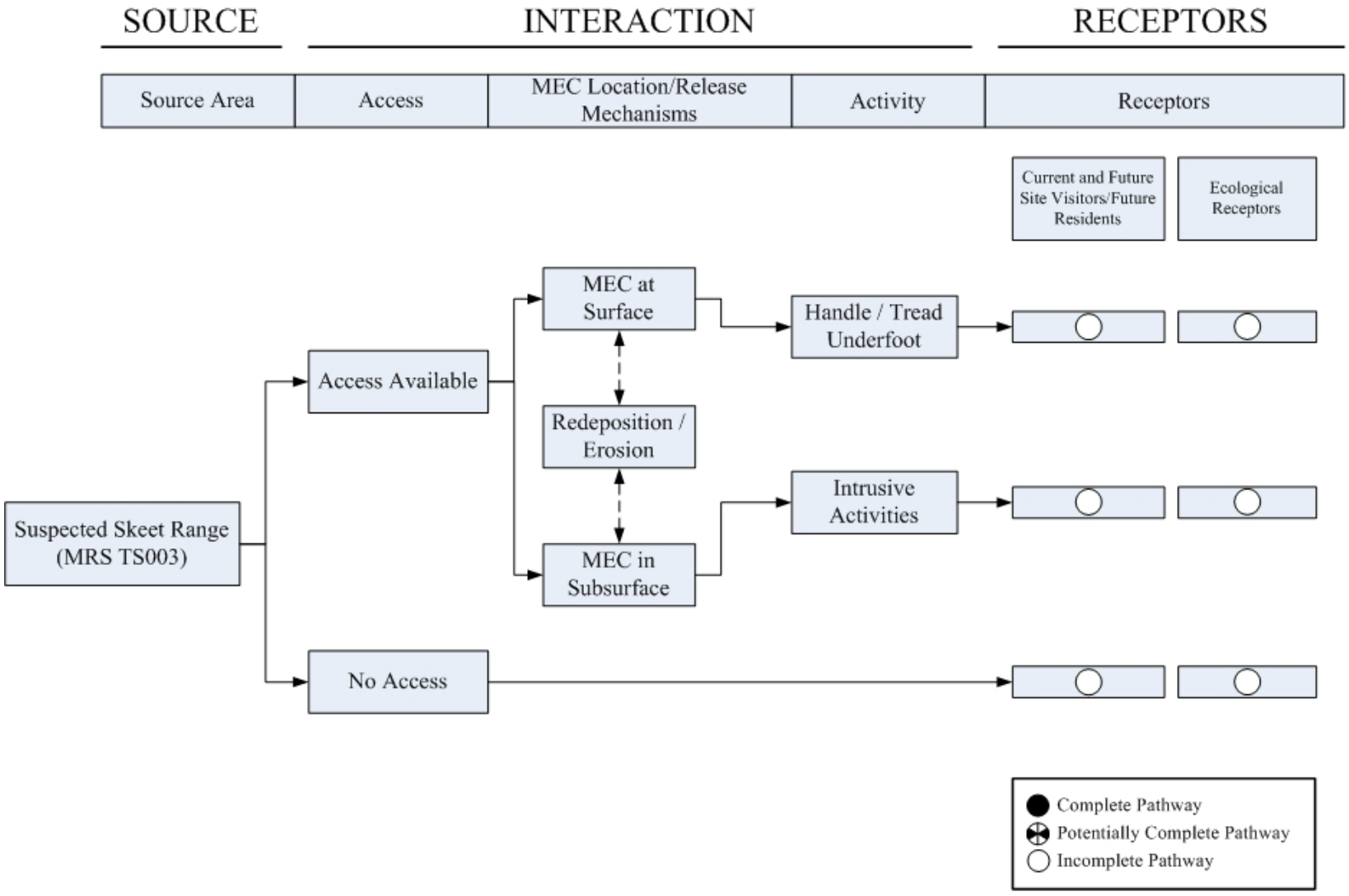

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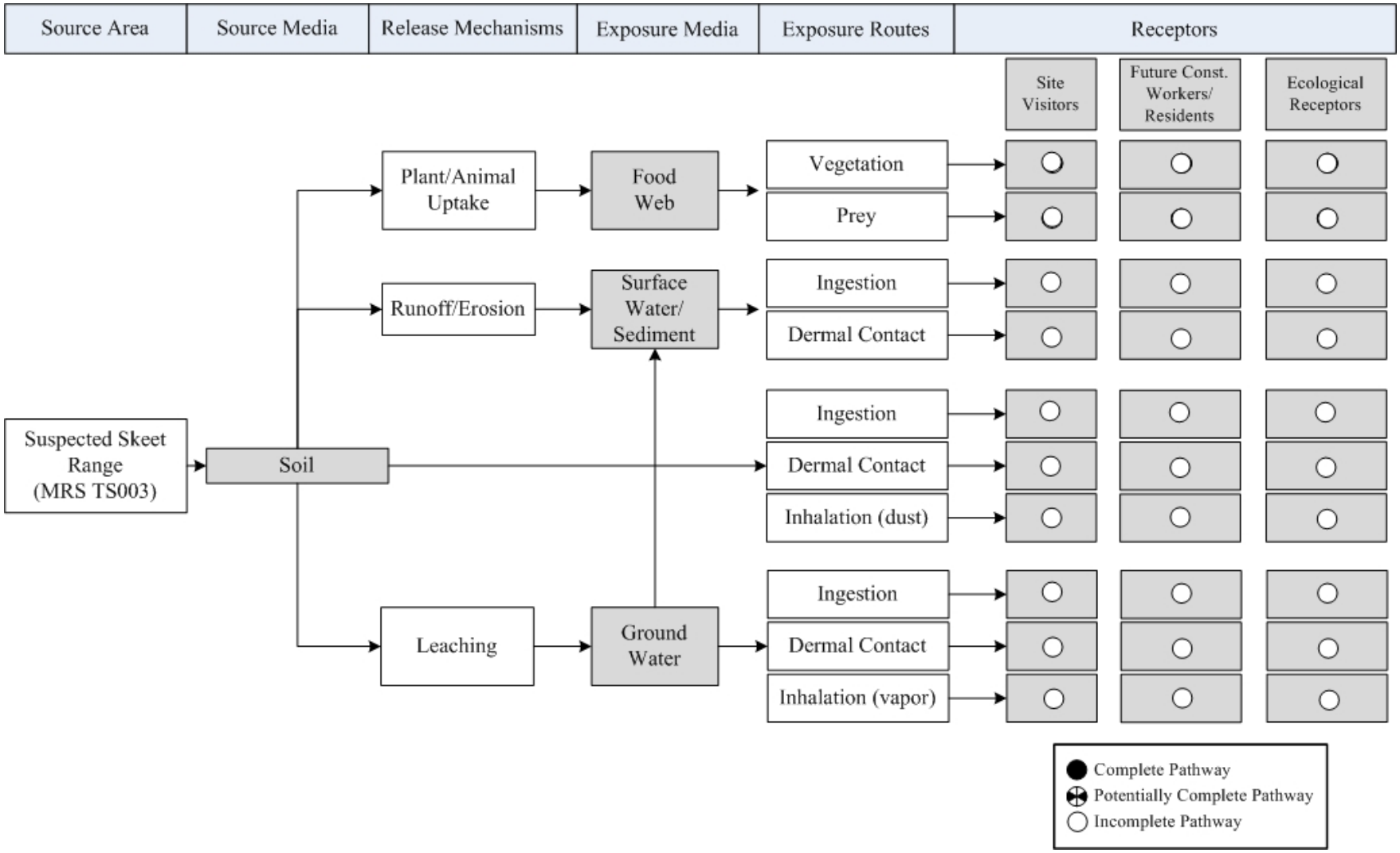
Figure 2-5 MRS TS003 – MC Exposure Pathway Analysis



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3.0 SUMMARY OF OPERATIONS AND MAINTENANCE

Operations and maintenance activities are not required because no evidence of MEC was observed at this site.

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4.0 PROTECTIVENESS DECLARATION

All completion requirements for Site TS003 have been met as specified in ADEC Regulation 18 AAC 75 (ADEC, 2011) and CERCLA (EPA, 2010 and EPA, 2011); specifically:

- The selected remedy of no further military munitions response action achieves State and CERCLA requirements that are applicable or relevant and appropriate.
- No evidence of MEC was observed at any location, which presents no significant threat to human health and the environment; thus, no cleanup activities are required.
- Site conditions and land use are consistent with "no further military munitions response action."

Based on the existing conditions and the information available, MRS TS003 does not pose a significant threat to human health and the environment; therefore, a no further action under the MRMP and cleanup complete determination with institutional controls under ADEC 18 AAC 75.380 and CERCLA is appropriate.

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5.0 REFERENCES

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