NO FURTHER ACTION PROPOSED PLAN

1940S SKEET RANGE (MRS TS876A), 1970S SKEET RANGE (MRS TS877A), AND FORMER EOD PROFICIENCY RANGE (MRS ED879)

MILITARY MUNITIONS RESPONSE PROGRAM
MOUNTAIN HOME AIR FORCE BASE, IDAHO

Air Force Announces Proposed Plan

The U.S. Air Force (USAF) is seeking public comment on this Proposed Plan recommending No Further Action at three Munitions Response Sites (MRSs) (TS876a, TS877a, and ED879) at Mountain Home Air Force Base (MHAFB) in Idaho (Figure 1). This document is issued by the USAF, the federal agency responsible for site activities, with the support of the Idaho Department of Environmental Quality (IDEQ), the supporting regulatory agency in this matter. The USAF, will select a remedy for the sites after reviewing and considering all information submitted during the 30-day public comment period. The USAF may modify the selected remedy or select another response action based on new information or public comments. Therefore, the public is encouraged to review and comment on the recommended action in this Proposed Plan. A Responsiveness Summary, which summarizes the USAF's responses to comments received during the comment period, will be issued as part of the Record of Decision (ROD) and will become part of the Administrative Record.

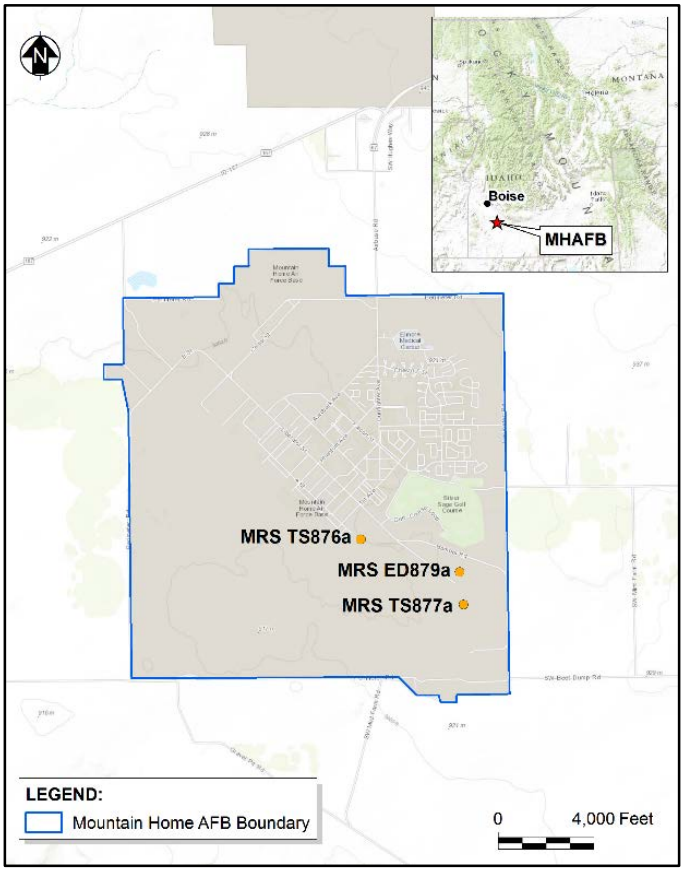

Figure 1. Site Location and Vicinity

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:
April 6 to May 6, 2016

MHAFB will accept written comments on the Proposed Plan during the public comment period. Comment letters must be postmarked May 6 and should be submitted to:

Mr. Rick Roller, ERP Manager
Mt. Home Air Force Base
1040 Liberator Street, Building 130
Mountain Home Air Force Base, ID 83648
Email: richard.roller.1@us.af.mil
Phone: (208) 828-2454

To request an extension of the Public Comment Period send a request in writing to Rick Roller by 1700, May 6, 2016

PUBLIC MEETING:
TBD

MHAFB will host a public meeting if public interested is received to explain the Proposed Plan, including the proposed final recommendation presented in the SSFR. Oral and written comments will also be accepted at the meeting.

The USAF is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [CERCLA, 42 USC § 9617(a)] and the National Oil and Hazardous Substances Pollution Contingency Plan [NCP, 40 CFR § 300.430(f)(2)]. The USAF and IDEQ encourage the public to review the documents to gain a more comprehensive understanding of the sites and response actions that have been conducted at the sites. Following public review and comment, USAF will finalize the decision in a ROD.

This Proposed Plan explains:

1. ways the public can comment on this Proposed Plan;
2. provides the basis for the Final Record of Decision;
3. includes a brief history and principal findings of environmental investigations and risk assessments; and
4. outlines the USAF's rationale for recommending No Further Action.

This Proposed Plan addresses the following three MRSs located at MHAFB, which have been the subject of numerous environmental investigations and response actions:

- TS876a, 1940s Skeet Range
- TS877a, 1970s Skeet Range
- ED879 (Former Explosive Ordnance Disposal [EOD] Proficiency Range)

Figure 1 on page 1 shows the locations of the three MRSs within MHAFB. Based on the results of environmental investigations and response actions, these MRSs have been recommended for No Further Action as discussed in the following sections.

Site History and Background

MRS TS876a. TS876a is approximately 1.1 acres in size and is located mostly within the 33.1-acre 1940s Skeet Range (i.e., Munitions Response Area [MRA] TS876), which is in the southern portion of MHAFB, east of the flight line. The 1940s Skeet Range was in use from the early 1940s until the late 1940s or early 1950s. Figure 2 shows the MRA and MRS boundaries of TS876a.

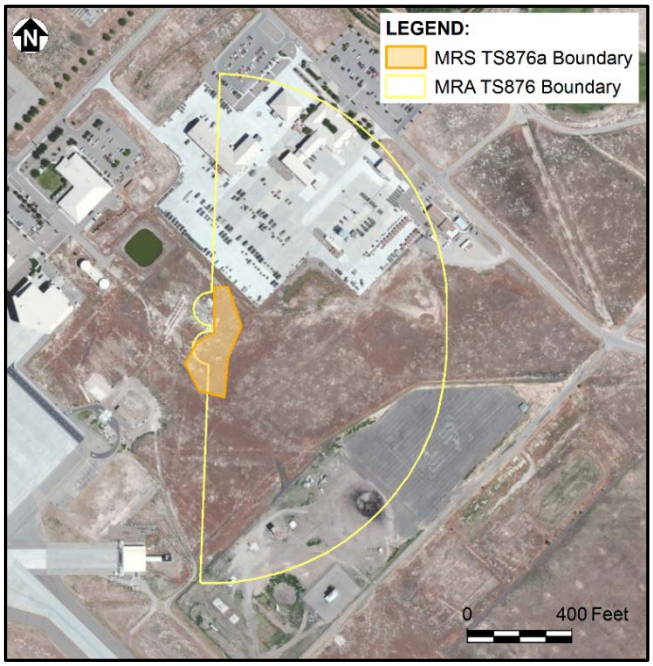

Figure 2. TS876a, MRA/MRS Boundaries

In 2009, a Comprehensive Site Evaluation (CSE) Phase I was conducted to characterize MRA TS876, and evaluate actual or potential releases of hazardous substances to people and the environment. The CSE Phase I concluded that small arms and skeet range activities at MRA TS876 may have released chemicals from spent bullets (metals) and clay targets (polycyclic aromatic hydrocarbons [PAHs]), and recommended a CSE Phase II investigation be performed at MRA TS876 to collect additional soil samples and fully determine the nature and extent of the contamination.

In 2010, a CSE Phase II was conducted to further evaluate chemicals, including (metals) and PAHs, at MRA TS876. Visual surveys were performed to identify potential munitions or munitions debris (pieces of munitions) on the site surface. Soil samples were collected to further delineate chemical (i.e. metals and PAH) contamination in soil at the site and the results were used to perform human health and ecological risk assessments.

During the CSE Phase II, lead shot and clay pigeon fragments were observed on the ground surface. Metals contamination results from lead shot and PAH contamination results from clay pigeons, therefore, samples were collected for analysis of metals and PAHs. Based on the analytical and risk assessment results, the CSE Phase II concluded that PAHs in soil posed a potential risk to human health if the future property use was residential, as well as to ecological receptors (animals) in areas of dense pigeon fragments. As a result, the CSE Phase II recommended that MRA TS876 be divided into two MRSs with the following recommended actions:

- TS876: No further action was warranted
- TS876a: Further action was warranted to address elevated concentrations of PAHs in soil.

Following the CSE Phase II, a non-time-critical interim removal action (IRA) was performed at MRS TS876a, which included excavation and removal of 1,541 cubic yards of PAH-contaminated soil. Soil samples were collected from the excavation area, and sample results confirmed that all PAH-contaminated soil was removed from TS876a. Based on the IRA findings, the site was recommended for No Further Action under an unrestricted use/unrestricted exposure (UU/UE) scenario.

MRS TS877a. TS877a is approximately 0.9 acre in size and is located mostly within the 29.6-acre 1970s Skeet Range (i.e., MRA TS877), which is in the southeastern portion of MHAFB, near the southern flight line. The 1970s Skeet Range was in use in the late 1960s and 1970s. The high and low houses (range structures) were demolished in 1980, suggesting that all activity at the skeet range ceased by 1980. Figure 3 shows the MRA and MRS boundaries of TS877a.

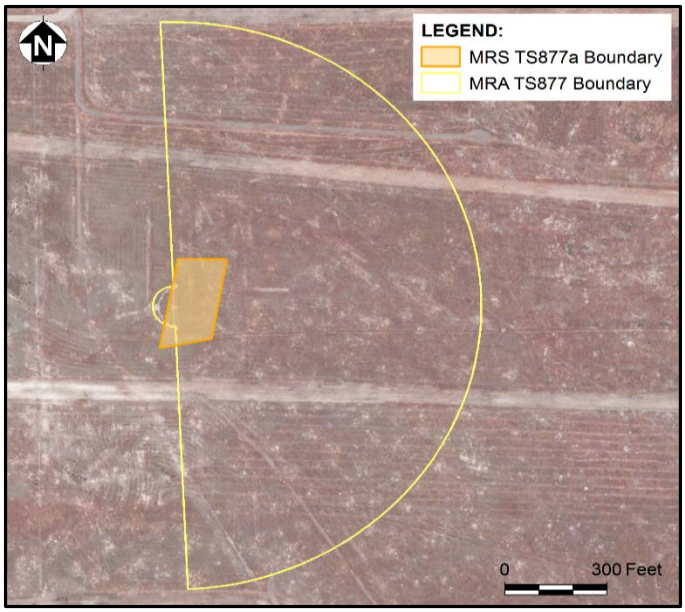

Figure 3. TS877a, MRA/MRS Boundaries

In 2009, a CSE Phase I was conducted to characterize MRA TS876, evaluate actual or potential releases of hazardous substances to humans and the environment. The CSE Phase I concluded that (1) small arms and skeet range activities at MRA TS877 may have released metals and PAHs to environmental media from spent bullets and clay targets, and recommended that a CSE Phase II investigation be performed at MRA TS877 to fully determine the nature and extent of the contamination.

In 2010, a CSE Phase II was conducted to further evaluate metals and PAHs at MRA TS877. Visual surveys were performed to identify potential munitions or munitions debris (inert pieces of munitions) on the site surface, and soil samples were collected to further delineate chemical (i.e. metals and PAH) contamination in soil at the site and results were used to perform human health and ecological risk assessments. During the CSE Phase II, lead shot and areas of clay pigeon fragments were observed on the ground surface. As a result, samples were collected for analysis of lead and PAHs. Based on the analytical and risk assessment results, the CSE Phase II concluded that PAHs in soil posed a potential risk to human health if the future property use was residential, as well as to ecological receptors (animals) in areas of dense pigeon fragments. Consequently, the CSE Phase II recommended that MRA TS877 be divided into two MRSs with the following recommended actions:

- TS877: No further action was warranted
- TS877a: Further action was warranted to address elevated concentrations of PAHs in soil.

Following the CSE Phase II, an IRA was performed at MRS TS877a, which included excavation and removal of 506 cubic yards of PAH-contaminated soil. Soil samples were collected from the excavation area, and sample results confirmed that all PAH-contaminated soil was removed from TS877a. Based on the IRA findings, the site was recommended for No Further Action under an UU/UE scenario.

MRS ED879. ED879 is a 28.5-acre former EOD proficiency range (i.e., MRA ED879) located in the southeastern portion of MHAFB, south of Silver Sage Golf Course, off Bomber Street. The range was in use until the late 1990s; however, the exact dates of use are unknown. Various munitions are assumed to have been used and detonated at this range during training and proficiency exercises. The exact types of munitions used at this site are unknown, however, base representatives indicated that inert munitions were buried at the site to help train AF personnel. Figure 4 above right shows the MRA and MRS boundaries of TS877a.

In 2009, a CSE Phase I was conducted to characterize MRA ED879, evaluate actual or potential releases of hazardous substances to exposure pathways, and evaluate associated targets of concern. The CSE Phase I concluded that detonation and burning of munitions at MRA ED879 may have released live munitions and chemicals to environmental media, and recommended that a CSE Phase II investigation be performed at MRA ED879 to fully determine the nature and extent of the contamination. In 2010, a CSE Phase II was conducted to further evaluate whether live munitions or chemicals were released at MRA ED879.

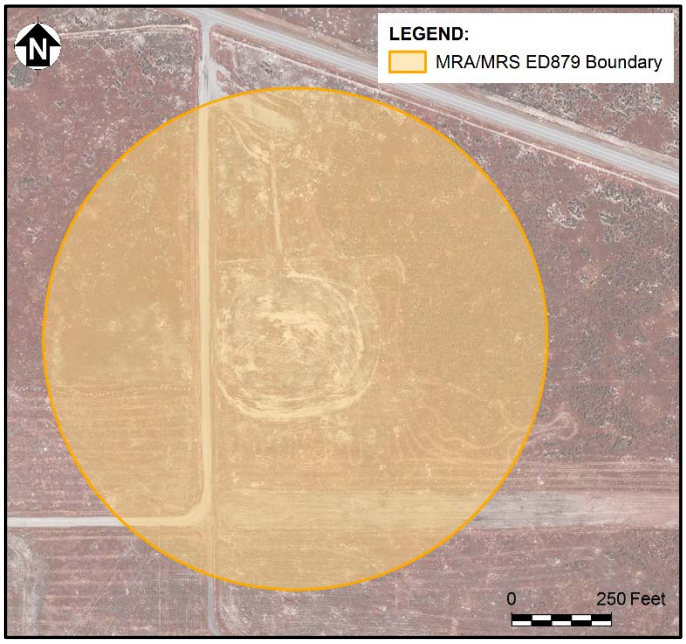

Figure 4. ED879, MRA/MRS Boundaries

During the CSE Phase II, evidence of EOD proficiency activities were observed, including .50 caliber bullets, practice grenade components, and debris from practice bombs; however, no items with an explosive hazard were found. A metal detection survey was performed over 100 percent of the MRA. The metal detection survey identified a total of 1,786 subsurface anomalies, mostly in the western half of the MRA. Soil samples were collected to further delineate chemical contamination in soil at the site and results were used to perform human health and ecological (animals) risk assessments. The CSE Phase II concluded that chemicals did not pose a risk to human health if the future property use was residential; however, lead posed a potential risk to ecological receptors. As a result, the CSE Phase II recommended that further action was warranted at MRA TS876 to address the subsurface metal identified during the metal detection surveys.

Following the CSE Phase II, an IRA was performed at MRS ED879, which included relocation of 1,633 subsurface metal items identified during the CSE Phase II and investigation of each anomaly. In total, 95 locations contained inert munitions fragments and 12 locations contained expended small arms ammunition casings.

In addition, the team conducted additional hand held metal detector surveys and investigations (mag-and-dig operations) in two areas of the site: in the northern area where a high number of anomalies could not be relocated using the geophysical survey equipment, and in an area where the metal detection survey equipment could not be used because of ongoing activities of another contractor. Mag-and-dig operations also were performed at locations throughout ED879 where attempts to relocate metal resulted in no metal being found. Mag-and-dig operations recovered approximately 5 pounds of munitions fragments and 180 pounds of scrap metal. Based on the IRA findings, no items with an explosive hazard were identified at ED879, and the site was recommended for No Further Action under an UU/UE scenario.

Site Characteristics

This section summarizes the site characteristics and nature and extent of PAHs remaining in soil at TS876a and TS877a and potential explosive hazard remaining in soil at ED879. This information was evaluated to assess the appropriateness of No Further Action as the preferred response action for TS876a, TS877a, and ED879. No perimeter fencing is present at MRSs TS876a, TS877a, and ED879.

Current and Future Land Use

TS876a. Current land use is industrial and is associated with flight-line maintenance facilities. In addition, two antennae are located at the eastern end of the site and are associated with activities of the 726th Air Control Squadron. The Mountain Home General Plan (MHGP) states future land use is not expected to change. No buildings or concrete structures are located within TS876a. The 726th Air Control Squadron building and a number of other administrative buildings are located near the site. Hangar facilities to the west of TS876a are associated with the MHAFB flight-line.

TS877a. Currently designated as open space within the approach zone clear area for the runway on the southeast corner of the base. The MHGP states future land use is not expected to change. No buildings or concrete structures are located near or within TS877a.

ED879. This MRS is an open field. Current land use is an industrial use area partially overlapping the open space area and the runway clear zone. The MHGP states future land use is not expected to change. No buildings or concrete structures are located near or within ED879.

Physical and Environmental Setting

The topography of all three sites is flat, and the depth to groundwater is approximately 350 feet to 400 feet below ground surface. Vegetation consists of low grassland communities. Soil consists of Bahem silt loam. No wetlands or surface water features are located within the sites. No known threatened or endangered species are present; however, habitat of the western burrowing owl (*Athene cunicularia*), a state-listed species of concern, has been identified on the sites. No known archaeological resources have been identified at TS876a, TS877a, and ED879.

Nature and Extent of Contamination

TS876a. During the IRA, soil containing PAHs at concentrations greater than the cleanup levels (i.e., U.S. Environmental Protection Agency's [EPA] 2012 regional screening levels [RSLs] for residential soil) was excavated and removed from the site. Results of soil confirmation samples collected from the excavation floors and sidewalls confirmed that all PAH-contaminated soil has been removed from the site. Figure 5 above right shows the locations where contaminated soil was removed. Table 1 on page 9 summarizes the results of the confirmation samples.

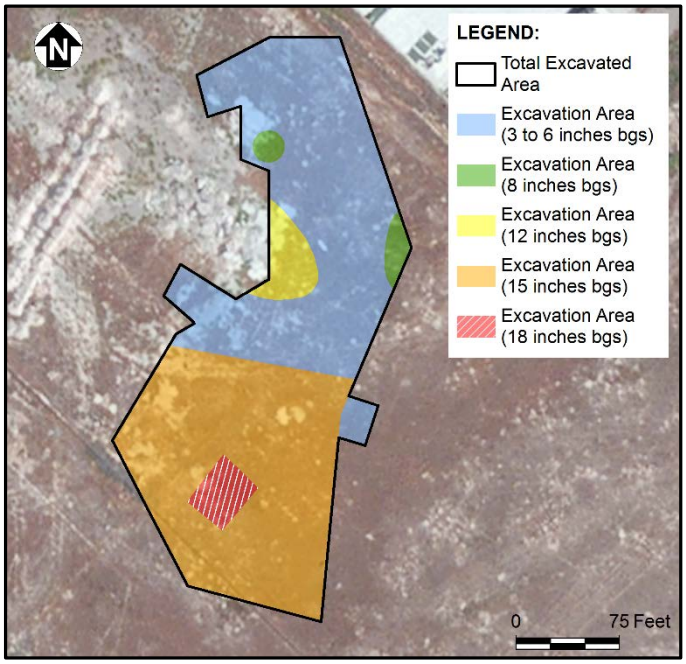

Figure 5. TS876a Excavation Locations

TS877a. During the IRA, soil containing PAHs at concentrations greater than cleanup levels (i.e., EPA's 2012 RSLs for residential soil) was excavated and removed from the site. Results of soil confirmation samples collected from the excavation floors and sidewalls confirmed that all PAH-contaminated soil has been removed from the site. Figure 6 shows the locations where contaminated soil was removed, and Table 2 on page 11 summarizes the results of the confirmation soil samples.

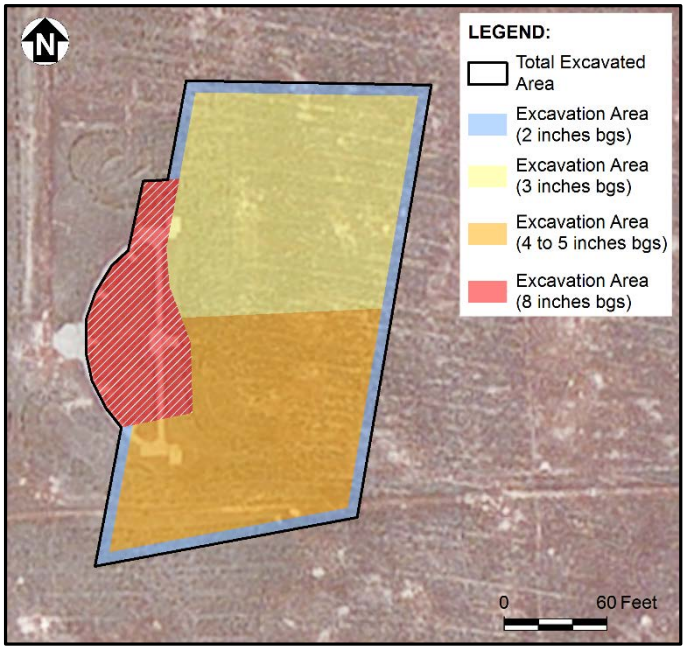

Figure 6. TS877a Excavation Locations

ED879. During the IRA, no items with an explosive hazard were identified at the site. Most munitions debris was found around the center of the EOD training facility. Except for munitions fragments that were purposely buried for training purposes, all munitions fragments were found within the top 13 inches of soil. Figure 7 below shows the locations where metal items were relocated and investigated, and the types of items recovered.

Scope and Role of the Response Action

The objective of the Military Munitions Response Program (MMRP), and of the environmental investigations and response actions implemented to date, is to make the MRSs safe for reuse, such that these sites are compatible with their anticipated future land use, while protecting human health and the environment. Based on the results of the IRA for TS876a, TS877a, and ED879, No Further Action is recommended for all three sites. Because the sites are eligible for UU/UE, no further response actions are warranted at the sites. Details of the CSE Phase II investigations and the IRA activities are presented in the CSE Phase II Report and in the SSFR, which are available in the Administrative Record.

Summary of Site Risks

Below is a summary of the human health and ecological risks at TS876a, TS877a, and ED879 following the IRA.

TS876a and TS877a. Soil samples were collected from the footprint of each excavation area to confirm all PAH-contaminated soil had been removed. All confirmation sample results indicated remaining PAH concentrations in soil were less than the EPA RSLs. EPA considers concentrations less than the RSLs to be below thresholds of concern for risks to human health. These results allow for UU/UE and eliminate the risks to human health and the environment from PAHs. Tables 1 and 2 on pages 9 and 11 summarize the results of the confirmation soil samples.

ED879. A metal detection survey of 100 percent of ED879 identified 1,786 locations that required investigation for potential munitions. Investigation of 1,633 locations (the area containing the remaining 153 was not accessible during the IRA because it was located within an area where another contractor was performing work; however, it was investigated via mag and dig operations [discussed in the following paragraph]) identified no MEC items.

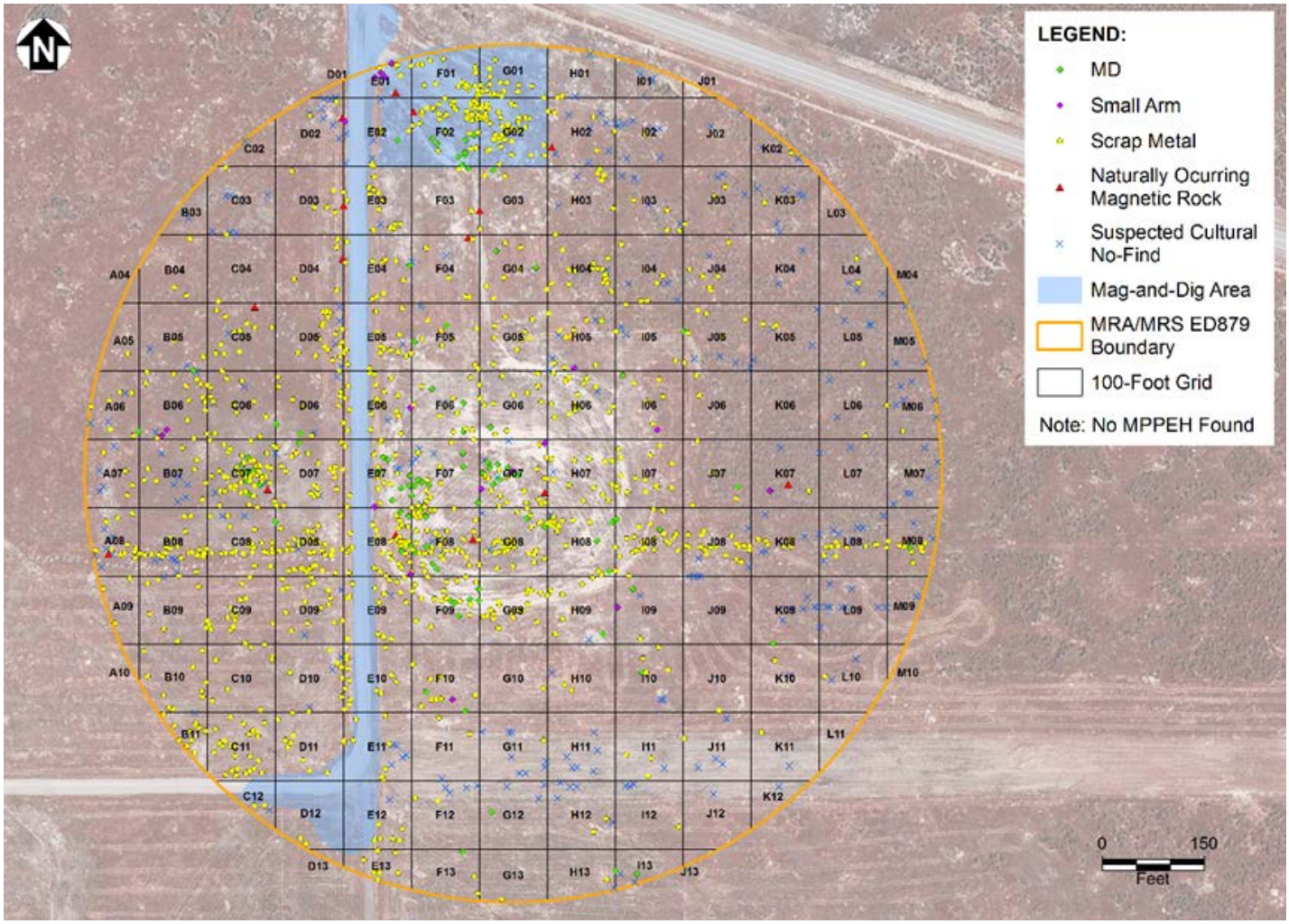

Figure 7. Reacquired Anomalies and Mag-and-Dig Locations

All 1,633 accessible locations were excavated and found to be inert. Of the 1,633 locations investigated, 391 were considered no-find. No-finds were likely the result of ground disturbance between the time the metal detection survey was conducted and the investigations of anomalies were conducted or areas where rocks that contain metallic properties exist. Hot rocks are not related to munitions, they are simply rocks that contain small bits of metal minerals that cause a metal detector to react, resulting in a false reading.

Mag-and-dig operations were conducted in areas where large numbers of no-finds were observed, as well as in an area that was inaccessible during the time of the initial mobilization. An additional 1,997 items were excavated during mag-and-dig operations, and no explosive hazard was identified. Based on the results of the IRA, no explosive hazard exists at ED879, which allows for UU/UE and eliminates the explosive hazards posed to human health and the environment from live munitions. Table 3 on page 12 summarizes the items recovered at ED879.

Removal Action Objectives

At TS876a and TS877a, the removal action objective (RAO) established in the Action Memorandum to prevent or minimize exposure to PAH-contaminated soil was achieved with the excavation and offsite disposal of approximately 1,541 and 506 cubic yards of PAH-contaminated soil. As a result, No Further Action was recommended in the Site-Specific Final Report (SSFR); therefore, no additional RAOs were required nor established for TS876a and TS877a.

At ED879, the RAO established in the Action Memorandum to prevent exposure to munitions with an explosive hazard in the subsurface in all areas with a high density of anomalies was achieved through relocation, investigation, and mag-and-dig (excavate and disposal or recycling) of 3,630 subsurface anomalies, without discovering any items that have an explosive hazard. As a result, No Further Action was recommended in the SSFR; therefore, no additional RAOs were required nor established for ED879.

Summary of Removal Alternatives

An Engineering Evaluation/Cost Analysis (EE/CA) was completed for TS876a, TS877a, and ED879 to evaluate removal alternatives to achieve the RAOs presented in the Action Memorandum. Three alternatives were considered in the EE/CA to address the hazards present at TS876a, TS877a, and ED879. These alternatives were evaluated using the alternative technology selection criteria established by the NCP for evaluating alternatives (effectiveness, implementability, and cost) and then subsequently evaluated in a comparative analysis.

The alternatives considered for TS876a, TS877a, and ED879 included:

- Alternative 1: No Action;
- Alternative 2: Land Use Controls
- Alternative 3: Excavation and Disposal

The evaluation of these alternatives, as presented in the EE/CA, is summarized below. Following the IRA, No Further Action was recommended for TS876a, TS877a, and ED879, and no additional removal alternatives were evaluated.

Evaluation of Alternatives

A comparative analysis of the three removal alternatives was conducted during the EE/CA using the alternative technology selection criteria established by the NCP for evaluating alternatives for effectiveness, implementability, and cost. Tables 4 and 5 on pages 15 and 16 summarize the comparative analysis of alternatives for TS876a/TS877a and ED879, respectively. As a result of the analysis, Alternative 3, Excavation and Disposal, was recommended to address hazards posed by PAH-contaminated soil at TS876a and TS877a and by an explosive hazard from live munitions at ED879. Alternative 3 was recommended because it would provide a permanent remedy for the sites by physically removing the PAH hazards at the skeet ranges and explosive hazards (if any) at the EOD range at the sites. The results of the EE/CA and the selected removal alternatives were subsequently summarized in the Action Memorandum.

Following the IRA, No Further Action was recommended for TS876a, TS877a, and ED879 in the SSFR, and no additional removal alternatives were evaluated.

Preferred Alternative

Based on the results of the IRA at TS876a, TS877a, and ED879, No Further Action is the preferred alternative for all three MRSs. No PAHs or explosive hazard are present at the sites that would pose a risk to current or future receptors, and no additional response action is warranted. The USAF, lead agency, believes that this alternative is protective of human health and the environment. The responsible state agency, IDEQ, supports the USAF's selection of the preferred alternative for these three MRSs.

Community Participation

The USAF and IDEQ provide information on the cleanup of MHAFB to the public through public meetings, the Administrative Record file for the site, and announcements published in the Mountain Home News, Mountain Home, Idaho. The USAF and IDEQ encourage the public to gain a more comprehensive understanding of the site and the investigation and removal activities that have been conducted at MRSs TS876a, TS877s, and ED879.

To facilitate public involvement, will host a public meeting on this Proposed Plan if public interest is received.

A copy of this Proposed Plan is also available at the following Mt. Home website:

The dates for the public comment period, the date, and location, are provided on the front page of this Proposed Plan. The public comment period for this Proposed Plan will run from April 6 through May 6. Written comments should be sent to Mr. Richard Roller, the MHAFB Environmental Restoration Program (ERP) Manager, at the following address:

MHAFB
Mr. Richard Roller
366 CES/CZOM - ERP Manager and RAB Contact
1040 Liberator Street, Building 1300
Mountain Home AFB, ID 83648
Phone: (208) 828-2454
E-mail: richard.roller.1@us.af.mil

Also Contact for More Information
IDEQ
Mr. Dean Nygard
Site Remediation Manager
Waste and Remediation Division
1410 North Hilton
Boise, ID 83706
Phone: (208) 373-0285
E-mail: Dean.Nygard@deq.idaho.gov

Acronyms and Abbreviations	
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSE	Comprehensive Site Evaluation
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Program
IDEQ	Idaho Department of Environmental Quality
IRA	interim removal action
MHAFB	Mountain Home Air Force Base
MHGP	Mountain Home General Plan
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRSs	Munitions Response Sites
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PAHs	polycyclic aromatic hydrocarbons
RAB	Restoration Advisory Board
RAOs	removal action objectives
RSLs	regional screening levels
SSFR	Site-Specific Final Report
USAF	U.S. Air Force
USC	United States Code
UU/UE	unrestricted use/unrestricted exposure
§	Section

PUBLIC COMMENT SHEET

NO FURTHER ACTION PROPOSED PLAN
MRS TS876A, MRS TS877A, AND MRS ED879

Please use the space below to submit your comments on the Proposed Plan for MRS TS876a, TS877a, and ED879. If you need more space for your comments, attach additional pages. After completing this comment sheet, you may mail it to the following address: Mr. Richard Roller, ERP Manager, 1040 Liberator Street, Building 1300 Mountain Home Air Force Base, ID 83648. Comments must be postmarked by May 6, 2016.

If you have any questions about the public comment period, please contact Richard Roller at (208) 828-2454

Name _____

Address _____

City _____

State _____ Zip _____

Table 1. TS876a IRA Final Soil Confirmation Sample Results

Sample ID No.[1]	Sample Date	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Dibenzo(a,h) anthracene (mg/kg)	Indeno (1,2,3-cd)pyrene (mg/kg)
Cleanup Level[2]		*0.15*	*0.015*	*0.15*	*1.5*	*0.015*	*0.15*
TS876A-01-CF-01	7/22/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS876A-02-CF-01	7/22/2014	0.0015 J	0.0034 UJ	0.0034 UJ	0.0034 UJ	0.0034 UJ	0.0034 UJ
TS876A-03-CF-01	7/22/2014	0.0022 J	0.0034 UJ	0.0023 J	0.0034 UJ	0.0034 UJ	0.0034 UJ
TS876A-04-CF-01	7/22/2014	0.0017 J	0.0019 J	0.0022 J	0.0034 UJ	0.0034 U	0.0034 UJ
TS876A-05-CF-01	7/22/2014	0.0037 J	0.0034 J	0.0052 J	0.0034 UJ	0.0034 UJ	0.0034 UJ
TS876A-06-CF-01	7/22/2014	0.0012 J	0.00087 J	0.0034 U	0.0034 U	0.0034 U	0.0034 UJ
TS876A-07-CF-01	7/22/2014	0.0013 J	0.0011 J	0.0022 J	0.0034 U	0.0034 U	0.0032 J
TS876A-08-CF-01	7/22/2014	0.0037 J	0.0038 J	0.0064 J	0.0028 J	0.0035 U	0.0051 J
TS876A-09-CF-01	7/22/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS876A-10-CF-01	7/23/2014	0.0061 J	0.0061 J	0.0094	0.0034 J	0.0045 J	0.0073 J
TS876A-11-CF-01	7/23/2014	0.0032 J	0.0041 J	0.0051 J	0.0037 J	0.0023 J	0.0053 J
TS876A-12-CF-01	7/24/2014	0.0024 J	0.0038 J	0.0059 J	0.0022 J	0.0035 U	0.0053 J
TS876A-13-CF-01	7/24/2014	0.0029 J	0.0046 J	0.006 J	0.0022 J	0.0018 J	0.0062 J
TS876A-14-CF-02[3]	8/5/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U
TS876A-15-CF-01	7/24/2014	0.0078	0.01	0.0075	0.0062 J	0.002 J	0.01 J
TS876A-16-CF-01	7/24/2014	0.0034 U	0.00082 J	0.0034 U	0.0034 U	0.0034 U	0.0034 UJ
TS876A-17-CF-01	7/24/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS876A-18-CF-01	7/23/2014	0.0013 J	0.0015 J	0.0017 J	0.0013 J	0.0035 U	0.0035 J
TS876A-19-CF-01	7/24/2014	0.005 J	0.0087	0.014	0.0051 J	0.0016 J	0.009 J
TS876A-20-CF-01	7/24/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS876A-A-CS-01	7/22/2014	0.003 J	0.0033 J	<0.0035 J	0.0028 J	0.0034 UJ	0.0047 J
TS876A-B-CS-03[3]	8/19/2014	0.00064 U	0.0034 U	0.0034 U	0.0034 U	0.0034 U	0.0034 U
TS876A-C-CS-02[3]	8/5/2014	0.0036 U	0.00063 J	0.0036 U	0.0036 U	0.0036 U	0.0036 U
TS876A-D-CS-01	7/22/2014	0.0084 J	0.009 J	0.015 J	0.0053 J	0.0021 J	0.0081 J
TS876A-E-CS-01	7/22/2014	0.001 J	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS876A-F-CS-02[3]	8/5/2014	0.0035 UJ	0.00057 J	0.0035 UJ	0.0035 UJ	0.0035 UJ	0.0035 UJ
TS876A-G-CS-01	7/23/2014	0.0044 J	0.0046 J	0.0069	0.0038 J	0.0035 UJ	0.0062 J
TS876A-H-CS-01	7/23/2014	0.0011 J	0.0014 J	0.0016 J	0.0035 U	0.0035 U	0.003 J
TS876A-I-CS-01	7/23/2014	0.0024 J	0.0024 J	0.0037 J	0.0021 J	0.0034 U	0.0038 J
TS876A-J-CS-01	7/24/2014	0.0046 J	0.0068	0.0091	0.0046 J	0.0034 U	0.007 J
TS876A-K-CS-01	7/24/2014	0.001 J	0.00081 J	0.00097 J	0.0035 U	0.0035 U	0.0027 J
TS876A-L-CS-01	7/24/2014	0.0043 J	0.0051 J	0.008	0.0026 J	0.0035 U	0.006 J
TS876A-M-CS-02[3]	8/5/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U
TS876A-N-CS-01	7/22/2014	0.0021 J	0.0025 J	0.0033 J	0.0021 J	0.0034 UJ	0.0034 UJ
TS876A-O-CS-01	7/22/2014	0.0015 J	0.0014 J	0.0016 J	0.0034 UJ	0.0034 UJ	0.0034 UJ

Table 1. TS876a IRA Final Soil Confirmation Sample Results *(continued)*

Sample ID No.[1]	Sample Date	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Dibenzo(a,h) anthracene (mg/kg)	Indeno (1,2,3-cd)pyrene (mg/kg)
Cleanup Level[2]		*0.15*	*0.015*	*0.15*	*1.5*	*0.015*	*0.15*
TS876A-P-CS-01	7/22/2014	0.0019 J	0.0027 J	0.0023 J	0.0019 J	0.0023 J	0.0042 J
TS876A-Q-CS-01	7/22/2014	0.0026 J	0.0031 J	0.003 J	0.0021 J	0.0017 J	0.0044 J
TS876A-R-CS-01	7/22/2014	0.0034 R	0.0034 R	0.0034 R	0.0034 R	0.0034 R	0.0034 R
TS876A-R-CS-02	10/20/2014	0.01	0.021	0.0075	0.01	0.0022	0.01
TS876A-S-CS-01	7/22/2014	0.0017 J	0.0018 J	0.003 J	0.0017 J	0.0035 UJ	0.0035 UJ
TS876A-T-CS-01	7/24/2014	0.00089 J	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ

Notes:

1 = All sidewall samples are denoted a letter and CS in the sample ID designations. All excavation floor samples are denoted a number and CF in the sample ID designations.

2 = The cleanup levels are the 2012 EPA Residential RSLs, which were established in the Final Action Memorandum.

3 = Concentrations at this location exceeded the cleanup level, which resulted in additional excavation and collection of confirmation samples until all PAH concentrations were less than cleanup levels. Only final concentrations are shown.

EPA = U.S. Environmental Protection Agency

J = Estimated, the analyte was positively identified; the quantitation is an estimation

mg/kg = milligrams per kilogram

PAHs = polycyclic aromatic hydrocarbons

U = Undetected at the limit of detection

Table 2. TS877a IRA Soil Confirmation Sample Results

Sample ID No.[1]	Sample Date	Benzo(a) anthracene (mg/kg)	Benzo(a) pyrene (mg/kg)	Benzo(b) fluoranthene (mg/kg)	Benzo(k) fluoranthene (mg/kg)	Dibenzo(a,h) anthracene (mg/kg)	Indeno(1,2,3-cd) pyrene (mg/kg)
Cleanup Level[2]		*0.15*	*0.015*	*0.15*	*1.5*	*0.015*	*0.15*
TS877A-01-CF-01	7/16/2014	0.0013 J	0.002 J	0.002 J	0.0034 UJ	0.0034 UJ	0.0044 J
TS877A-02-CF-01	7/16/2014	0.00078 J	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS877A-03-CF-01	7/16/2014	0.0014 J	0.0012 J	0.0012 J	0.0034 U	0.0034 U	0.0038 J
TS877A-04-CF-01	7/16/2014	0.0011 J	0.00085 J	0.0034 U	0.0034 U	0.0034 U	0.0032 J
TS877A-05-CF-01	7/16/2014	0.00086 J	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS877A-06-CF-01	7/16/2014	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 U	0.0035 UJ
TS877A-07-CF-01	7/16/2014	0.0021 J	0.0034 J	0.0034 UJ	0.0018 J	0.0034 U	0.0056 J
TS877A-08-CF-01	7/16/2014	0.0034 U	0.0034 U	0.0011 J	0.0034 U	0.0034 UJ	0.0028 J
TS877A-09-CF-02[3]	8/5/2014	0.0036 U	0.00062 J	0.0036 U	0.0036 U	0.0036 U	0.0036 U
TS877A-10-CF-01	7/16/2014	0.0068 J	0.014	0.014	0.006 J	0.0021 J	0.013
TS877A-11-CF-01	7/16/2014	0.00097 J	0.0037 U	0.001 J	0.0037 U	0.0037 U	0.0037 UJ
TS877A-12-CF-01	7/16/2014	0.0016 J	0.0017 J	0.0015 J	0.0035 U	0.0035 U	0.0036 UJ
TS877A-13-CF-01	7/16/2014	0.0013 J	0.0012 J	0.0012 J	0.0035 U	0.0035 U	0.0035 U
TS877A-14-CF-01	7/16/2014	0.0012 J	0.0012 J	0.0014 J	0.0035 U	0.0035 U	0.0035 U
TS877A-15-CF-01	7/16/2014	0.0023 J	0.0045 J	0.0059 J	0.0026 J	0.0035 UJ	0.0053 J
TS877A-16-CF-01	7/16/2014	0.0035 R	0.0035 R	0.0035 R	0.0035 R	0.0035 R	0.0035 R
TS877A-16-CF-02	10/20/2014	0.0032 U	0.0032 U	0.0032 U	0.0032 U	0.0032 U	0.0032 U
TS877A-A-CS-01	7/16/2014	0.0017 J	0.0017 J	0.0017 J	0.002 J	0.0035 U	0.0041 J
TS877A-B-CS-02[3]	8/5/2014	0.0034 U	0.00074 J	0.0034 U	0.0034 U	0.0034 U	0.0034 U
TS877A-C-CS-02[3]	8/5/2014	0.0036 U	0.0012 J	0.0013 J	0.0036 U	0.0036 U	0.0051 J
TS877A-D-CS-01	7/16/2014	0.0011 J	0.0018 J	0.0017 J	0.0035 U	0.0035 U	0.0034 J
TS877A-E-CS-01	7/16/2014	0.0035 UJ	0.0035 UJ	0.0016 J	0.0035 UJ	0.0035 UJ	0.0035 UJ
TS877A-F-CS-01	7/16/2014	0.012	0.015	0.015	0.01	0.0068 J	0.012
TS877A-G-CS-01	7/16/2014	0.0021 J	0.0024 J	0.0027 J	0.0017 J	0.0034 UJ	0.004 J
TS877A-H-CS-01	7/16/2014	0.0014 J	0.0011 J	0.0011 J	<.0036 U	0.0036 U	0.0031 J
TS877A-I-CS-01	7/16/2014	0.0013 J	0.001 J	0.0013 J	0.0034 U	0.0034 U	0.0033 J
TS877A-J-CS-01	7/16/2014	0.00077 J	0.0008 J	0.0035 U	0.0035 U	0.0035 U	0.0027 J
TS877A-K-CS-01	7/16/2014	0.0012 J	0.0014 J	0.0012 J	0.0034 U	0.0034 U	0.0034 UJ
TS877A-L-CS-01	7/16/2014	0.0026 J	0.0043 J	0.0048 J	0.0025 J	0.0017 J	0.0075 J

Notes:

1 = All sidewall samples are denoted a letter and CS in the sample ID designations. All excavation floor samples are denoted a number and CF in the sample ID designations.

2 = The cleanup levels are the 2012 EPA Residential RSLs, which were established in the Final Action Memorandum.

3 = Concentrations at this location exceeded the cleanup level, which resulted in additional excavation and collection of confirmation samples until all PAH concentrations were less than cleanup levels. Only final concentrations are shown.

J = Estimated, the analyte was positively identified; the quantitation is an estimation

mg/kg = milligrams per kilogram

PAHs = polycyclic aromatic hydrocarbons

U = Undetected at the limit of detection

Table 3. Items Discovered at ED879 During IRA

Anomaly Number	Dig Type	Date Investigated	Item Discovered	Actual Depth (inch)
163	Target	7/31/2014	MD (bomb lug)	2
193	QA/QC	7/23/2014	MD (grenade fragment)	8
515	Target	7/29/2014	MD (fuze piece)	3
2046	Target	7/29/2014	MD (.50-Cal de-armor slug and bomb fuze M904)	13
2143	Target	7/29/2014	MD (fragment)	6
2293	Target	7/31/2014	MD (fragment)	0
2520	Target	7/31/2014	MD (fragment)	6
2568	Target	7/28/2014	MD (fragment)	6
2762	Target	7/24/2014	MD (100-lb bomb tail fin assembly)	3
2951	Target	7/24/2014	MD (fragment)	0
2974	Target	7/24/2014	MD (fragment/wire)	3
2988	Target	7/24/2014	MD (fragment)	2
3115	Target	7/24/2014	MD (fragment)	2
3117	Target	7/31/2014	MD (dummy fuze)	5
3307	Target	7/28/2014	MD (20mm TP-T)	3
3365	QA/QC	7/22/2014	MD (fragment)	6
3553	Target	7/29/2014	MD (pusher plate)	45
3554	Target	7/24/2014	MD (bomb fuze M904)	2
3618	Target	7/31/2014	MD (fragment and chain link)	6
3626	Target	7/24/2014	MD (fragment)	3
3641	Target	7/29/2014	MD (fragment)	4
3734	QA/QC	7/22/2014	MD (fragment)	5
3977	Target	7/31/2014	MD (fuze)	6
4001	Target	7/28/2014	MD (fuze)	3
4051	Target	8/5/2014	MD (BDU-45)	48
4063	Target	7/28/2014	MD (fuze ring)	4
4139	Target	7/28/2014	MD (fragment)	4
4140	Target	7/31/2014	MD (20mm TP-T)	3
4177	Target	7/29/2014	MD (fuze fragment)	6
4179	Target	7/29/2014	MD (fragment)	4
4234	Target	7/29/2014	MD (fragment)	6
4409	QA/QC	8/4/2014	MD metal cap/fragment	1
4445	Target	7/29/2014	MD (fragment)	4
4534	Target	7/29/2014	MD (fragment)	4
4556	Target	7/23/2014	MD (fragment)	3
4636	Target	7/29/2014	MD (fragment)	4

Table 3. Items Discovered at ED879 During IRA *(continued)*

Anomaly Number	Dig Type	Date Investigated	Item Discovered	Actual Depth (inch)
4658	Target	7/31/2014	MD (20mm TP-T)	6
4676	Target	7/29/2014	MD (fragment)	6
4686	Target	7/29/2014	MD (20mm TP-T)	4
4700	Target	8/5/2014	MD (Mk 81)	48
4726	Target	7/28/2014	MD (Grenade Spoon)	3
4750	Target	7/29/2014	MD (fragment)	12
4778	Target	7/28/2014	MD (fragment)	3
4835	Target	7/29/2014	MD (fragment)	4
4845	Target	7/28/2014	MD (fragment)	6
4878	Target	7/28/2014	MD (.50-cal bullet and 105mm projectile, wax filled)	18
4879	Target	7/28/2014	MD (fragment, slag)	20
4888	Target	7/23/2014	MD (fragment)	12
4896	Target	7/29/2014	MD (bomb fuze-M904)	6
4970	Target	7/28/2014	MD (fuze fragments)	3
4980	Target	7/28/2014	MD (fuze MT and fragment)	4
4981	Target	7/28/2014	MD (slag M60 fuze ignitor parts and fuze fragments)	6
5018	QA/QC	7/22/2014	MD (M60 fuze ignitor)	6
5032	Target	7/28/2014	MD (fragment)	6
5073	QA/QC	7/22/2014	MD (grenade spoon)	6
5119	Target	7/23/2014	MD (fragment)	6
5122	Target	7/29/2014	MD (fragment)	2
5173	Target	7/28/2014	MD (fuze fragments)	7
5364	Target	7/23/2014	MD (rocket fragments)	5
5528	Target	7/23/2014	MD (fragment)	1
5535	Target	7/24/2014	MD (fragment)	6
5540	Target	7/23/2014	MD (M39 practice hand grenade)	2
5593	Target	7/24/2014	MD (fragment)	3
5611	Target	7/23/2014	MD (fragment)	1
5901	QA/QC	7/22/2014	MD (fuze fragment and washer)	6
6086	Target	7/28/2014	MD (fragment)	3
6298	Target	7/31/2014	MD (fragment)	6
6360	QA/QC	7/22/2014	MD (fragment)	5
6769	Target	7/29/2014	MD (fragment)	1
6986	Target	7/31/2014	MD (fragment)	6
7048	QA/QC	8/4/2014	MD (metal cap/ fragment)	1
7890	Target	7/30/2014	MD (fuze fragments)	4

Table 3. Items Discovered at ED879 During IRA *(continued)*

Anomaly Number	Dig Type	Date Investigated	Item Discovered	Actual Depth (inch)
7915	Target	7/30/2014	MD (fragment)	6
8115	Target	7/30/2014	MD (fragment)	2
9438	Target	7/30/2014	MD (grenade spoon)	6
9440	Target	7/30/2014	MD (grenade spoon)	5
9536	Target	7/30/2014	MD (grenade spoon)	5
9689	Target	7/30/2014	MD (two grenade spoons)	5
9698	Target	7/30/2014	MD (grenade spoon)	5
9744	Target	7/30/2014	MD (grenade spoon)	6
9913	Target	7/30/2014	MD (grenade spoon)	6
9915	Target	7/30/2014	MD (grenade spoon)	5
9971	Target	7/30/2014	MD (grenade spoon)	6
10019	Target	7/30/2014	MD (grenade spoon)	5
11262	Target	7/24/2014	MD (20mm TP-T)	3
11270	Target	7/24/2014	MD (bomb fuze M904)	2
11284	Target	7/23/2014	MD (fragments)	2
11290	Target	7/23/2014	MD (fuze fragment)	1
11293	Target	7/29/2014	MD (fragment)	6
11296	Target	7/29/2014	MD (fragment)	12
273	QA/QC	7/22/2014	MD (grenade fragment) and metal scrap	8
3320	Target	7/24/2014	MD (fuze fragment) and metal scrap	2
4705	Target	7/29/2014	MD (fragment) and metal scrap	3
9864	Target	7/30/2014	MD (fuze fragment) and metal scrap	4
11289	Target	7/23/2014	MD (fragment) and construction debris	4

Notes:
MD = munitions debris
mm = millimeter
MT = mechanical time
QA = quality assurance
QC = quality control
TP-T = target practice with tracer

Table 4. Comparative Analysis of IRA Alternatives at MRS TS876a and MRS TS877a

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Land Use Controls	Alternative 3 Excavation and Offsite Disposal
Effectiveness	**Qualitative Ranking**		
Overall Protection of Public Health and Environment	Low	Medium	High
Compliance with ARARs and Other Criteria, Advisories, and Guidance	NA	Medium	High
Long-Term Effectiveness and Permanence	Low	Medium	High
Reduction of Toxicity, Mobility, or Volume through Treatment	Low	Low	Low[1]
Short-Term Effectiveness	Low	Medium	High
Achieve RAOs	Low	Medium	High
Implementability	**Qualitative Ranking**		
Technical Feasibility	High	High	High
Administrative Feasibility	High	High	High
Availability of Services or Materials	NA	High	High
Cost	**IRA Cost**		
Period of Analysis (Years)	30	30	30
Estimated Capital Cost	$0	$250,331	$1,495,715
Estimated Annual/Periodic Cost	$0	$461,835/$246,725	$0/$0
Estimated Total Cost	$0	$958,891	$1,495,715
Estimated Total Present Value of Alternative	$0	$772,084[2]	$1,495,715

Notes:

1 = Although excavation does not involve treatment, it will result in the reduction of toxicity, mobility, and volume of the contaminants at this site.

2 = Note that, because contamination would remain in place indefinitely, the long-term costs associated with maintaining LUCs (LUC inspections, LUC reports, and Five-Year Reviews) would continue in perpetuity; meaning, the out-year costs (beyond the 30-year costing period mandated by the NCP) would be significantly higher.

ARARs = applicable or relevant and appropriate requirements

IRA = interim removal action

LUCs = land use controls

NA = not applicable

NCP = National Oil and Hazardous Substances Pollution Contingency Plan

RAOs = removal action objectives

Table 5. Comparative Analysis of IRA Alternatives at MRS ED879

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Land Use Controls	Alternative 3 Excavation and Offsite Disposal
Effectiveness	**Qualitative Ranking**		
Overall Protection of Public Health and Environment	Low	Medium	High
Compliance with ARARs and Other Criteria, Advisories, and Guidance	NA	Medium	High
Long-Term Effectiveness and Permanence	Low	Medium	High
Reduction of Toxicity, Mobility, or Volume through Treatment	Low	Low	Low[1]
Short-Term Effectiveness	Low	Medium	High
Achieve RAOs	Low	Medium	High
Implementability	**Qualitative Ranking**		
Technical Feasibility	High	High	High
Administrative Feasibility	High	High	High
Availability of Services or Materials	NA	High	High
Cost	**IRA Cost**		
Period of Analysis (Years)	30	30	30
Estimated Capital Cost	$0	$350,246	$531,936
Estimated Annual/Periodic Cost	$0	$652,280/$330,909	$0/$0
Estimated Total Cost	$0	$1,333,435	$531,936
Estimated Total Present Value of Alternative	$0	$1,074,558[2]	$531,936

Notes:

1 = Although excavation does not involve treatment, it will result in the reduction of toxicity, mobility, and volume of the contaminants at this site.

2 = Note that, because contamination would remain in place indefinitely, the long-term costs associated with maintaining LUCs (LUC inspections, LUC reports, and Five-Year Reviews) would continue in perpetuity; meaning, the out-year costs (beyond the 30-year costing period mandated by the NCP) would be significantly higher.

ARARs = applicable or relevant and appropriate requirements

IRA = interim removal action

LUCs = land use controls

NA = not applicable

NCP = National Oil and Hazardous Substances Pollution Contingency Plan

RAOs = removal action objectives