

DRAFT FINAL

Proposed Plan

Military Munitions Response Program

Roswell North Range Munitions Response Site (NM545-001-R-01)

Chaves County, New Mexico

MARCH 2021



Prepared For:



U.S. Army Corps of Engineers

Army National Guard G9

New Mexico Army National Guard

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ACRONYMS AND ABBREVIATIONS

AGC	advanced geophysical classification
ARAR	Applicable or Relevant and Appropriate Requirements
ARNG	Army National Guard
ARNG G9	Army National Guard G9
bgs	below ground surface
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMUA	concentrated munitions use area
DESR	Defense Explosive Safety Regulation
DGM	digital geophysical mapping
DMM	discarded military munitions
DoD	Department of Defense
DU	decision unit
ft.	feet
FS	Feasibility Study
HE	high explosive
HHRA	Human Health Risk Assessment
HRR	Historical Records Review
ISM	incremental sampling methodology
LTM	long-term monitoring
LUC	land use control
m	meter
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
mm	millimeter
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDNODS	Non-Department of Defense, Non-Operational Defense Sites
NMAC	New Mexico Administrative Code
NMARNG	New Mexico Army National Guard

ACRONYMS AND ABBREVIATIONS (CONT.)

NMED	New Mexico Environment Department
NMRD	non-munitions related debris
PA	Preliminary Assessment
PP	Proposed Plan
PRG	preliminary remediation goal
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RMM	risk matrix methodology
ROD	Record of Decision
SAA	small arms ammunition
SI	Site Inspection
SLERA	Screening Level Ecological Risk Assessment
SSL	soil screening level
TBC	to-be considered
TCLP	toxicity characteristic leaching procedure
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTM	Universal Transverse Mercator
UU/UE	unlimited use/unrestricted exposure
UXO	unexploded ordnance
VSP	Visual Sample Plan
WESTON	Weston Solutions, Inc.

1 INTRODUCTION

2 This **Proposed Plan (PP)**¹ presents the United States
3 (U.S.) Army National Guard G9's (ARNG G9) and
4 the U.S. Army Corps of Engineers' (USACE)
5 preferred remedial (cleanup) alternative for the
6 244.12-acre **Non-Department of Defense (DoD),**
7 **Non-Operational Defense Site (NDNODS) Roswell**
8 **North Range Munitions Response Site (MRS)**
9 (NM545-001-R-01). The area of contamination is
10 described in the Final **Remedial Investigation (RI)**
11 report (Weston Solutions, Inc., [WESTON], 2020).
12 **Land Use Controls (LUCs),** Instrument-Aided
13 Surface Clearance, and Excavation, Stabilization and
14 Off-Site Disposal of Lead-Contaminated Soil is the
15 preferred **remedial alternative** for the Roswell North
16 Range MRS. The preferred remedial alternative
17 presented in this PP is designed to protect people from
18 encountering **munitions and explosives of**
19 **concern (MEC)** and **munitions constituents (MC)**
20 at the 244.12-acre Roswell North Range MRS.

21 NDNODS are sites that were exclusively used by the
22 Army National Guard (ARNG), but were never
23 owned, leased, or otherwise possessed or used by the
24 U.S. Army or another DoD component. The Roswell
25 North Range MRS was used by the New Mexico
26 ARNG (NMARNG) and is located on land that is
27 federally-managed by the U.S. Department of the
28 Interior's Bureau of Land Management (BLM).

29 This document is being issued by ARNG G9, the lead
30 agency for NDNODS activities. ARNG G9, in
31 coordination with the U.S. Environmental Protection
32 Agency (USEPA) and the New Mexico Environment
33 Department (NMED), will select the final remedy for
34 the MRS after reviewing and considering all
35 information submitted during the **public comment**
36 **period** and the virtual public meeting (14 April 2021
37 – see box on right side of this page). ARNG G9 may
38 modify the remedy preference or select another
39 response action based on public comments, regulator
40 comments, or other new information received after
41 this PP is issued. The public is encouraged to review
42 and comment on this PP.

43 The DoD's Military Munitions Response Program
44 (MMRP), which began in 2001, addresses the
45 potential explosives safety, health, and environmental
46 issues resulting from past munitions use at current
47 and former military training lands. In fulfilling its

48 obligations under MMRP, the Army's priority is the
49 protection of human health and the environment.

MARK YOUR CALENDARS!

PUBLIC COMMENT PERIOD:

The public is invited to participate in the decision-making process by reviewing and commenting on the remedial alternative presented in this Proposed Plan for the 244.12-acre Roswell North Range Munitions Response Site (NM545-001-R-01), located in Chaves County, New Mexico, between **21 March 2021** and **23 April 2021**. Oral and written comments will be accepted during the public comment period. Written comments must be postmarked by the last day of the public comment period.

Comments should be submitted to the following:

LTC Donna Wu
Cleanup Branch Chief (ARNG-IED-S)
111 South George Mason Drive
Arlington, VA 22204-1373
(703) 607-2177
donna.s.wu.mil@mail.mil

INFORMATION REPOSITORY:

A copy of the Remedial Investigation Report, Feasibility Study, and Proposed Plan are available to the public for review at the following location:

Roswell Public Library
301 N. Pennsylvania Ave.
Roswell, New Mexico 88201
575-622-7101

Hours of Operation:
Tuesday – Friday
10:00 am – 2:00 pm

PUBLIC MEETING:

A virtual public meeting will be held on **14 April 2021 at 6 pm Mountain Standard Time** to discuss the remedial alternative presented in this Proposed Plan and to respond to questions. To attend the virtual public meeting interested parties should go online to <https://global.gotomeeting.com/join/884559741>. You may also dial in using your phone (Toll Free): 1-866-899-4679, Access Code: 884-559-741. Both oral and written comments will be accepted at the public meeting.

¹ **Boldfaced** terms are defined in Glossary, pages 20-22.

The ARNG G9 is required by the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** §117(a) and **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** §300.430(f)(3)(i) to issue this PP and seek public participation and comment.

This PP summarizes the information that is detailed in the Roswell North Range MRS RI Report (WESTON, 2020), the **Feasibility Study (FS)** (WESTON, 2021), and other documents contained in the **Administrative Record** or the **information repository** at the Roswell Public Library (see box on first page). ARNG G9, NMARNG, USACE, USEPA, and NMED encourage the public to review these documents to gain a more comprehensive understanding of the Roswell North Range MRS and investigation activities that have been conducted. ARNG G9 will issue a **Record of Decision (ROD)** announcing the final remedy for the Roswell North Range MRS after the comment period has closed and all stakeholder comments have been reviewed. The public's comments on this PP will be considered in the final selection process and will be discussed in the *Responsiveness Summary* of the ROD.

SITE DESCRIPTION

The former 244.12-acre Roswell North Range MRS is located at Universal Transverse Mercator (UTM) Zone 13 N coordinates 558884.46 meters (m) Easting and 3701688.38 m Northing, and approximately 10 miles east and 4 miles north of the center of Roswell, New Mexico (**Figure 1**). The MRS is located west of Dulce Road and is an irregularly shaped, large sinkhole with sedimentary rock escarpments related to limestone dissolution and collapse features. The MRS is located within a single parcel of land that is federally-managed by the BLM.

There are no federal or state threatened, or endangered species known to be present on the MRS, and no federally-designated critical habitats or Areas of Critical Environmental Concern within the 244.12-acre MRS boundary (U.S. Fish and Wildlife Service [USFWS], 2021).

There are no historic properties listed on the National Register of Historic Places, no National Historic Landmarks, and no National Historic Sites within the MRS boundaries. There are also no known pre-historic resources within the 244.12-acre MRS.

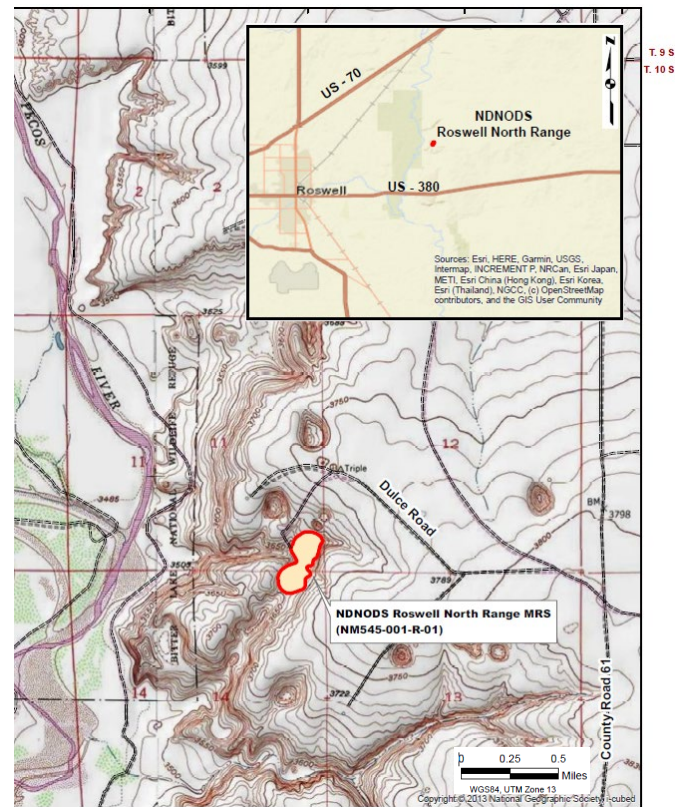


Figure 1 Site Location

SITE HISTORY AND BACKGROUND

The Roswell North Range MRS was used by NMARNG from 1965 until 2000 for an average of 18 weekends per calendar year. Munition types used included: small arms (.22-caliber, .38 caliber, .45 caliber, 9-millimeter [mm], 12 gauge, 5.52mm, and 7.62mm from M60 submachine gun); 20mm projectiles, rocket practice 35mm Subcaliber M73; M18 Claymore mines; 40mm high explosive (HE) grenades, 40mm practice grenades and 40mm grenades using the M203 (M16 rifle with 40mm grenade launcher attached). The MRS consisted of two ranges (former Pistol/Rifle Range and Machine Gun Range) in the southwestern portion of the MRS with a direction of fire toward the southwest using the walls of the sinkhole as a natural backstop. Additionally, a foxhole training area was reported at the northern end of the machine gun firing berm. A crater in the northeastern portion of the MRS was identified as a possible demolition area that may have been used to dispose of various munitions by way of intentional detonation using donor explosives to render the munition items safe. A brief history of the MRS is presented in **Table 1**.

Table 1: Historical Timeline

Date	Activity
1965-2000	NMARNG used the 244.12-acre MRS for multipurpose training of small arms, grenades, pyrotechnics, and explosive munitions.
2008	<u>Site Inventory/Preliminary Assessment</u> - MRS training operations reportedly occurred along the floor of the sinkhole. Small arms training consisted of two non-standard ranges: a 25-meter pistol and rifle range and a 50-meter machine gun range, a foxhole training area, and a possible demolition area.
2011-2012	<u>Site Inspection</u> - Munitions debris associated with M21A1 40mm training grenades, expended M60 igniters, 20mm projectiles, rocket practice 35mm subcaliber M73, 40mm grenades fragments (unknown if HE), and 40mm smoke/marker grenades were found. Lead concentrations in soil from the target/berms in the small arms ranges exceeded human health and ecological risk-based screening levels to a depth of 3 inches.
2018	<u>Remedial Investigation</u> - The RI was completed in two mobilizations. Munitions debris identified outside of the RI-designated boundary prompted investigation around the upper perimeter of the sinkhole during the second mobilization. Munitions debris found consisted of 108 items from undetermined 40mm grenades and identified M407A1, M781 40mm practice grenades, and M715 40mm smoke grenades; a 20mm practice projectile; 90 miscellaneous unidentifiable frag; 16 M73 practice rocket motor debris; and a piece of grenade fuse debris (from unknown type of grenade [HE, practice, pyrotechnic]). Lead concentrations in soil from the target/berms in the Pistol/Rifle Range exceeded human health and ecological risk-based screening levels to a depth of 12 inches. It was recommended that the 12-acre RI-designated MRS boundary be extended to 244.12 acres to be inclusive of the maximum range of the munitions debris (M407A1 and M781 40mm practice grenades) identified outside the RI-designated MRS boundary.

2 Site Inventory/Preliminary Assessment

A Final State/Territory Inventory Report for New Mexico, also referred to as a **Preliminary Assessment (PA)**, was conducted at the Roswell North Range MRS in 2008 (EA Engineering, Science, and Technology, Inc., 2008). According to the PA, the original 12-acre MRS was used for training by the NMARNG from 1965 until 2000 for an average of 18

weekends per calendar year. The MRS served as a multipurpose training area for small arms, grenades, pyrotechnics, and explosive munitions with training operations occurring along the floor of the sinkhole. The MRS was comprised of two non-standard ranges: a 25-meter pistol and rifle range and a 50-meter machine gun range, a foxhole training area, and a possible demolition area which may have been used to dispose of various munitions by way of intentional detonation.

20 Historical Records Review

A Historical Records Review (HRR) was completed in 2011 as part of the **Site Inspection (SI)** Work Plan (CH2M Hill, 2011). The HRR included a review of reasonably ascertainable historical records regarding use of the MRS. The locations of the firing lines for the small arms ranges were depicted in the work plan.

27 Site Inspection

A SI was conducted for the original 12-acre Roswell North Range MRS in late 2011 and early 2012 to determine whether MEC and MC were present at the MRS (CH2M Hill, 2012).

During the survey of the machine gun range, it was determined that the location of the firing line that was depicted in the HRR/SI Work Plan is the machine gun target impact berm. The location of the firing line for the machine gun range was not confirmed (CH2M Hill, 2012).

SI field work consisted of 10,087 linear feet (ft.) (1.16 acres) of instrument-aided surveys and the collection of surface soil samples in the location of the firing line of the pistol/rifle range, target berm of the pistol/rifle range and the machine gun range, foxhole training area of the machine gun range, and the demolition area crater (**Figure 2**).

Munitions debris (MD) associated with M21A1 40mm training grenades, expended M60 igniter, 20mm projectiles, and rocket practice 35mm subcaliber M73 artillery were encountered near the demolition area. Several aluminum fragments thought to be remnants of 40mm HE grenades were observed near the demolition area. However, without finding a complete grenade or fragments with item coloring and/or identification on them, it could not be determined whether the items were HE grenades. A 40mm smoke/marker grenade was found near the foxhole training area located in the southwestern

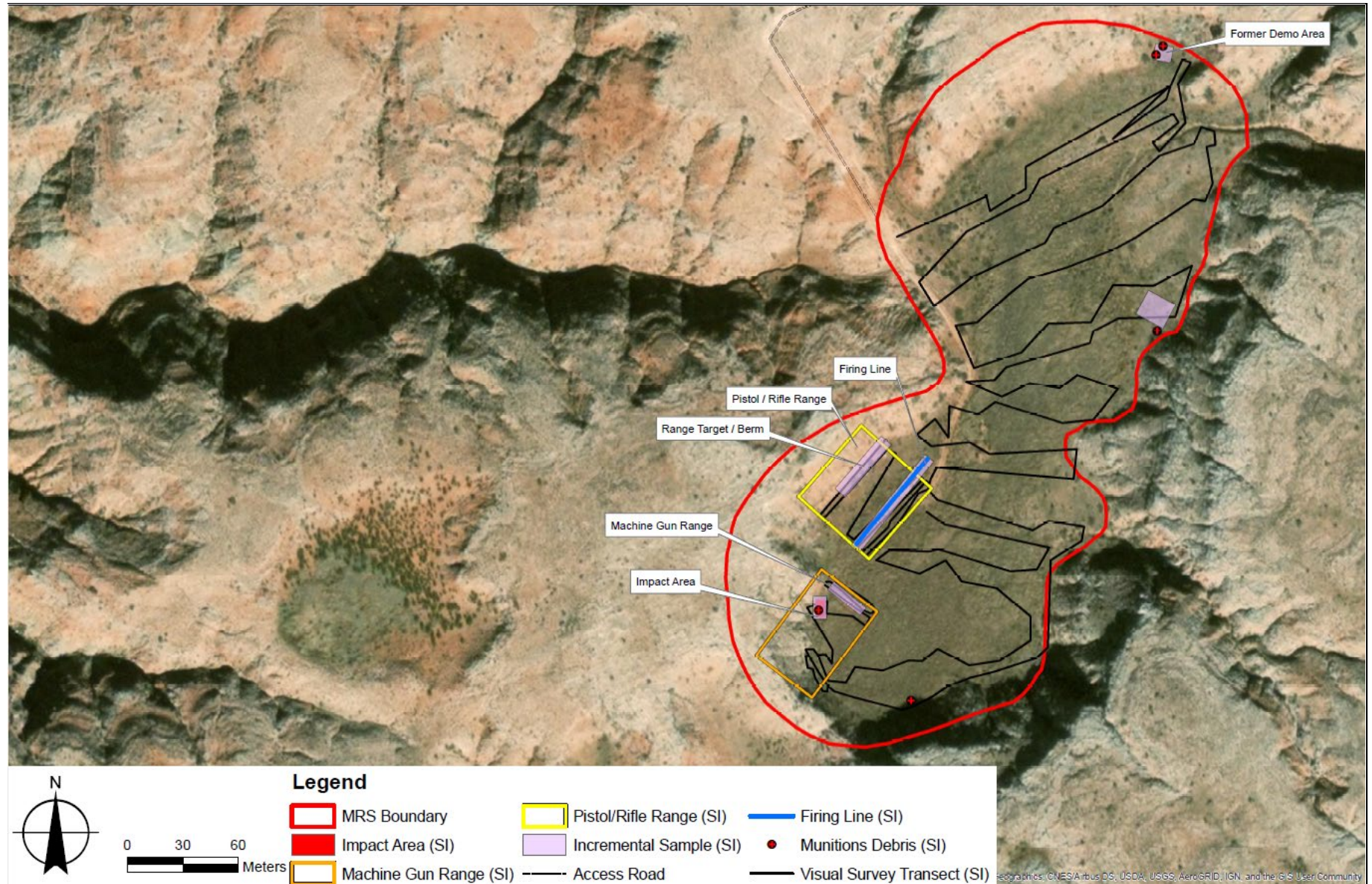


Figure 2 SI Results

portion of the machine gun range. An M60 igniter also was found. No MEC were found during the SI field activities.

During the SI, incremental sampling method (ISM) surface soil samples were collected from six (6) locations (including a background location) within the MRS. A total of five (5) samples were analyzed for select metals of concern (antimony, copper, lead, and zinc) and/or explosive compounds and one background sample for select metals. Lead was detected at concentrations exceeding the NMED residential Soil Screening Levels (SSLs) (400 milligrams per kilogram [mg/kg]) in samples collected at the pistol/rifle range (5,800 mg/kg) and machine gun range (620 mg/kg) berms (**Figures 2 and 3**). Explosive compounds were only detected in the ISM samples at the pistol/rifle range firing line and the demolition area; however, no concentrations were greater than human health screening criteria.

Based on the results of the SI, the original 12-acre Roswell North Range MRS (NM545-001-R-01) was recommended to proceed to the RI/FS phase for MEC and MC (CH2M Hill, 2012).

Remedial Investigation

An RI was conducted over two mobilizations in 2018 (February and May/June) to characterize the nature and extent of MEC and MC potentially present on the original 12-acre Roswell North Range MRS, evaluate the hazards and risks to human health and the environment from MEC and MC, and determine whether the MRS warranted further response actions pursuant to CERCLA (WESTON, 2020a).

February 2018 MEC Survey Event

The geophysical survey design for the first mobilization for the characterization of MEC at the original 12-acre Roswell North Range MRS included parallel **digital geophysical mapping (DGM)** transects of the sinkhole floor.

Unexploded ordnance (UXO) Technicians surveyed 45 parallel DGM transects spaced 21 ft. apart across the sinkhole floor using a single coil Geonics EM61-MK2A metal detector system. The UXO Technicians covered a total of 4.32 miles (1.72 acres) of transects within of the RI area of investigation (12 acres).

To identify potential **concentrated munitions use areas (CMUAs)**, a geostatistical spatial density analysis was performed on the results of the DGM

transects using Visual Sample Plan (VSP) modeling software. This analysis resulted in the development of a target density plot in units of targets per acre. It was determined that densities greater than 400 **anomalies** per acre were representative of a potential CMUA. Based on the MD identified during the DGM transect survey, five areas of elevated MD density were identified across the MRS (**Figure 3**). Two of the potential CMUAs were in a possible impact area. A total of 408 anomalies were identified along the transects and were investigated during the second field mobilization in May/June 2018.

February 2018 MC Sampling Event

The MC sampling program was designed to determine the nature and extent of MC associated with the 12-acre Roswell North Range MRS. The MC sampling approach for the first mobilization was based on historical information and the results of the RI. ISM was utilized for soil sampling to delineate the lateral extent of MC using decision units (DUs). Samples were collected from the known range features (Machine Gun Range and Pistol/Rifle Range) and field observations during the RI (suspected firing point and potential target areas).

Sampling for MC during the first mobilization occurred in February 2018. Seven DUs within the study area were identified to characterize: the Machine Gun Range backstop and slump area (DU1); a portion of the former Pistol/Rifle Range backstop and slump area (DU2) that was not sampled during the SI; the former Pistol/Rifle Range floor (DU3); the former Machine Gun Range floor (DU4); a suspected firing point (DU5), which was based on the presence of an earthen berm and MD findings (i.e., 40mm grenade casing); and two target areas (DU6 and DU7), which were based on numerous MD items (i.e., 40mm practice grenade and M73 subcaliber practice rocket components) found. Background sampling was conducted at a sampling unit established within the north-central portion of the MRS boundary to distinguish site-related contamination from naturally occurring or other non-site-related levels of chemicals. A total of 11 ISM MC surface soil samples (one background sample, eight MC samples and two quality control samples) were collected, prepared, shipped, and analyzed for explosive compounds (nitroaromatics and nitramines) using USEPA Method 8321B and select metals (antimony, copper, lead, and zinc) using USEPA Method 6020A.

1 Explosive compounds 2,4-dinitrotoluene and
2 nitroglycerin were detected above their respective
3 method detection limits in six samples. Select metals
4 (antimony, copper, lead, and zinc) were detected in
5 all samples. For samples with replicates, a 95% upper
6 confidence level was determined. Lead was detected
7 at a concentration of 1,000 mg/kg, which exceeded
8 the preliminary remediation goal (PRG) (400 mg/kg)
9 in the ISM sample (RNR-DU2-180223) collected
10 from DU2. No other exceedances were reported in
11 any of the samples collected during the first
12 mobilization. At DU3, detected concentrations of 2,4-
13 dinitrotoluene and nitroglycerin were the highest
14 among the samples collected during the initial phase
15 of MC sampling.

16 *May/June 2018 MEC Survey Event*

17 The geophysical survey design for the
18 characterization of MEC included analog geophysical
19 transects along the inside perimeter of the sinkhole
20 and base of the escarpment and a meandering, analog
21 instrument-aided visual survey transect conducted on
22 the escarpment outside the RI-designated MRS
23 boundary. Both surveys were supplemented by
24 intrusive investigation of anomalies within the
25 transects.

26 UXO Technicians surveyed analog geophysical
27 transects spaced 15 ft. apart along the inside perimeter
28 of the sinkhole and base of the escarpment (**Figure**
29 **3**). In addition, a meandering 5-ft.-wide analog
30 instrument-aided visual survey transect was
31 conducted on the escarpment outside the RI-
32 designated MRS boundary where MD was observed
33 during RI field activities. Analog geophysical
34 transects were collected using White's All Metal
35 detectors to ensure complete coverage within a 5-ft.-
36 wide lane for each instrument operator. The UXO
37 Technicians covered 0.50 miles (0.91 acres) of analog
38 transects within the RI-designated boundary and 2.60
39 miles (1.58 acres) of analog instrument-aided visual
40 survey transects on the escarpment outside the RI-
41 designated MRS boundary. In total, the UXO
42 Technicians surveyed 4.21 acres of coverage (35% of
43 the MRS) with DGM/analog transects within of the
44 area of investigation (12 acres).

45 All 408 DGM targets identified in the VSP analysis
46 were reacquired and intrusively investigated. During
47 analog geophysical surveys, all targets encountered
48 were intrusively investigated. Analog geophysical
49 surveys resulted in 264 targets and the instrument-

50 aided visual surveys resulted in 20 targets for
51 investigation. After the intrusive investigation of the
52 five high anomaly density areas, three were
53 characterized as CMUAs. A total of 844 items were
54 identified during the intrusive investigations. MD
55 identified the locations observed are presented on
56 **Figure 3**.

57 No MEC was discovered during the RI; however, 215
58 MD items relating to 20mm and 40mm practice and
59 smoke grenades (i.e., M407A1, M781, M715),
60 unidentifiable fragmentation debris, M73 subcaliber
61 practice rocket motors and a grenade fuze were
62 identified (**Figure 3**). Small arms ammunitions
63 (SAA) (196 items) were also identified. The MD and
64 SAA were primarily encountered at the surface to 12
65 inches below ground surface (bgs) (over 90% of the
66 recovered MD items were within the upper 6 inches),
67 with a maximum depth of 2 ft. bgs for five items of
68 SAA. A total of 346 **non-munitions related debris**
69 (**NMRD**) items (aluminum cans, scrap metal, wire,
70 foil, fencing material, cable, and bolts/nails) were
71 encountered at a maximum depth of 12 inches bgs.

72 *May/June 2018 MC Sampling Event*

73 The MC sampling approach was based on the results
74 of the intrusive investigations and included samples
75 to determine the vertical extent of MC. This included
76 discrete subsurface soil sampling at soil boring
77 locations across the former Machine Gun Range and
78 former Pistol/Rifle Range target berms, DU MC
79 sampling using ISM, and MC characterization of
80 identified CMUAs.

81 Sampling for MC during the second mobilization
82 occurred in May/June 2018. Discrete subsurface soil
83 samples were collected from 18 soil boring locations
84 across the former Machine Gun Range (DSSB1
85 through DSSB6) from 0.5-1 ft. bgs, 1.5-2 ft. bgs, and
86 4.5-5 ft. bgs to determine the vertical extent of
87 potential lead contamination below the target berm. A
88 total of 36 discrete samples were collected from 12
89 borings (DSSB7 through DSSB18) distributed across
90 the former Pistol/Rifle Range target berms to
91 determine the vertical extent of lead contamination
92 below the target berm. One ISM sample was collected
93 from the Pistol/Rifle Range floor from 6-9 in. bgs to
94 determine the vertical extent of potential lead and
95 explosive compounds contamination below DU3.
96 Additionally, two supplementary DUs were created
97 adjacent to the flanks of the Pistol/Rifle Range fan
98 (DU10 and DU11) and ISM soil samples collected

1 from 0-3 in. bgs to determine the lateral extent of
2 possible lead and explosive compounds
3 contamination around DU3.

4 MC characterization of identified CMUAs (DU12,
5 DU15, and DU16) included collection of one ISM
6 soil sample from each DU (including two replicates
7 from DU12) from 0-3 in. bgs based on the results of
8 the intrusive investigation. All samples collected
9 were analyzed for explosive compounds
10 (nitroaromatics and nitramines) using USEPA
11 Method 8321B and select metals (antimony, copper,
12 lead, and zinc) using USEPA Method 6020A.

13 Select metals (antimony, copper, lead, and zinc) were
14 detected in all samples. Lead was reported at a
15 concentration of 1,200 mg/kg, which exceeded the
16 PRG of 400 mg/kg, in the duplicate soil sample
17 (DSSB11) collected from a soil boring in the
18 Pistol/Rifle Range target berm from a depth of 6-12
19 inches bgs. No other exceedances were reported in
20 any of the samples collected during the second
21 mobilization. At DU3, concentrations of lead, 2,4-
22 dinitrotoluene, and nitroglycerin from 6-9 in. bgs
23 were significantly lower than the concentrations in
24 the surface samples collected from 0-3 in. bgs during
25 the first phase of MC sampling.

26 The results of the RI fieldwork indicated MC (lead)
27 sources at the former Pistol/Rifle Range and former
28 Machine Gun Range target areas. MC contamination
29 at the former Pistol/Rifle Range target area (0.14
30 acres) is from 0-6 inches bgs with the area between
31 soil boring locations DSSB10 and DSSB12 extending
32 to a maximum depth of 1.5 ft. bgs or approximately
33 4,664.2 cubic ft. MC contamination at the former
34 Machine Gun Range target berm is from 0-6 inches
35 bgs or approximately 1,306.8 cubic ft.

36 **RI Recommendations**

37 While no MEC was identified during the SI or the RI,
38 several aluminum fragments thought to be remnants
39 of 40mm HE grenades were observed near the
40 demolition area during the SI, MD was identified
41 outside of the RI-designated MRS boundary, and the
42 MEC risk assessment resulted in an “Unacceptable”
43 rating. A source of MC (lead) was identified at the
44 former Pistol/Rifle Range and former Machine Gun
45 Range target areas; therefore, human health risks are
46 present at the MRS. Further action for MEC and MC
47 was recommended for the Roswell North Range MRS
48 (NM545-001-R-01). A FS was recommended to

49 evaluate the potential remedial alternatives to address
50 MEC and MC hazards.

51 Additionally, it was recommended that the 12-acre
52 RI-designated MRS boundary be extended 1,312 ft.
53 (400 m), the maximum range of the MD (M407A1
54 and M781 40mm practice grenades) identified
55 outside the RI-designated MRS boundary, to increase
56 the MRS to 244.12 acres (**Figure 3**) (WESTON,
57 2020a).

58 **Feasibility Study**

59 A FS was completed to evaluate potential remedial
60 alternatives for the Roswell North Range MRS
61 (NM545-001-R-01) (WESTON, 2021). Five
62 remedial alternatives were identified as “reasonable
63 measures” for protecting the public and the
64 environment from potential exposure to MEC. They
65 are described in the *Summary of Remedial*
66 *Alternatives*.

67 **SITE CHARACTERISTICS**

68 The proposed Roswell North Range MRS (NM545-
69 001-R-01) is in Chaves County, New Mexico,
70 approximately 10 miles east and 4 miles north of the
71 center of Roswell, New Mexico. The 12-acre MRS is
72 located west of Dulce Road and is an irregularly
73 shaped, large sinkhole with sedimentary rock
74 escarpments related to limestone dissolution and
75 collapse features. The 1,312 ft. (400 m) buffer area
76 collectively brings the size of the MRS up to 244.12
77 acres. The MRS is located within a single parcel of
78 land that is federally-managed by the BLM.

79 There are no known critical habitats or Areas of
80 Critical Environmental Concern within the 244.12-
81 acre MRS boundary, and there are no federal or state
82 threatened, endangered, or candidate species known
83 to exist on the MRS (USFWS, 2021).

84 **Nature and Extent of MEC**

85 UXO and/or discarded military munitions (DMM)
86 were not discovered during the SI or RI. However,
87 MD associated with M21A1 40mm training grenades,
88 a 40mm smoke/marker grenade, expended M60
89 igniters, 20mm projectiles, rocket practice 35mm
90 subcaliber M73, 40mm practice and smoke grenades
91 (i.e., M407A1, M781, M715), and aluminum
92 fragments from potential 40mm HE grenades, M73
93 subcaliber practice rocket motors, and a grenade fuze
94 were encountered. The maximum range of the 40mm
95 practice grenades and M73 subcaliber practice





M407A1 40mm Practice Grenade MD recovered from DGM transect at the Roswell North Range MRS during the RI.

rockets (MD identified outside the RI MRS boundary) is approximately 1,312 ft. and 1,062 ft., respectively.

The RI determined that there was physical evidence that HE munitions may have been used at the Roswell North Range MRS (WESTON, 2020).

The MD items identified during the SI and RI were primarily located within the 12-acre RI-designated MRS boundary. The highest density of MD is present at the northeastern portion of the MRS at the former demolition area; the southwestern portion of the MRS, behind the former Machine Gun range; and along the eastern perimeter of the MRS at the foot of the escarpment (**Figure 3**). MD items were encountered from the surface to a maximum of 12 inches bgs, which is also expected to be the maximum depth of impact of these items primarily because of the geologic conditions at the MRS (i.e., very dense substrate consisting of large amounts of gravel and rock). Therefore, the MEC exposure pathways remain potentially complete for all receptors and all pathways (WESTON, 2020).

Nature and Extent of MC

Analytical results from the RI indicated concentrations of lead exceeding residential soil screening levels are present in soils in the former Machine Gun Range and Pistol/Rifle Range target berm areas at the Roswell North Range MRS. The vertical extent of MC contamination at the former Machine Gun Range target berm (approximately 0.06 acres/2,614 square ft.) is to a depth of 6 inches bgs for

a total of approximately 1,307 cubic ft. The vertical extent of MC contamination at the former Pistol/Rifle Range target berm (0.14 acres/6,098 sq. ft.) is to a depth of 6 inches bgs with the area between soil boring locations DSSB10 and DSSB 12 extending down to 1.5 ft. bgs for a total of approximately 4,664 cubic ft. Concentrations of nitroglycerin and 2,4-dinitrotoluene were detected in DU3 soil samples at levels less than their respective preliminary remediation goals (i.e., the most stringent human health and ecological screening levels).

Antimony, copper, lead, and zinc concentrations in soil exceeded background concentrations and ecological screening levels in CMUA 3 and lead in CMUA 1. Although these concentrations exceeded ecological screening levels, the areas that they represent (former target berm and demolition areas) are insufficient to support an ecology suitable for ecological review.

SCOPE AND ROLE OF THE RESPONSE ACTION

This PP addresses the preferred remedial alternative selected by ARNG G9, USACE, NMARNG, USEPA, and NMED to manage the risks posed by MEC and MC at the 244.12-acre Roswell North Range MRS.

SUMMARY OF SITE RISKS

Based on the RI findings, the MEC and MC risks are summarized below (WESTON, 2020).

MEC Risk Summary

Results of the SI and RI indicate that NMARNG training at the MRS included small arms (e.g., 20mm), grenades (e.g., 40mm training and smoke/marker [M21A1, M407A1, M781, M715]), pyrotechnics (e.g., M60 igniter), and explosive munitions (e.g., 40mm HE grenades, M73 subcaliber practice rockets).

The risk matrix methodology (RMM) described in the Study Paper: *Decision Logic to Assess Risks Associated with Explosive Hazards, and to Develop Remedial action objectives for Munitions Response Sites* (USACE, 2020) was used to evaluate the risks associated with potential MEC present at the 244.12-acre Roswell North Range MRS. Based on the evaluation, the Roswell North Range MRS has a baseline risk of MEC that is “Unacceptable”.

1 MC Risk Summary

2 Lead was the only chemical of potential concern
3 identified in one ISM and one discrete soil sample
4 collected during the RI at the Pistol/Rifle Range
5 backstop and slump areas at concentrations that
6 exceeded the human health risk-based screening
7 levels. Therefore, a **Human Health Risk**
8 **Assessment (HHRA)** was conducted. Based on the
9 results of the HHRA, lead presents a potential risk to
10 residential receptors. DU2 is not presently suitable for
11 unrestricted use for human receptors for residential
12 reuse.

13 **A Screening Level Ecological Risk Assessment**
14 **(SLERA)** was also conducted based on RI MC
15 sampling results. Each sampled DU encompassed no
16 more than approximately 0.5 acres. Elevated MC
17 (i.e., antimony, copper, lead, and zinc) concentrations
18 were identified in CMUA 3 (former Pistol/Rifle
19 Range and former Machine Gun Range target berms)
20 and CMUA 1 (near the former demolition area). Risks
21 to plants, avian herbivores, insectivores, and
22 carnivores, and mammalian insectivores and
23 carnivores in all intervals of CMUA 1 and 3 are
24 possible. Special status species potentially present in
25 the vicinity of the site include plants, fish, birds,
26 aquatic invertebrates, and carnivorous mammals.
27 Adverse ecological threats are not expected anywhere
28 else in the MRS. The screening levels assumed 100
29 percent site use. Based on the very small areal extent
30 of contamination (0.8 acres) in CMUA 3 (DU1, DU2,
31 DU3, DU4, DU10, and DU 15 combined) and
32 CMUA1 (0.5 acres), it was not reasonable to assume
33 that the DUs would support wildlife populations.
34 Therefore, a Baseline Ecological Risk Assessment
35 was not required for this MRS.

36 REMEDIAL ACTION OBJECTIVE

37 **Remedial action objectives (RAOs)** are site-specific
38 goals that are developed to protect human health and
39 the environment and are what remedial alternatives
40 are screened against. The RAOs established for the
41 244.12-acre Roswell North Range MRS are to:

- 42 ■ Reduce the unacceptable risk due to presence of
43 military munitions (40mm practice and smoke
44 grenades [M21A1, M407A1, M781, M715],
45 40mm smoke/marker grenades, M60 igniters,
46 20mm projectiles, rocket practice 35mm
47 subcaliber M73, and 40mm HE grenades) within
48 the Roswell North Range MRS to a depth of 24-

49 in. bgs to address likelihood of exposure to site
50 workers and site visitors/recreational users via
51 intrusive and non-intrusive activities such that an
52 acceptable condition (as defined by Matrix 4 of
53 the RMM) is achieved.

- 54 ■ Reduce the unacceptable risk due to the presence
55 of MC (lead in surface and shallow subsurface
56 soil) within the former Pistol/Rifle Range and
57 former Machine Gun Range within Roswell
58 North Range MRS to a depth of 18-24-in. bgs to
59 address the likelihood of exposure to site workers
60 and site visitors/recreational users via surface soil
61 and subsurface soil (ingestion, dermal contact,
62 and/or inhalation) such that an acceptable
63 condition (less than 400 mg/kg) is achieved.

64 During RAO development, potential **applicable or**
65 **relevant and appropriate requirements (ARARs)**
66 and to-be-considered (TBC) criteria were evaluated.
67 The ARARs and TBCs for the MRS are provided in
68 **Table 2.**

69 SUMMARY OF REMEDIAL 70 ALTERNATIVES

71 ARNG G9, USACE, AZARNG, and ADEQ are
72 considering five different remedial alternatives for
73 the 244.12-acre Roswell North Range MRS. The
74 remedial alternatives were evaluated against seven of
75 the nine criteria required by CERCLA and the NCP
76 (see criteria explanation in **Table 3**). Criteria 8 and 9
77 will be considered after the public comment period
78 has ended.

79 The evaluated Response Action Alternatives are
80 as follows:

- 81 ■ Alternative 1: No Action.
- 82 ■ Alternative 2: LUCs.
- 83 ■ Alternative 3: LUCs, Complete Surface and
84 Subsurface MEC Clearance (24-in. bgs)
85 using DGM/ Advanced Geophysical
86 Classification (AGC), Excavation and
87 Stabilization of Lead-Contaminated Soil.
- 88 ■ Alternative 4: Complete Surface and
89 Subsurface MEC Clearance (24-in. bgs)
90 using DGM/AGC, Excavation and
91 Stabilization and Off-Site Disposal of Lead-
92 Contaminated Soil.

1

Table 2: Key ARARs

Requirement	Citation	Description	ARAR/TBC Determination	Comments
Chemical Specific				
Identification and Listing of Hazardous Waste	40 Code of Federal Regulations (CFR) Part 261	Identifies those solid wastes which are subject to regulation as hazardous wastes under parts 262 through 265, and parts 270, 271, and 124 of 40 CFR Chapter I, Subchapter I – Solid Wastes and which are subject to the notification requirements.	ARAR	Soil concentrations are compared to Resource Conservation and Recovery Act (RCRA) characteristics of hazardous waste for waste characterization and proper disposal purposes.
Defines RCRA hazardous waste	RCRA (42 U.S. Code [USC], Chapter 82, §§ 6901–6991(i))c	A solid waste is characterized as toxic, based on the results of the toxicity characteristic leaching procedure (TCLP), if the waste exceeds the TCLP maximum concentrations.	ARAR	Excavated soil from the MRS will be treated and analyzed through the TCLP.
Maximum contaminant concentration	NMED SSLs	Establishes maximum levels of specific chemicals in soil	TBC	Applies to MC and soil removal.
Soil screening levels	USEPA Regional Screening Level	Establishes screening levels of specific chemicals in soil	TBC	Applies to MC that are not addressed in NMED SSLs.
Location Specific				
New Mexico regulations governing Endangered Plant Species Wildlife Conservation Act	New Mexico Administrative Code (NMAC) Title 19 Chapter 21 Part 2	Rules and permitting requirements for taking endangered plants during scientific investigations or propagation and transplantation activities that enhance survival.	ARAR	Based on prior investigations, no known endangered plant species are present at the site.
Federal Endangered Species Act	16 USC §§ 1531-1544	The Federal Endangered Species Act protects animal and plant species that are in danger of extinction or are threatened due to loss of habitat or other pressures.	ARAR	Based on prior investigations, no known endangered plant or animal species are present at the site.
Action Specific				
New Mexico regulations governing hazardous waste	20.4 NMAC	State regulation addresses the generation, management, and transportation of hazardous waste at facilities in New Mexico.	ARAR	Applies to MEC and soil removal.

Requirement	Citation	Description	ARAR/TBC Determination	Comments
RCRA – Thermal treatment of MEC	40 CFR § 264.602	Onsite detonation: Requires measures be taken to prevent the release of contaminants to soil, water, and air.	ARAR	The substantive portions of RCRA apply to the on-site treatment of MEC material. The onsite detonation of MEC should not cause migration of explosion by-product contaminants. Any residual contamination from the MEC treatment activities will be assessed and potentially remediated, as appropriate, by the ARNG G9 when Roswell North Range MEC removal activities are completed.
Management of military munitions	Military Munitions Rule 40 CFR § 266.203(a)(1)(i)-(iii), 266.205(a)(1)(i)-(vii), and 266.206	Military munitions: Standards for transportation and storage of solid waste military munitions and treatment and disposal of waste military munitions.	ARAR	Applicable for the management of military munitions.
Storage of military munitions	Military Munitions Rule (40 CFR Part 266, Subpart M)	Identification of hazardous waste munitions and treatment and storage requirements for hazardous waste munitions.	ARAR	Military munitions may be encountered. LUCs will be applied to manage future use, limiting potential impact to buried munitions.
MEC	DoD Defense Explosive Safety Regulation (DESR) 6055.09 (DoD, 2019)	DoD Defense Explosives Safety Regulation for the management of explosives-related risks associated with DoD operations	TBC	Governs the handling, storage, transportation, disposal, and cleanup requirements for UXO.
Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities; miscellaneous units	40 CFR 264 Subpart X	A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment.	TBC	Applies to treatment (detonation) of MEC / material potentially presenting an explosive hazard (MPPEH) that requires technologies defined as “miscellaneous units” in Subpart X. Subpart X specifies an environmental performance standard that must be met through conformance with appropriate design, operating, and monitoring requirements.

Table 3: Evaluation Criteria

Threshold Criteria – requirements that an alternative must meet or specifically waive for selection eligibility
Overall Protection to Human Health and the Environment – addresses how well an alternative protects people and the environment. This standard can be met by reducing or removing contamination or by reducing exposure to it.
Compliance with ARARs or Other Requirements – ensures that options comply with federal, state, and local laws.
Balancing Criteria – basis for comparing and contrasting alternatives that meet Threshold Criteria
Long-term Effectiveness and Permanence – evaluates how well an option will work over the long term, including how remaining contamination can be safely managed.
Reduction of Toxicity, Mobility, or Volume through Treatment – addresses how well an alternative reduces the danger, movement, and amount of contamination.
Short-term Effectiveness – compares how quickly an option could achieve cleanup goals and how much risk there would be to workers and members of the public while the alternative is being implemented.
Implementability – evaluates how feasible an alternative is to implement and whether materials and services are available in the area.
Cost – includes not only capital costs (for example, equipment, materials, and labor), but also the costs of maintaining the option for the life of the cleanup.
Modifying Criteria – additional factors that can influence acceptability of the alternative
State Acceptance – judges how well the state environmental agency accepts the alternative. This will be evaluated after receiving public comments.
Community Acceptance – judges how well the nearby residents and other members of the community accept the selected alternative. This will be evaluated after receiving public comments.

Table 4: Remedial Alternative Summary

Alternative 1: No Action	
<i>Estimated Present Value Cost</i>	\$0
<i>Alternative Description:</i> <ul style="list-style-type: none"> CERCLA requires that a “No Action” alternative be evaluated for the purpose of comparison to the other proposed alternatives. For the No Action alternative, it is assumed that no change to the current land use of the MRS would occur. 	
Alternative 2: LUCs	
<i>Estimated Present Value Cost</i>	\$500,000
<i>Alternative Description:</i> <ul style="list-style-type: none"> Alternative 2 includes engineering and educational controls. Engineering controls will include four warning signs located on the access roads at the perimeter of the MRS and at the target berms where elevated lead levels were observed. Educational controls will include a fact sheet prepared for the landowners, land managers (BLM), and public agencies. The signs will be inspected and replaced (as necessary) during annual inspections of the MRS and Five-Year Reviews. Alternative 2 would include development of a management plan that would identify the steps necessary to manage the potential MEC remaining and how residual contamination should be handled at the MRS. Four types of management plans may be required: a LUC Implementation Plan, LUC monitoring and maintenance plan, Long-Term Monitoring (LTM) program plan; and Environmental Hazard Management Plan (used to mitigate potential hazards remaining after treatment). Alternative 2 would be protective of human health and the environment by controlling exposure of MEC and MC to possible receptors through engineering and education controls. Alternative 2 would protect the environment because no clearing, grubbing, or excavation would be required. Minor disturbances to the soil would be needed where the signs are placed. The remaining potential MEC hazards at the Roswell North Range MRS would be mitigated by LUCs to prevent receptors from encountering MEC. However, this alternative offers no physical reduction of MEC or MC present in the soil. 	

Alternative 3: LUCs, Complete Surface and Subsurface MEC Clearance (24-in. bgs) using DGM/ AGC, Excavation and Stabilization of Lead-Contaminated Soil	
<i>Estimated Present Value Cost</i>	\$2,906,000
<ul style="list-style-type: none"> Alternative 3 includes LUCs, as described in Alternative 2, and the removal of MEC in the surface and subsurface (from the ground surface to a depth of 24 inches bgs) from approximately 217 acres of the MRS using geophysical techniques. Approximately 27 acres of escarpment is steeply graded and considered non-traversable. This area would be cleared using analog geophysical methods and possibly by repelling from the top of the escarpment down. Alternative 3 includes removal of all lead-contaminated soil (0.2 acres) to 12-in. or 24-in. bgs, depending on the area (approximately 383 cubic yards). All excavated soil would be treated on-site using stabilization methods and tested to ensure compliance with RCRA requirements, and the treated soil left on site. Clean fill would be brought in and graded to pre-NMARNG usage. The new soil would be seeded with an NMED-approved seed mixture and watered until the seeds germinate. Following excavation, analytical laboratory confirmation sampling would be performed to verify that remaining soil concentrations of lead are below the PRGs. Additional soil would be excavated if necessary, to achieve PRGs. Alternative 3 would be protective of human health by controlling the exposure and migration of contaminants through a reduction of MEC using a surface and subsurface clearance, and by treating MC-contaminated soil. LUCs would mitigate the exposure to MEC and treated MC-contaminated soil through signage identifying the potential MEC and MC hazard area and minimizing interaction of all users with MEC and MC. Alternative 3 would disturb surface vegetation during implementation; however, removal of contaminants from soil would be protective of the environment. 	
Alternative 4: Complete Surface and Subsurface MEC Clearance (24-in. bgs) using DGM/AGC, Excavation and Stabilization and Off-Site Disposal of Lead-Contaminated Soil	
<i>Estimated Present Value Cost</i>	\$2,687,000
<ul style="list-style-type: none"> Alternative 4 includes removal of MEC as described in Alternative 3. Alternative 4 includes removal of all lead-contaminated soil (0.2 acres) to 12-in. or 24-in. bgs, depending on the area (approximately 383 cubic yards). All excavated soil would be treated on-site using stabilization methods and tested to ensure compliance with RCRA requirements, and the treated soil disposed of offsite. Clean fill would be brought in and graded to pre-NMARNG usage. The new soil would be seeded with an NMED-approved seed mixture and watered until the seeds germinate. Following excavation, analytical laboratory confirmation sampling would be performed to verify that remaining soil concentrations of lead are below the PRGs. Additional soil would be excavated if necessary, to achieve PRGs. Alternative 4 would be protective of human health by controlling the exposure and migration of contaminants through a reduction of MEC using a surface and subsurface clearance and by eliminating MC in the soil. No LUCs would be required when soil contamination is removed to the extent that the MRS is acceptable for Unlimited Use/Unrestricted Exposure (UU/UE). Alternative 4 would disturb surface vegetation during implementation; however, removal of contaminants from soil would be protective of the environment. 	
Alternative 5: LUCs, Instrument-Aided Surface Clearance, and Excavation and Stabilization and Off-Site Disposal of Lead-Contaminated Soil	
<i>Estimated Present Value Cost</i>	\$2,019,000
<ul style="list-style-type: none"> Alternative 5 includes LUCs, as described in Alternative 2, except only one warning sign will be located on Dulce Road at the entrance to the MRS. Alternative 5 includes a full coverage instrument-aided surface clearance (from the ground surface to a depth of 2 inches bgs) of the entire 244.12 acres of the MRS. Alternative 5 includes removal of all lead-contaminated soil and offsite disposal as described in Alternative 4. Following excavation, analytical laboratory confirmation sampling would be performed to verify that remaining soil concentrations of lead and antimony are below the PRGs. Additional soil would be excavated if necessary, to achieve PRGs. Alternative 5 would be protective of human health by controlling the exposure and migration of contaminants through a reduction of MEC using a surface clearance and by eliminating MC in the soil. MC-contaminated soil would be permanently removed from the MRS and would not be present for future exposure. LUCs would mitigate the exposure to MEC through signage identifying the potential MEC hazard area and minimizing interaction of all users with MEC. Alternative 5 would disturb surface vegetation during implementation; however, removal of contaminants from soil would be protective of the environment. 	

- Alternative 5: LUCs, Instrument-Aided Surface Clearance, and Excavation and Stabilization and Off-Site Disposal of Lead-Contaminated Soil.

Table 4 provides a brief description of the remedial alternatives and their associated costs.

ARNG G9 prefers Alternative 5 because it best meets the criteria for addressing the MEC and MC-related risks to human health and the environment at the 244.12-acre Roswell North Range MRS.

EVALUATION OF REMEDIAL ALTERNATIVES

Nine criteria are used to evaluate the different remedial alternatives individually and against each other to select a remedy.

1. Overall Protection of Human Health and the Environment.
2. Compliance with ARARs.
3. Long Term Effectiveness and Permanence.
4. Reduction of Toxicity, Mobility, or Volume through Treatment.
5. Short Term Effectiveness.
6. Implementability.
7. Cost.
8. State Acceptance.
9. Community Acceptance.

This section profiles the relative performance of each remedial alternative against the nine criteria, noting how it compares to the other options under consideration.

The final remedy is selected based on weighing the tradeoffs identified during analysis of the criteria, comments received during the public comment period, and any new information discovered after the PP has been issued. **Table 3** presents the specific components of each of the nine criteria. The alternatives are summarized in **Table 4**. The evaluations of each of the remedial alternatives against the nine evaluation criteria are provided in the following paragraphs and summarized in **Table 5**. Additional detailed analysis of each remedial alternative can be found in the FS (WESTON, 2021).

1. Overall Protection of Human Health and the Environment

Alternative 1 would not eliminate, reduce, or control human exposures to surface and subsurface

MEC/MD or MC in soil. Therefore, the potential exists for MEC to be handled by unqualified/untrained personnel and disposed of improperly. Alternative 2 would be protective of human health through signage identifying the potential MEC/MC hazard areas, and educational controls that raise public awareness resulting in increased protection for human health. Through LTM, land use would be monitored and restricted such that human health and the environment is protected. Together, these LUCs would be sufficient in meeting the RAOs for the MRS.

Alternative 3 would be more protective of human health than Alternative 2 because potential MEC would be removed from the surface and subsurface (0-24 inches bgs) using DGM and conducting an analog clearance of the steeply sloping escarpment area, and by treating MC-contaminated soil at the MRS. This alternative includes LUCs and meets the RAOs for the MRS.

Alternative 4 would be more protective of human health than Alternative 3 by treating MC-contaminated soil at the MRS and disposing of it offsite. Alternative 4 is intended to meet UU/UE requirements.

Alternative 5 would be more protective of human health than Alternative 2 because potential MEC would be removed using a full coverage instrument-aided surface clearance (0-2 inches bgs) of the entire 244.12-acre MRS. Additionally, it would be protective of human health and the environment by treating MC-contaminated soil at the MRS and disposing of it offsite. This alternative includes LUCs and meets the RAOs for the MRS.

Alternatives 1 and 2 would not damage the environment because clearing, grubbing, or excavating will not occur. Alternatives 3, 4, and 5 would cause damage to the environment during excavation and revegetation activities. The extent of the damage will be dependent upon the density and depth of the soil excavation and the extent to which vegetation will have to be cleared for MC removal. Alternatives 3 and 4 would be the least environmentally protective alternatives because they would cause the most damage to the MRS. However, the MRS would be backfilled with native soil and

1 restored. Alternative 5 would cause less
2 environmental damage than Alternatives 3 and 4
3 because MEC removal would be limited to the top 2
4 inches of soil.

5 **2. Compliance with ARARs**

6 ARARs are not applicable for Alternative 1.
7 Alternatives 2 through 5 would be performed in
8 compliance with the ARARs (**Table 2**). Alternatives
9 3 through 5 would require more coordination and
10 planning to avoid potential environmental impacts
11 than Alternatives 1 and 2. If MPPEH or MEC items
12 requiring a consolidated shot approach are identified
13 during activities of Alternatives 3 through 5, 40 CFR
14 Part 264, Subpart X would become an ARAR.

15 **3. Long Term Effectiveness and Permanence**

16 Alternative 1 is not effective or permanent.
17 Alternative 2 would be more effective and lasting
18 than Alternative 1, assuming the cooperation and
19 active participation of the existing powers and
20 authorities of government agencies. The LUCs
21 recommended under Alternative 2 would be designed
22 to be effective for the long term: signs would be
23 placed near the MRS to alert visitors of potential
24 hazards and educational materials would be provided
25 to landowners, land managers (BLM) and public
26 agencies to mitigate exposures to potential MEC, and
27 annual inspections and Five-Year Reviews would be
28 performed to ensure LUCs remain effective.
29 Alternative 3 would be more effective and lasting
30 than Alternative 2 because it would clear MEC to a
31 depth of 24 inches bgs across the MRS, clear MEC
32 from the escarpment using a visual survey, and
33 implement LUCs for remediated soil. Alternative 4
34 would be the most effective and lasting alternative
35 because MEC and MC would be permanently
36 removed from the MRS. Alternative 5 would be more
37 effective and permanent than Alternatives 1 and 2 at
38 managing the risk of encountering remaining MEC at
39 the MRS through the implementation of LUCs and
40 removal of MC but less effective and permanent than
41 Alternatives 3 and 4.

42 **4. Reduction of Toxicity, Mobility, or** 43 **Volume through Treatment**

44 Alternative 1 would not reduce the toxicity, mobility,
45 or volume of MEC or MC at the MRS. Alternative 2
46 would provide a slight reduction in mobility of
47 munitions remaining at the MRS by modifying
48 human behavior through LUCs (reducing the

49 probability of handling munitions encountered).
50 Alternatives 3 and 4 would be most effective in
51 reducing the Toxicity, Mobility, or Volume of
52 munitions and MC because detectable surface and
53 subsurface munitions and MC-contaminated soil
54 would be removed. Alternatives 3 and 4 satisfy the
55 statutory preference for treatment as a principal
56 element of the remedy because MEC would be
57 identified and removed from the MRS. Alternative 5
58 would be more effective than Alternative 1 in
59 reducing the probability of encountering MEC
60 remaining at the MRS by modifying human behavior
61 through LUCs and removing MC-contaminated soil.

62 **5. Short Term Effectiveness**

63 Alternative 1 would pose no short-term risk to the
64 community or workers at the MRS. Alternative 2
65 would require minimal land disturbance associated
66 with the installation of warning signs and minimal
67 risk to workers installing the warning signs.
68 Alternatives 3 through 5 would have an increased risk
69 to workers during clearance and treatment of suspect
70 MEC/MPPEH and MC, which would be mitigated
71 using engineering controls. Alternative 2 would have
72 the shortest duration for implementation of the
73 remedy at approximately one week. Alternatives 3
74 and 4 would require the most time to complete at
75 approximately eight months and Alternative 5 would
76 take approximately one month to complete.

77 **6. Implementability**

78 Alternative 1 would be easy to implement because it
79 requires no action. Alternative 2 requires minimal
80 effort to install warning signs and to produce and
81 distribute fact sheets. However, the LTM portion of
82 Alternative 2 may appear onerous to stakeholders.
83 Clearance of MEC as required by Alternatives 3
84 through 5 are more difficult to implement than
85 Alternatives 1 and 2. Additionally, implementation of
86 MC removal, treatment, and disposal would be more
87 difficult to implement than Alternatives 1 and 2.

88 **7. Cost**

89 Costs for the alternatives were estimated using the
90 present-day value applied over a 30-year period.
91 **Tables 4 and 5** provide estimated costs for the
92 implementation of the five remedial alternatives.
93 Alternative 3 is the costliest alternative to implement,
94 followed by Alternative 4, then 5, and then
95 Alternative 2. Alternative 1 is a no cost alternative.

1 **8. State Acceptance**

2 Regulatory acceptance will be documented in the
3 ROD.

4 **9. Community Acceptance**

5 Solicitation of community involvement in the
6 decision making of a final remedy is sought through
7 this PP and public comments will be documented in
8 the ROD.

9 **PREFERRED REMEDIAL ALTERNATIVE**

10 Alternative 5, LUCs, Instrument-Aided Surface
11 Clearance, and Excavation and Stabilization and Off-
12 Site Disposal of Lead-Contaminated Soil, is the
13 preferred remedial alternative (**Figure 4**) for the
14 244.12-acre Roswell North Range MRS. Alternative
15 5 is recommended because it is protective of human
16 health and the environment through removal of
17 surface MEC and implementation of LUCs, LTM,
18 annual inspections and Five-Year Reviews to manage
19 potential MEC remaining onsite. This remedy was

20 selected since regulatory approval of UU/UE for this
21 MRS would not be supported. Additionally, it
22 provides complete removal of MC-contaminated soil
23 achieving no further action for MC at the MRS.
24 Based on information currently available, ARNG G9,
25 USACE, NMARNG, USEPA, and NMED believe the
26 preferred remedial alternative meets the threshold
27 criteria and provides the best balance of tradeoffs in.
28 comparison with the other alternatives. ARNG G9,
29 USACE, NMARNG, USEPA, and NMED expect the
30 preferred remedial alternative to satisfy the following
31 statutory requirements of CERCLA 121(b): 1) be
32 protective of human health and the environment; 2)
33 comply with ARARS; 3) be cost-effective; 4) utilize
34 permanent resource recovery technologies to the
35 maximum extent practicable; and 5) satisfy the
36 preference for treatment as a principal element or
37 explain why the preference for treatment will not be
38 met.

Table 5: Evaluation of Remedial Alternatives

Detailed Criteria	Alternative 1 No Action Alternative	Alternative 2 LUCs	Alternative 3 LUCs, Complete Surface and Subsurface MEC Clearance (24-in. bgs) using DGM/AGC, Excavation and Stabilization of Lead-Contaminated Soil	Alternative 4 Complete Surface and Subsurface MEC Clearance (24-in. bgs) using DGM/AGC, Excavation and Stabilization and Off- Site Disposal of Lead- Contaminated Soil.	Alternative 5 LUCs, Instrument- Aided Surface Clearance, and Excavation and Stabilization and Off-Site Disposal of Lead-Contaminated Soil
Description	Per the NCP, the no action alternative is included for baseline comparison	Protecting receptors by limiting access to MEC and MC	Protecting receptors by removing the potential MEC and MC hazard across the MRS.	Protecting receptors by removing the potential MEC and MC hazard across the MRS.	Protecting receptors by removing the potential MEC at the surface and MC hazard across the MRS.
Overall Protectiveness of Human Health and the Environment	○	●	●	●	●
Compliance with ARARS	NA	●	●	●	●
Long-Term Effectiveness and Permanence	○	○	○	●	○
Reduction of Toxicity, Mobility, or Volume through Treatment	○	○	○	●	○
Short-Term Effectiveness	○	○	○	○	○
Implementability	●	●	●	●	●
Cost (Total Present Value)	(\$0)	(\$500,000)	(\$2,906,000)	(\$2,687,000)	(\$2,019,000)

Note: ● Favorable (Yes for threshold criteria) ○ Moderately Favorable ○ Not Favorable (No for threshold criteria)

1 **COMMUNITY PARTICIPATION**

2 Information regarding the implementation of
3 Alternative 5 at the 244.12-acre NDNODS Roswell
4 North Range MRS is provided to the public through
5 documents placed in the Administrative Record and
6 information repository, as well as announcements
7 published in local newspapers. The public is
8 encouraged to refer to these sources of information to
9 gain a better understanding of the 244.12-acre
10 Roswell North Range MRS and the activities that
11 have been conducted to date.

12 In accordance with the NCP, an Administrative
13 Record file has been established by the ARNG G9.
14 The contents of the file include a variety of written
15 materials, such as correspondence, data reports,
16 assessments, plans, newspaper articles, notices, and
17 fact sheets. The contents of the Administrative
18 Record file are also housed at an information
19 repository located at the Roswell Public Library, in
20 Roswell, New Mexico.

21 The ARNG G9 solicits input from the community on
22 this PP. The comment period will extend from 21
23 March 2021 through 23 April 2021. Written
24 comments must be postmarked by midnight on 23
25 April 2021.

26 A virtual public meeting will be held on 14 April 2021
27 during the comment period. The virtual public meeting
28 will present the PP and provide answers to questions
29 regarding the MRS.

30 Comments or questions concerning this PP should
31 also be addressed to LTC Donna Wu. Comments
32 received on this PP and their responses will be
33 summarized in the *Responsiveness Summary* section
34 of the ROD which will present the final selected
35 remedy for the MRS.

36 For additional information on the Roswell North Range
37 MRS, please contact the following individual:

38 **LTC Donna Wu**
39 **Cleanup Branch Chief (ARNG-IED-S)**
40 **111 South George Mason Drive**
41 **Arlington, VA 22204-1373**
42 **(703) 607-2177**
43 donna.s.wu.mil@mail.mil
44

45
46 Or see the Information Repository at the following
47 location:

48 **Roswell Public Library**
49 **301 N. Pennsylvania Ave.**
50 **Roswell, New Mexico 88201**
51 **575-622-7101**

52 Hours of Operation:
53 Tuesday – Friday
54 10:00 am – 2:00 pm

55 *A copy of the Proposed Plan can be viewed at the Roswell Public*
56 *Library. A copy can also be mailed via the U.S. Postal Service or*
57 *an electronic version can be emailed to you.*

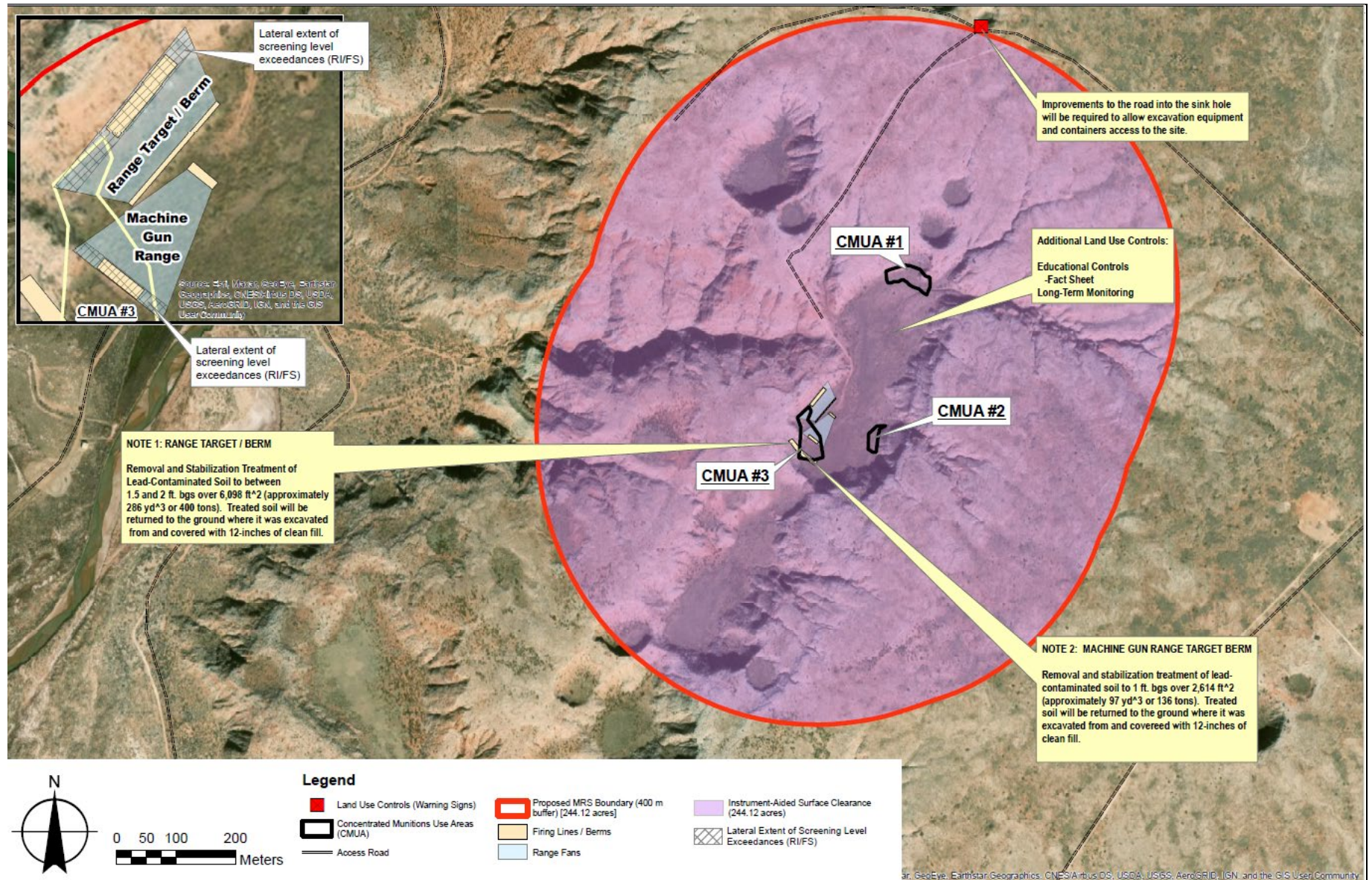


Figure 4 Preferred Remedial Alternative – Alternative 5

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- 25 WESTON, 2020. *Final Remedial Investigation*
26 *Report, Military Munitions Response*
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28 *Feasibility Study, Roswell North Range MRS*
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30 *Mexico*. February.
- 31 WESTON, 2021. *Final Feasibility Study, Military*
32 *Munitions Response Program, Remedial*
33 *Investigation / Feasibility Study, Roswell*
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36 GLOSSARY OF TERMS

- 37 **Administrative Record file:** A compilation of all
38 documents relied upon to select an alternative for a
39 remedial action.
- 40 **Anomaly (or Anomalies):** Any item that is seen as a
41 subsurface irregularity after geophysical
42 investigation. This irregularity will deviate from the
43 expected subsurface ferrous and non-ferrous material
44 at a site (e.g., pipes, power lines).

- 45 **Applicable and Relevant and Appropriate**
46 **Requirements (ARARs):** Cleanup standards,
47 standards of control, and other substantive
48 requirements, criteria, or limitations promulgated
49 under federal environmental or state environmental or
50 facility siting laws that specifically address a
51 hazardous substance, pollutant, contaminant,
52 remedial action, location, or other circumstance
53 found at a CERCLA site. Only those state standards
54 that are identified by a state in a timely manner and
55 that are more stringent than federal requirements may
56 be applicable (40 CFR 300.5).

- 57 **Comprehensive Environmental Response,**
58 **Compensation, and Liability Act (CERCLA,**
59 **otherwise known as Superfund):** A federal law that
60 addresses the funding for and cleanup of abandoned
61 or uncontrolled hazardous waste sites. This law also
62 establishes criteria for the creation of decision
63 documents.

- 64 **Concentrated Munitions Use Area (CMUA):**
65 CMUAs are MRSs or areas within MRSs where there
66 is a high likelihood of finding UXO or DMM and that
67 have a high amount of MD within them as a result of
68 historical munitions use and fragmentation. CMUAs
69 are most commonly target areas on ranges; however,
70 they also include explosion sites, open burn/open
71 detonation areas, and potentially disposal sites where
72 munitions have been disposed of over a relatively
73 large area (i.e., not small, isolated burial pits).

- 74 **Digital Geophysical Mapping (DGM):** A method
75 used to acquire geophysical data using self-recording
76 instruments. The data acquired are post-processed to
77 identify geophysical anomalies for further
78 investigation.

- 79 **Feasibility Study (FS):** An investigation stage in the
80 CERCLA cleanup process that identifies alternatives
81 available to address contamination at a site, including
82 an analysis of cost and how each alternative would
83 protect human health and the environment.

- 84 **Human Health Risk Assessment (HHRA):** An
85 evaluation of the carcinogenic and non-carcinogenic
86 risks presented by contaminants at a site for current
87 and potential future property uses.

- 88 **Information Repository:** A record or file that
89 contains all information used to make a decision on
90 the selection of a response action under CERCLA.

1 **Land Use Controls (LUCs):** Restrictions such as
2 zoning, fencing, and signage that prevent specific
3 activities from occurring in specified areas to reduce
4 or eliminate the potential for exposure.

5 **Munitions and Explosives of Concern (MEC):** This
6 term, which distinguishes specific categories of
7 military munitions that may pose unique explosives
8 safety risks, means: (a) UXO, (b) DMM, or (c)
9 explosive MC (e.g., trinitrotoluene) present in high
10 enough concentrations to pose an explosive hazard.

11 **Munitions Constituents (MC):** Any materials
12 originating from UXO, DMM, or other military
13 munitions, including explosive and non-explosive
14 materials, and emission, degradation, or breakdown
15 elements of such ordnance or munitions.

16 **Munitions Debris (MD):** Remnants of munitions
17 (e.g., penetrators, projectiles, shell casings, links, fins)
18 remaining after munitions use, demilitarization, or
19 disposal. MD is confirmed inert and free of explosive
20 hazards by technically qualified personnel.

21 **Munitions Response Site (MRS):** A discrete
22 location within a Munitions Response Area (MRA)
23 on a defense site that is known or suspected to contain
24 UXO, DMM, or MC. Examples include former
25 ranges and munitions burial areas. An MRA is made
26 up of one or more MRSs.

27 **National Oil and Hazardous Substances Pollution**
28 **Contingency Plan (NCP):** Also referred to as the
29 National Contingency Plan, it is a plan required by
30 CERCLA and codified at 40 CFR Section 300 that
31 provides a framework for responding to releases or
32 threats of release of hazardous substances.

33 **Non-Department of Defense, Non-Operational**
34 **Defense Sites (NDNODS):** Defense sites that were
35 exclusively used by the Army National Guard and
36 were never owned, leased, or otherwise possessed or
37 used by the U.S. Army or other Department of
38 Defense component.

39 **Preliminary Assessment (PA)/Site Inspection (SI):**
40 A PA is a limited-scope investigation that collects
41 readily available information about a project and its
42 surrounding area. An SI is then performed if the PA
43 results warrant further investigation. An SI includes
44 activities implemented to determine whether there is
45 a release or potential release and the nature of
46 associated threats at a site.

47 **Public Comment Period:** A prescribed period
48 during which the public may comment on various
49 documents and actions taken by the government and
50 regulatory agencies.

51 **Non-Munitions Related Debris (NMRD):** Debris
52 found on operational ranges or MRSs that is not
53 related to munitions or range operations, but which
54 may be removed to facilitate a range clearance or
55 munitions response. Such debris includes, but is not
56 limited to rebar, household items (refrigerators,
57 washing machines, etc.), automobile parts and
58 automobiles that were not associated with range
59 targets, fence posts, fence wire, nails, cans,
60 horseshoes, magnetic rocks, etc.

61 **Proposed Plan (PP):** A plan that identifies the
62 preferred remedial action for a site selected by the
63 lead agency that best meets the requirements in
64 §300.430(f)(1) and is made available to the public for
65 comment.

66 **Record of Decision (ROD):** A ROD is used for the
67 documentation of remedial response decisions.
68 Concurrence on the ROD by USEPA or the state
69 regulatory agency is sought, and the ARNG G9
70 approves the document.

71 **Remedial Action Objective (RAO):** A site-specific
72 objective developed based on evaluation of potential
73 risks to human health and the environment for future
74 protection of environmental resources.

75 **Remedial Alternative:** A technology or process
76 option that represents a viable approach to remedial
77 action for a site that has been evaluated in a screening
78 stage.

79 **Remedial Investigation (RI):** An exploratory
80 inspection conducted at a site to define the nature and
81 extent of contamination present.

82 **Screening Level Ecological Risk Assessment**
83 **(SLERA):** A simplified ecological risk assessment
84 used to provide an evaluation of the potential risks to
85 ecological receptors posed by constituents of
86 potential ecological concern. This assessment is used
87 when there is limited site-specific information and, as
88 a result, values are biased in the direction of
89 overestimating risk. The need for conservatism is to
90 provide a defensible conclusion that negligible
91 ecological risk exists or that certain contaminants and
92 exposure pathways can be eliminated from
93 consideration.

1 **Unexploded Ordnance (UXO):** Military munitions
2 that: (a) have been primed, fuzed, armed, or otherwise
3 prepared for action; (b) have been fired, dropped,
4 launched, projected, or placed in such a manner as to
5 constitute a hazard to operations, installations,
6 personnel, or material; and (c) remain unexploded

7 either by malfunction, design, or any other cause.

8 **Unlimited Use/Unrestricted Exposure (UU/UE):**
9 UU/UE generally is the level of cleanup at which all
10 exposure pathways present an acceptable level of risk
11 for all land uses.



WESTON Geophysicist collecting DGM data using the Geonics EM61-MK2A metal detector at the Roswell North Range MRS during the RI.

