FINAL

RECORD OF DECISION FOR RICOCHET AREA MUNITIONS RESPONSE SITE IN STATE GAME LANDS 211, PENNSYLVANIA

Contract No.: W9133L-09-F-0304

May 2013

Prepared for:

Army National Guard
Arlington, VA 22202-3231

Prepared by

Weston Solutions, Inc.
West Chester, PA 19380

09P-1255-7

FINAL

RECORD OF DECISION
FOR THE RICOCHET AREA MUNITIONS RESPONSE SITE IN STATE GAME LANDS 211, PENNSYLVANIA

Contract No.: W9133L-09-F-0304

Prepared for:

Army National Guard
1411 Jefferson Davis Highway
Arlington, VA 22202-3231

Prepared by:

Weston Solutions, Inc.
1400 Weston Way
West Chester, PA 19380

WESTON PROJECT NO.: 12767.099.001.2011

May 2013

TABLE OF CONTENTS

Section **Page**

DECLARATION **1**
SITE NAME AND LOCATION 1
STATEMENT OF BASIS AND PURPOSE 1
ASSESSMENT OF SITE 2
DESCRIPTION OF THE SELECTED REMEDY 3
STATUTORY DETERMINATION 4
DATA CERTIFICATION CHECKLIST 5
AUTHORIZING SIGNATURE 5
DECISION SUMMARY **1-1**
1. SITE NAME, LOCATION, AND DESCRIPTION **1-1**
1.1 SITE NAME AND LOCATION 1-1
1.2 SITE DESCRIPTION 1-1
2. SITE HISTORY AND ENFORCEMENT ACTIVITIES **2-1**
2.1 SITE HISTORY 2-1
2.2 SITE INSPECTION 2-1
2.3 REMEDIAL INVESTIGATION/FEASIBILITY STUDY 2-2
3. COMMUNITY PARTICIPATION **3-1**
4. SCOPE AND ROLE OF RESPONSE ACTION **4-1**
5. PROJECT MUNITIONS RESPONSE SITE CHARACTERISTICS **5-1**
5.1 ENVIRONMENTAL SETTING 5-1
5.1.1 Current Topography 5-1
5.1.2 Soil Conditions 5-1
5.1.3 Geology 5-1
5.1.4 Hydrology 5-2
5.1.5 Hydrogeology 5-2
5.2 NATURE AND EXTENT OF MUNITIONS CONSTITUENTS 5-2
5.3 NATURE AND EXTENT OF MUNITIONS AND EXPLOSIVES OF CONCERN 5-3
6. CURRENT AND POTENTIAL FUTURE LAND USE **6-1**
7. SUMMARY OF SITE RISKS **7-1**
8. REMEDIAL ACTION OBJECTIVES **8-1**
9. DESCRIPTION OF ALTERNATIVES **9-1**

TABLE OF CONTENTS (CONTINUED)

Section **Page**

10. COMPARATIVE ANALYSIS OF ALTERNATIVES 10-1
10.1 OVERALL PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT 10-2
10.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS 10-2
10.3 LONG-TERM EFFECTIVENESS AND PERMANENCE 10-3
10.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS THROUGH TREATMENT 10-4
10.5 SHORT-TERM EFFECTIVENESS 10-4
10.6 IMPLEMENTABILITY 10-5
10.7 COST 10-5
10.8 STATE ACCEPTANCE 10-5
10.9 COMMUNITY ACCEPTANCE 10-6
10.10 COMPARATIVE ANALYSIS RECOMMENDATION 10-6
11. PRINCIPAL THREAT WASTES 11-1
12. SELECTED REMEDY 12-1
12.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY 12-1
12.2 DETAILED DESCRIPTION OF THE SELECTED REMEDY 12-1
12.3 SUMMARY OF ESTIMATED COSTS 12-4
12.4 EXPECTED OUTCOME OF SELECTED REMEDY 12-7
13. STATUTORY DETERMINATIONS 13-1
13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT 13-1
13.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS 13-1
13.3 COST-EFFECTIVENESS 13-2
13.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT POSSIBLE 13-2
13.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT 13-3
13.6 FIVE-YEAR REVIEW REQUIREMENTS 13-3
14. DOCUMENTATION OF SIGNIFICANT CHANGES 14-1
15. REFERENCES 15-1

LIST OF APPENDICES

APPENDIX A RESPONSIVENESS SUMMARY

APPENDIX B APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CRITERIA

APPENDIX C LETTERS OF AGREEMENT

LIST OF FIGURES

Section

Figure 1-1 Ricochet Area and Fort Indiantown Gap, Annville, PA

Figure 2-1 Post-RI MRS Boundary

Figure 5-1 Calculated Densities: Category 1-2-3 Items at the Surface

Figure 9-1 Selected Remedy: Alternative 4

LIST OF TABLES

Table **Page**

Table 9-1 Remedial Alternative Munitions and Explosives of Concern Hazard Assessment Scoring Summary 9-3

Table 12-1 Ricochet Area Munitions Response Site Alternative 4 Cost Estimate 12-5

LIST OF ACRONYMS AND ABBREVIATIONS

AEDB-R	Army Environmental Database Restoration
amsl	above mean sea level
ARAR	Applicable or Relevant and Appropriate Requirement
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CTT	closed, transferred, and transferring
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	digital geophysical mapping
DMM	discarded military munitions
DoD	Department of Defense
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
FIG	Fort Indiantown Gap Military Reservation
FS	Feasibility Study
ft	feet
HRR	historical records review
MC	munitions constituents
MD	munitions debris
MEC HA	munitions and explosives of concern hazard assessment
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRA	munitions response area
MRS	munitions response site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	no further action
PAANG	Pennsylvania Army National Guard
PADEP	Pennsylvania Department of Environment Protection
PGC	Pennsylvania Game Commission
PP	Proposed Plan
RAO	Remedial Action Objective
RI	remedial investigation

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SGL	State Game Lands
SI	site inspection
TBC	To Be Considered Criteria
TMV	toxicity, mobility, or volume
U.S.	United States
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
UXO	unexploded ordnance
WESTON®	Weston Solutions, Inc.

Note to the reader: Definitions of bold-faced terms in the text are provided in the "Glossary of Terms" located at the end of this document.

MAY 2013

DECLARATION

SITE NAME AND LOCATION

Site Name: Ricochet Area Munitions Response Site

Address: State Game Lands 211, Pennsylvania

Army Environmental Database Restoration (AEDB-R): FTIG-003-R-01

STATEMENT OF BASIS AND PURPOSE

This **Record of Decision (ROD)** presents the Selected Remedy for the Ricochet Area (FTIG-003-R-01) Munitions Response Site (MRS) located in State Game Lands 211, Pennsylvania. The Ricochet Area MRS is one of the sites included in the Defense Environmental Restoration Program (DERP) – Military Munitions Response Program (MMRP). The remedy presented in this ROD was selected in accordance with the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** (42 U.S.C. 960 et seq.) of 1980 and its amendments, and to the extent practicable, the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** (40 CFR 300). This decision is based on the site investigation documents contained in the **Administrative Record** for the Ricochet Area MRS. This ROD is being issued by the Army National Guard (ARNG), the lead agency managing remediation of **munitions and explosives of concern (MEC)** and **munitions constituents (MC)** at the Ricochet Area MRS, in accordance with CERCLA as required by DERP.

The Ricochet Area MRS is not included on the National Priorities List promulgated under CERCLA and the NCP, and maintained by the United States Environmental Protection Agency (EPA). Under DERP-MMRP, ARNG is the lead agency establishing this remedy for the MRS with regulatory support provided by the Pennsylvania Department of Environmental Protection (PADEP). Agreement on the Selected Remedy is being sought from PADEP and the Pennsylvania Game Commission (PGC), so that remedy concurrence letters can be included in

the Administrative Record. EPA has been given the opportunity to review this document. ARNG anticipates that this will be the final decision related to MEC and MC for this MRS.

ASSESSMENT OF SITE

Past military munitions training activities conducted at the Fort Indiantown Gap Military Reservation (FIG), adjacent to the southern boundary of the Ricochet Area MRS, resulted in MEC contamination within the MRS boundaries.

ARNG conducted an inventory of closed, transferred, and transferring (CTT) military ranges and defense sites at FIG in 2003. The Ricochet Area was identified as MMRP eligible. A historical records review (HRR) (URS, 2007) and a site inspection (SI) (URS, 2008) were conducted between 2007 and 2008 to determine whether MEC and MC were present at the site. Based on the results of the HRR and SI, the Ricochet Area MRS was recommended for further evaluation of MEC during the **remedial investigation (RI)** phase of the CERCLA process. The SI report also recommended no further action (NFA) for MC unless MEC or munitions debris (MD) is recovered.

The nature and extent of MEC at the Ricochet Area MRS was delineated during the RI (Weston Solutions, Inc. [WESTON®], 2012a). Several areas totaling 1,334 acres within the MRS were identified that have a higher probability for encountering MEC. Both unexploded ordnance (UXO) and **discarded military munitions (DMM)** have been recovered in the MRS. No MC was detected during the RI.

The RI results were used to develop the **Feasibility Study (FS)** that identified remedial objectives and goals for the Ricochet Area MRS to protect human health and the environment, and evaluate remedial alternatives to address the type and extent of MEC contamination in the MRS (WESTON, 2012a). The recommendations of the FS were used to select a remedy, which was documented in a **Proposed Plan** (PP) finalized in June 2012, and submitted with an opportunity for public comment (7 June through 6 July 2012). All public comments received were considered prior to selecting the final remedy.

ARNG has determined that the response action selected in this ROD for MEC at the Ricochet Area MRS is necessary to protect public health, welfare, or the environment from the hazards

associated with MEC into the environment, based on the current and intended future use of the MRS. PGC and PADEP concur with this determination.

DESCRIPTION OF THE SELECTED REMEDY

The Selected Remedy for the Ricochet Area MRS is Alternative 4 – Focused Surface and Subsurface Removal of MEC with Containment and Controls. Under Alternative 4, MEC detected either fully or partially exposed at the ground surface will be removed in areas with the highest probability for encountering MEC (i.e., MEC and MD densities greater than 0.5 surface items per acre). Two herbaceous openings within the MRS, that are planted with forages and regularly maintained by PGC personnel as feeding sites for wild game, will undergo subsurface removal activities to remove MEC to the depth of detection. Removal activities are focused on these herbaceous openings due to the increased human activity in these locations. This alternative reduces exposure risks to the public and PGC personnel. In addition, containment and controls will be implemented to reduce MEC exposure through behavior modification. Specific components of the Selected Remedy (Alternative 4) include:

Removal of MEC:

- Focused surface removal in areas where there is a high probability to encounter MEC.
- Surface and subsurface removal of MEC to detection depth from two herbaceous openings (10 acres).

Containment and Controls:

- Signs.
- Notification during permitting and contracting.
- Brochures/fact sheets.
- Information packages to public officials and emergency management agencies.
- Awareness video.
- Classroom education.

- Internet website.
- Appalachian Trail Guidebook editorials.
- Providing UXO **construction support** as needed during timber management activities, such as constructing access roads and establishing log landings.

STATUTORY DETERMINATION

The Selected Remedy for the Ricochet Area MRS is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the **remedial action**, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

The Selected Remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the site. The Selected Remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). It provides the best balance of trade-offs in terms of balancing criteria while also considering the bias against off-site treatment and disposal and considering state and community acceptance.

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Statutory reviews will be conducted at the prescribed intervals until containment and controls can be removed.

Alternative 4 – Focused Surface and Subsurface Removal of MEC with Containment and Controls is consistent with the recommendations of the FS. PADEP and PGC are in agreement with the Selected Remedy and recommendations.

DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for the Ricochet Area MRS.

- Nature and extent of MEC contamination: Subsection 5.3 – Nature and Extent of MEC.
- Baseline risk represented by MEC: Section 7 – Summary of Site Risks.
- Remediation objectives: Section 8 – **Remedial Action Objectives**.
- How source materials constituting principal threats are addressed: Section 11 – Principal Threat Wastes.
- Current and reasonably anticipated future land use assumptions used in the baseline risk assessment and ROD: Section 6 – Current and Potential Future Land Use.
- Potential land use that will be available at the site as a result of the Selected Remedy: Subsection 12.4 – Expected Outcome of the Selected Remedy.
- Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected: Section 9 – Description of Alternatives.
- Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision): Section 10 – Comparative Analysis of Alternatives, Section 12 – Selected Remedy, and Section 13 – Statutory Determinations.

Note to the reader: Definitions of bold-faced terms in the text are provided in the "Glossary of Terms" located at the end of this document.

MAY 2013

DECISION SUMMARY

1. SITE NAME, LOCATION, AND DESCRIPTION

1.1 SITE NAME AND LOCATION

The Ricochet Area (FTIG-003-R-01) **Munitions Response Site (MRS)** is located in State Game Lands (SGL) 211, Pennsylvania, which is owned by the Commonwealth of Pennsylvania and managed by the Pennsylvania Game Commission (PGC). The Ricochet Area MRS lies within East Hanover Township in Dauphin County and Cold Spring Township in Lebanon County, and was initially demarcated as encompassing 8,002 acres of land area (see Figure 1-1**)**.

The southern boundary of the Ricochet Area MRS abuts the Fort Indiantown Gap Military Reservation (FIG) property, located in Annville, Pennsylvania, and follows the ridgeline of Second Mountain. The northern MRS boundary follows the ridgeline of Stony Mountain. The east and west boundaries correspond to the area documented as Restricted Airspace R5802A or as Restricted Area R5802A in the United States (U.S.) Army Garrison Safety Range Regulation (Army Regulation 385-1) for FIG (URS, 2008). This regulation describes the area as "a fall area for spent ordnance which ricochets north of Second Mountain" (U.S. Army Garrison, 1995).

1.2 SITE DESCRIPTION

Past military munitions training activities conducted at the FIG property resulted in **munitions and explosives of concern (MEC)** contamination within the MRS boundaries. The current artillery firing angles used by the Pennsylvania Army National Guard (PAANG) prevent ricochets into this area. All MEC recovered at the site to date have been classified as unexploded ordnance (UXO) or **discarded military munitions (DMM)** (Weston Solutions, Inc. [WESTON®], 2012a).

Cleanup funding for the implementation of the Ricochet Area MRS Selected Remedy will be provided by the Defense Environment Restoration Account, a source of funding approved by the

U.S. Congress to clean up contaminated sites on Department of Defense (DoD) installations under the Defense Environmental Restoration Program (DERP). The Army National Guard (ARNG) is the lead agency for investigating, reporting, making cleanup decisions, and taking cleanup actions regarding MEC at this MRS, with technical support provided by the U.S. Army Corps of Engineers (USACE), Baltimore District. The Pennsylvania Department of Environment Protection (PADEP) is the lead regulatory agency. ARNG is issuing this **Record of Decision (ROD)** in consultation with PGC and PADEP.

The land encompassing the Ricochet Area MRS is currently owned by the Commonwealth of Pennsylvania and is managed by the PGC. This land was privately owned prior to being purchased by the Commonwealth of Pennsylvania in 1931. The Ricochet Area MRS falls under the DERP – Military Munitions Response Program (MMRP) (10 U.S.C. 2710). In 2003, the U.S. Congress established the MMRP under the DERP to address MEC and **munitions constituents (MC)** located on current and former defense sites. ARNG management of MEC and MC at the Ricochet Area MRS under DERP-MMRP is being conducted in accordance with the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** (42 U.S.C. 960 et seq.) of 1980**,** as amended by the **Superfund Amendment and Reauthorization Act (SARA),** and the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** (40 CFR 300)**.** The ultimate objective under CERCLA is to protect human health, welfare, and the environment from hazards associated with both MEC and MC at MMRP sites.

Current land use within the MRS includes a number of recreational activities and non-recreational activities (e.g., fishing, hiking, trail maintenance, and timber management) with potential receptors including the general public, and PGC employees or their contractors. PGC personnel plant several feeding sites with forages. These sites are known as herbaceous openings and provide a source of food for wild game such as deer and turkey. Herbaceous openings are regularly maintained by PGC personnel, which increases human activity in these locations.

SECTION 1

FIGURE

Legend

- FIG Installation Boundary
- Ricochet Area Boundary

Source: PA USGS 7.5 minute Topographic Maps, 1996

N
W E
S

0 3 6
Miles

Figure 1-1
Ricochet Area and
Fort Indiantown Gap, Annville, PA

File: Y:\FIG\mxd\ROD\site_location.mxd, 7/19/2012 2:00:45 PM, ricksc

2. SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 SITE HISTORY

In the early 1800s, the area in and around the MRS was used for coal mining and timber harvesting. In the late 1800s, mining operations declined and recreational development (e.g., hiking, hunting, camping) increased through the early 1900s.

FIG was established in 1931 when the Commonwealth of Pennsylvania purchased approximately 18,000 acres as a military training facility for the PAANG, with training maneuvers starting in 1933. Historical records indicate that surface danger zones extended from FIG into the current area known as the Ricochet Area MRS. The Cold Spring portion of the MRS was also used as a **firing point** and bivouac area.

The Ricochet Area MRS was not intentionally used as a target area for military activities conducted at FIG's operational range areas. The presence of munitions within the Ricochet Area MRS is the result of unintentional overshots and/or ricochets from the former FIG operational ranges used from 1933 to 1998. Current FIG range designs incorporate firing angles that prevent ricochets into SGL 211.

FIG remained the Army's responsibility until October 1998 when ARNG took control as part of the 1995 Base Realignment and Closure. FIG then became an ARNG and Army Reserve training center. ARNG conducted an inventory of closed, transferred, and transferring (CTT) military ranges and defense sites, which meets the requirements of a CERCLA Preliminary Assessment. The CTT conducted at FIG in 2003 identified two MMRP-eligible areas: the Artillery Ricochet Area and the Cold Spring Range Fan. Both areas were categorized as artillery buffer areas for large caliber munitions and practice mortars.

2.2 SITE INSPECTION

The next phase of the CERCLA process at FIG was the site inspection (SI). The SI was completed in a two-phase approach. The Historical Records Review (HRR) (URS, 2007) was the initial step in the MMRP SI. During the HRR, records searches were performed to supplement the information gathered during the CTT and to facilitate decision-making processes to

determine the next step for the SI. Based on records reviews and overlapping range fans, the Artillery Ricochet Area and Cold Spring Range Fan were combined into a single MRS known as the Ricochet Area. Within the Ricochet Area MRS, four areas of concern (Areas A through D) were selected based on the approximate locations of previously observed and recovered MEC and **munitions debris (MD)**. Field inspections were then performed at the four areas of concern. The field inspections were completed in 2008 (URS, 2008) and included magnetometer-assisted visual surveys and the collection of eight soil samples at pre-determined locations within the areas of concern. No MEC or MC was detected during the SI. However, based on the limited scope of the SI and Explosive Ordnance Disposal Unit reports confirming that MEC had been previously recovered in the Ricochet Area MRS, a recommendation was made to further evaluate the Ricochet Area MRS for MEC during the **Remedial Investigation (RI)** phase of the CERCLA process. The SI report also recommended no further action for MC unless MEC or MD is recovered.

2.3 REMEDIAL INVESTIGATION/FEASIBILITY STUDY

An RI/**Feasibility Study (FS**), completed in accordance with the NCP [40 CFR 300.430(d) and (e)], was initiated in 2009 and concluded in 2012. The RI (WESTON, 2011) field work was conducted between March 2010 and May 2010 to characterize the nature and extent of MEC and MC on the ground surface and subsurface of the Ricochet Area MRS. The sources of data evaluated as part of the RI to characterize contamination at this MRS included historical information and archival searches, results of the RI field effort, site layouts based on historical maps and photos, and the visual inspection of terrain and structures. The data collected during the field investigation and the conclusions drawn in the RI regarding risks to human health and the environment were used to develop the FS, finalized in February 2012 (WESTON, 2012a).

During the RI, all MEC and MD recovered were located within a 3,262-acre area between the Stony Creek valley and the ridgeline of Second Mountain (see Figure 2-1). No evidence of MEC or MD was found from the southern slope of Sharp Mountain extending north to Stony Mountain's ridgeline. As a result, the Ricochet Area MRS boundary was reduced during the RI to include only the area that was found to contain MEC and MD. The new MRS is 3,262 acres in size. The results of the RI are discussed in greater detail in the *Final Remedial Investigation*

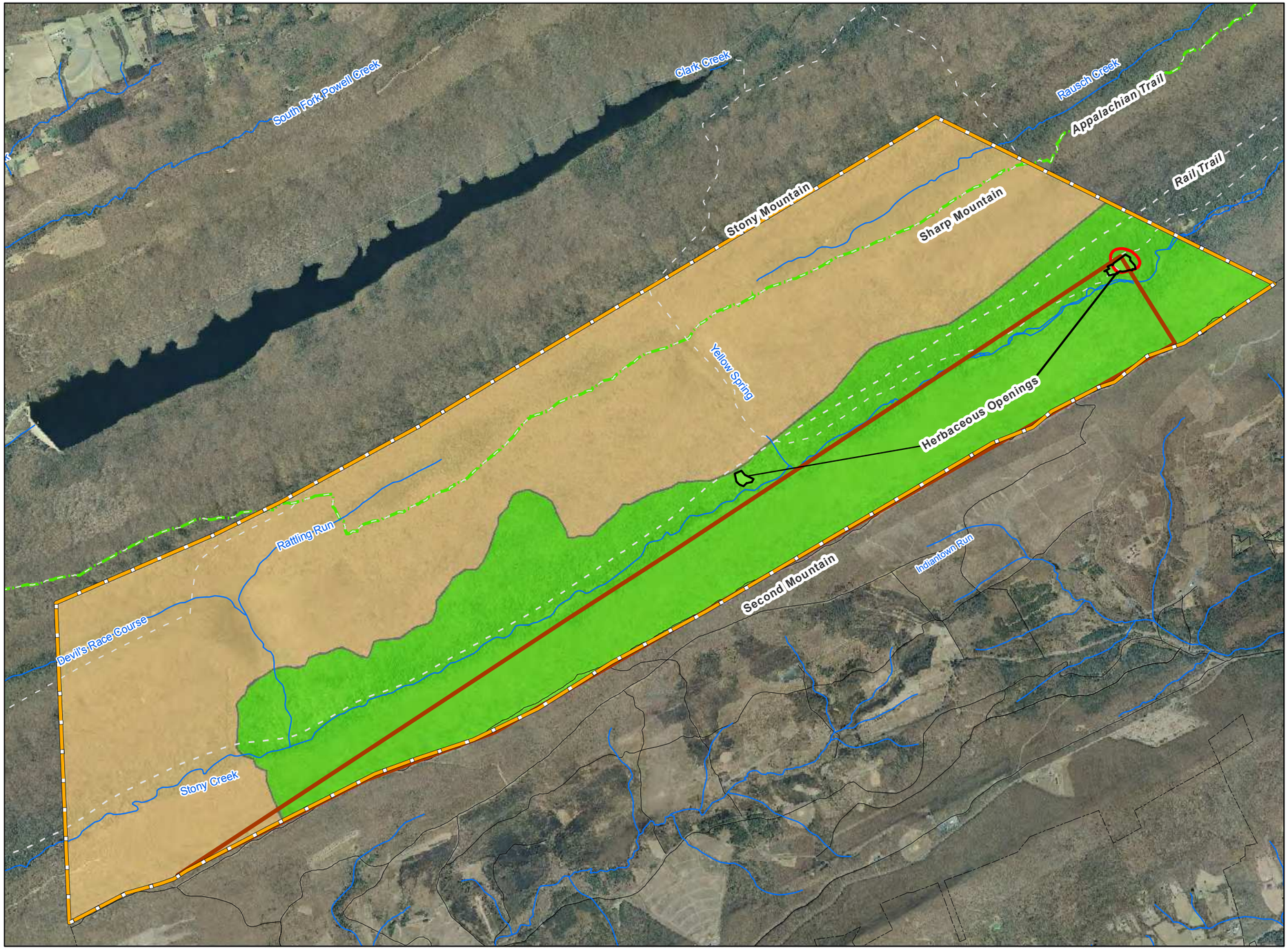
Report for the Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania (WESTON, 2011).

Primary components of the FS that were important in determining a Selected Remedy for the Ricochet Area MRS included development of **Remedial Action Objectives (RAOs)** to protect human health and the environment, followed by the development and evaluation of remedial alternatives to address residual MEC in the MRS. Five remedial alternatives were developed for the MRS, including no action, containment/controls, and variations of combination remedies (removal with containment/controls). These alternatives provided a range of options for comparison in their ability to meet the nine criteria prescribed by the NCP [40 CFR. 300.430(e)(9)(iii)(A)-(I)] that should be considered for remedy selection.

The results of the FS were presented in the *Final Feasibility Study, Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania* (WESTON, 2012a), and summarized in the *Final Proposed Plan, Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania* (WESTON, 2012b). As required by the NCP [40 CFR 300.800(a)], both technical documents are on file as part of the **Administrative Record**.

SECTION 2

FIGURE



Legend

- Ricochet Area MRS Boundary
- FIG Installation Boundary
- Ricochet Area MRS (3,262 Acres)
- Sharp Mountain MRS (4,740 Acres)
- Cold Spring Military Reservation Boundary
- Cold Spring Range Fan (Safety Buffer Zone)

N
W E
S

0 3,250 6,500
Feet

Figure 2-1
Post-RI MRS Boundary
Ricochet Area MRS
State Game Lands 211, PA

File: Y:\FIG\mxd\MRS_proposed.mxd, 11/8/2012 2:01:08 PM, ricksc

3. COMMUNITY PARTICIPATION

A summary of the community participation process is provided in the Responsiveness Summary, which is included as a component of this ROD (see Appendix A).

Pursuant to CERCLA Section 113(k)(2)(B) and Section 117, and Section 300.430(f)(2) and (3) of the NCP, the **Proposed Plan (PP)** for the Ricochet Area MRS was released for public comment on 1 June 2012. The PP and the RI/FS reports are available to the public in the Administrative Record, located in the Annville Free Library, 216 East Main Street, Annville, Pennsylvania; 717-867-1802.

A public comment period was held from 7 June 2012 to 6 July 2012. Comments were received by ARNG during this time. On 21 June 2012, a public meeting was held at the East Hanover Township Building (Dauphin County) in Grantville, Pennsylvania, to present the PP and to entertain questions and comments from the public. Representatives from ARNG, PAARNG, USACE, PGC, and WESTON attended the meeting. The notification for the PP 30-day public comment period and meeting was published in the Harrisburg, Pennsylvania *Patriot-News* and the Lebanon, Pennsylvania *Daily News* on 6 June 2012.

4. SCOPE AND ROLE OF RESPONSE ACTION

This ROD addresses the **remedial action** ARNG determined as a Selected Remedy to address MEC contamination at the Ricochet Area MRS. The role of the remedial action selected for this MRS is to reduce the risk associated with MEC to human health and the environment based on the current and intended future land use of public access for recreational and timber management activities.

5. PROJECT MUNITIONS RESPONSE SITE CHARACTERISTICS

The following information is presented to document the site characteristics of the Ricochet Area MRS. Detailed information about the MRS characteristics, the site conceptual model, and the nature and extent of contamination is presented in the *Final Remedial Investigation Report for the Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania* (WESTON, 2011).

5.1 ENVIRONMENTAL SETTING

5.1.1 Current Topography

The topography of the Ricochet Area MRS is that of the Valley and Ridge System. Inspection of a U.S. Geological Survey (USGS) Topographic Quadrangle Map (USGS, 1981) shows the study area is bounded to the north by Stony Mountain with ridgeline elevations between 1,610 and 1,670 feet (ft) above mean sea level (amsl). Second Mountain, with ridgeline elevations between 1,200 and 1,400 ft amsl, marks the southern boundary of the MRS. Stony Creek is at an approximate elevation of 700 ft and flows from northeast to southwest in the valley between the two mountains towards the Susquehanna River.

5.1.2 Soil Conditions

Four major soil associations are present across the Ricochet Area MRS: Dekalb-Lehew, Calvin-Klinesville, Berks-Weikert-Bedington, and Laidig-Hazelton-Leck Kill. The soil in the area can be summarized as being generally thin and rocky. The soil on the steep slopes of the mountains consists mostly of very stony sandy loams with channery subsoil. The valleys contain alluvial materials—from the well-drained stony sandy loams on the foot slope to shaley silt loams found along the streams (U.S. Department of Agriculture [USDA], 2009). Based on the U.S. Department of Commerce weather map, frost lines range from 20 to 25 inches below ground surface (bgs).

5.1.3 Geology

The Ricochet Area MRS is located within the Valley and Ridge physiographic province and for the most part underlain by Paleozoic age sedimentary rocks that have undergone extensive

faulting and folding. The ridges within the Ricochet Area MRS are predominantly made up of weather-resistant rocks such as sandstone and conglomerates. The valleys between the ridges consist of the less weather-resistant rocks such as limestone and shale. The occurrence of bedrock within the valley is typically 5 to 8 ft bgs (USGS, 1981).

Four major geological formations are present at the site: the Pocono Formation, Mauch Chunk Formation, Pottsville Formation, and Llewellyn Formation. The Pocono Formation, consisting of conglomerates, massive sandstone, shale, and thin lenticular coal, forms Second Mountain. Underlying Stony and Sharp Mountains is the Pottsville Formation that consists of conglomerate and sandstone. The Stony Valley consists of thin sandstone, siltstone, limestone, and red shales of the Mauch Chunk Formation. The valley between Sharp and Stony Mountain consists of shale, sandstone, conglomerates, and coal of the Llewellyn Formation (USDA, 2009).

5.1.4 Hydrology

The Stony Creek watershed is primarily within the Ricochet Area MRS and contains three major tributaries to Stony Creek: Rausch Creek, which is not in the Ricochet Area MRS; Yellow Spring in the center; and Rattling Run on the west side of the MRS; Stony Creek flows from northeast to southwest and drains into the Susquehanna River approximately 10 miles to the west of the western boundary of the Ricochet Area MRS.

5.1.5 Hydrogeology

The Mauch Chunk Formation provides the most reliable source of groundwater with high yields capable of supporting public water suppliers and industry. Depths to adequate drinking water supplies for domestic use can usually be reached at less than 200 ft. Groundwater occurrence in the mountains may be associated with old coal mine workings and in the numerous fractures associated with the faults, folds, and jointing of the sedimentary rocks (Pennsylvania Department of Environmental Resources, 1979). Depth to the groundwater in this region averages 20 ft bgs.

5.2 NATURE AND EXTENT OF MUNITIONS CONSTITUENTS

During RI activities, there were no munitions-related items identified with evidence of a release to surrounding media to warrant biased sampling. However, samples for MC analysis were collected to confirm that no releases were present from the recovered MEC. Thirteen soil

samples were collected from surface soil (between 0 and 6 inches bgs) during the RI and analyzed for explosives (e.g., 2,4,6-trinitrotoluene) and/or metals to assess potential MC impacts, independent of area reference, and pre-/post-blow-in-place sampling activities.

Analytical results for soil samples collected at MEC locations showed no significant MC detections. Explosives and munitions-related metals concentrations were not detected above background levels or PADEP standards. The human health risk assessment concluded that no remedial action was necessary for MC to protect public health, welfare, or the environment based on the current and intended future use of the site (i.e., recreational visitors and site workers). The ecological risk assessment concluded that the potential risk from MC in soil to populations (i.e., plants and wildlife) is low.

5.3 NATURE AND EXTENT OF MUNITIONS AND EXPLOSIVES OF CONCERN

A total of 161 acres of the Ricochet Area MRS were investigated during the RI. A total of 13 MEC items were recovered. Of the 13 MEC items, nine were determined to be UXO. In addition, 121 MD items were recovered during the investigation. Approximately 1,334 acres of the MRS were identified as having UXO and MD densities greater than 0.5 items per acre. The remainder of the MRS is calculated as having less than 0.5 items per acre. The UXO recovered includes:

- Seven 75 millimeter (mm) HE projectiles.
- One 155mm HE projectile.
- One 75mm AP HE projectile.

The 155mm HE projectile listed above was identified at the southernmost boundary of the MRS during the land survey and location control activities. FIG range control was notified, and U.S. Army Explosive Ordnance Disposal (EOD) personnel responded and transported the item to the FIG impact area for detonation.

Field information collected during the RI indicates that the UXO and MD recovered in the Ricochet Area MRS were located on the surface or in the shallow subsurface soils between 0 inches and 12 inches bgs. In general, 95% of the items were recovered in the 0- to 6-inch bgs interval, with 66% of the items recovered at the surface and 9% of the items located between 6 inches and 12 inches bgs. Only one UXO item was recovered at 12 inches bgs, probably

because the munitions impacting this area were primarily deflected or ricocheted, thereby greatly reducing their kinetic energy and depth of penetration.

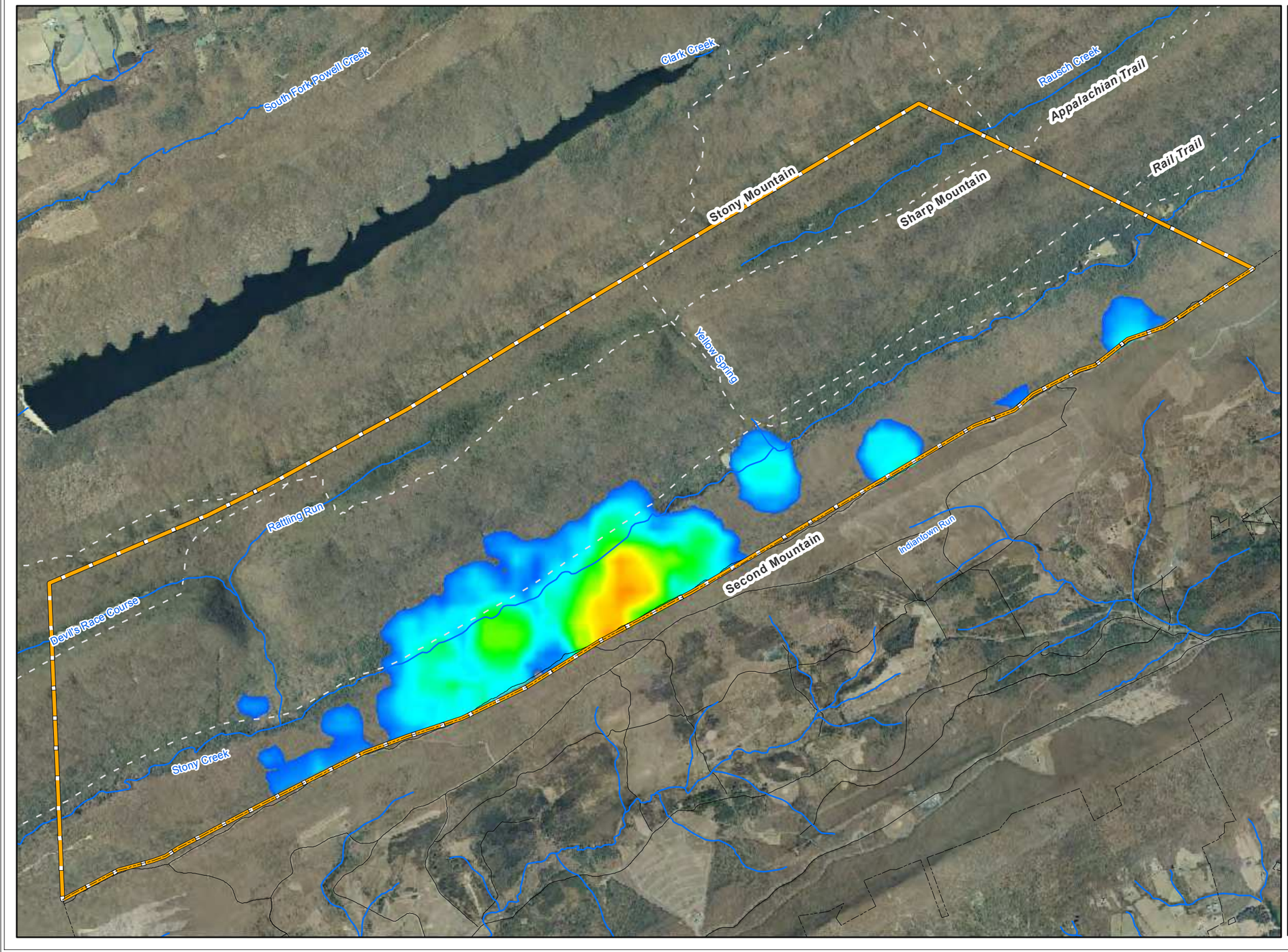
Additionally, the Cold Spring Firing Point is included in this MRS. A total of 1.4 acres were investigated during the RI. The firing point location was confirmed during the RI based on the discovery of firing point/range-related debris, including fuze-shipping containers, 155 mm rotating band covers, and 155 mm lifting lugs.

In addition, DMM was recovered during investigations. The DMM includes four MK-2A4 primers.

Field information collected during the RI indicates that the DMM recovered were located at a depth of 12 inches bgs. All other firing point/range-related debris was recovered on the ground surface.

SECTION 5

FIGURE



Legend

FIG Installation Boundary

Ricochet Area MRS Boundary

Surface Items:
Items fully or partially visible at the surface.

Anomaly Density Per Acre (From VSP)

<0.5 1 2 3 4 5 6 7 8 9

N
W E
S

0 3,250 6,500
Feet

Figure 5-1
Calculated Densities
Category 1-2-3 Items at the Surface
Ricochet Area MRS
State Game Lands 211, PA

File: \\Fsfed02\TIG\FIG\mxd\MMRP_RIFS\RI\Suface_Density.mxd, 06-May-11 10:28, ricksc

6. CURRENT AND POTENTIAL FUTURE LAND USE

Current land use includes a number of recreational activities such as fishing, hunting, hiking, running, bicycle riding, snow shoeing, dog-sledding, cross-country skiing, snowmobiling, horseback riding, Fall Drive-Thru, and bird watching. The Horse-Shoe Trail and Appalachian National Scenic Trail are adjacent to the MRS. Higher rates of recreational use are typically experienced between April and December and estimated at 16 hours per month during this time. The low recreational use between January and March is estimated at a frequency of 4 hours per month. The cumulative annual exposure estimated for recreational users within the MRS is 750,000 contact hours.

Non-recreational activities within the MRS include trail, game, and forest maintenance performed by PGC employees or their contractors. Herbaceous openings are planted with forages and regularly maintained as feeding sites for wild game such as turkey and deer. Management of the herbaceous openings may include operations using mechanical equipment performing ground disturbance activities by PGC personnel. Maintenance occurs year-round on a weekly basis by up to six staff members. The contact hours estimated cumulatively for PGC staff maintaining the herbaceous openings is 1,872 hours annually. Timber operations are also periodically conducted within SGL 211. The locations of harvests are selected based on timber surveys/inventories to identify manageable timber and areas for potential habitat improvement projects. The number of contact hours experienced by timber management personnel is cumulatively estimated at 2,880 hours annually, including exposure time incurred during road/trail maintenance.

There are no plans to change the current land use. The site will continue to be used for recreational and non-recreational activities, including game land maintenance, special wildlife area management at herbaceous openings, and timber management.

7. SUMMARY OF SITE RISKS

The results of the RI were used to evaluate potential risks associated with MC and MEC. Based on the screening-level risk assessment completed in the RI, MC, including metals and explosive compounds, was not detected at concentrations that pose an unacceptable risk to human health or the environment. Therefore, the only risk considered at the Ricochet Area MRS is explosive hazards associated with MEC.

An explosive hazard is the probability for a MEC item to detonate and potentially cause harm because of human activities. An explosive hazard exists if a person can come into contact with a MEC item and act upon it to cause detonation. The potential for **explosive safety risk** depends on the presence of three critical elements: a source (presence of MEC), a receptor (person), and interaction between the source and receptor (such as picking up the item or disturbing the item). There is no explosive safety risk if any one element is missing.

The **exposure pathway** for a MEC item to a receptor is primarily through direct contact because of some human activity. Agricultural or construction activities involving subsurface intrusion are examples of human activities that will increase the likelihood for direct contact with buried MEC. MEC will tend to remain in place unless disturbed by human or natural forces, such as erosion or **frost heave**. Movement of MEC by natural forces may increase the probability for direct human contact, but not necessarily result in a direct contact or exposure.

Explosive hazards for the Ricochet Area Munitions Response Site were evaluated in accordance with the 2008 *Interim Munitions and Explosives of Concern Hazard Assessment Methodology* (MEC HA), designed to be used as the CERCLA hazard assessment methodology for MRSs where there is an explosive hazard from the known or suspected presence of MEC. The MEC HA was used to evaluate the baseline hazard associated with the MRS based on the nature and extent of MEC and exposure risks related to the current use identified during the RI. Subsequently, the MEC HA methodology was used to facilitate the evaluation of remedial alternatives by adjusting the input parameters to account for the potential effects of remedial alternative implementation.

The MEC HA is structured around three components of a potential explosive hazard incident:

- **Severity** — The potential consequences (e.g., death, severe injury, property damage, etc.) of MEC detonating.
- **Accessibility** — The likelihood that a receptor will be able to come in contact with MEC.
- **Sensitivity** — The likelihood that a receptor will be able to interact with MEC such that it will detonate.

Each of these components is assessed in the MEC HA by input factors that consider a set of site conditions, including the types of munitions and how they were used with the current and proposed activities at the site. Each input factor has two or more categories. Each input factor category is associated with a numeric score that reflects the relative contributions of the different input factors to the MEC HA. The sum of the input factor scores falls within one of four defined ranges, called Hazard Levels. Each of the four Hazard Levels reflects attributes that describe groups of MRS and site conditions ranging from the highest to lowest hazards. The MEC HA hazard levels and maximum and minimum score ranges are as follows:

- **Hazard Level 1** — Sites with the highest hazard potential. Instances of an imminent threat to human health from MEC may exist. The hazard level score ranges between a maximum score of 1,000 to a minimum score of 840.
- **Hazard Level 2** — Sites with a high hazard potential. Surface MEC may exist at the site or intrusive activities being conducted may increase the risk of encountering MEC in the subsurface. The site has moderate or greater accessibility by the public. The hazard level score ranges between a maximum score of 835 to a minimum score of 725.
- **Hazard Level 3** — Sites with a moderate hazard potential. A site that would be considered safe for the current land use without further munitions responses, although not necessarily suitable for reasonable anticipated future use. Level 3 areas generally have restricted access and few contact hours. Typically, MEC is present only in the subsurface. The hazard level score ranges between a maximum score of 720 to a minimum score of 530.
- **Hazard Level 4** — Sites with a low hazard potential. The site is compatible with current and reasonably anticipated future use. Typically, a MEC cleanup has been performed at Level 4 sites. The hazard level score ranges between a maximum score of 525 to a minimum score of 125.

Based on the current use scenario, the Ricochet Area MRS has been assigned a baseline Hazard Level Category of 3. This assessment indicates that the site has a moderate hazard potential based on surface and near surface MEC and MD, coupled with exposure limited to a low number of contact hours by the public and maintenance personnel.

8. REMEDIAL ACTION OBJECTIVES

The Ricochet Area MRS current and future land use is primarily outdoor recreational activities by the residents of Lebanon and Dauphin Counties, including hunting, biking, fishing, and hiking. PGC employees also access the MRS routinely for maintenance.

The goal of a cleanup alternative is to reduce the explosives safety risk at the Ricochet Area MRS and to ensure the protection of human health, public safety, and the environment.

To achieve this goal, objectives were established to minimize MEC exposure to the following:

- The public while maintaining access for recreational activities.
- PGC personnel at herbaceous openings maintained for turkey and deer.
- PGC personnel and contractors during timber harvesting activities.

9. DESCRIPTION OF ALTERNATIVES

CERCLA, Section 121, requires that each selected remedial alternative be: 1) protective of human health and the environment; 2) cost-effective; 3) comply with all applicable or relevant and appropriate federal and state requirements; and 4) use permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment (i.e., removal and disposal) as a principal element for the reduction of toxicity, mobility, or volume (TMV) of the hazardous substances. The five remedial alternatives evaluated for the Ricochet Area MRS include the following:

- Alternative 1 – No Action.
- Alternative 2 – Containment and Controls.
- Alternative 3 – Surface Removal of MEC with Containment and Controls.
- Alternative 4 – Focused Surface and Subsurface Removal of MEC with Containment and Controls.
- Alternative 5 – Removal of MEC to **Detection Depth** with Containment and Controls.

CERCLA, Section 121(c), and Section 300.430(f)(4)(ii) of the NCP, requires the review of remedial actions no less than every 5 years if the selected remedy does not allow for unlimited use and unrestricted exposure. The reviews are conducted to ensure that human health and the environment are being protected. **Recurring reviews** for MEC remedial actions determine whether a remedial action continues to minimize explosives safety risks and continues to be protective of human health and the environment. Because none of the alternatives evaluated for the site allow for unlimited use and unrestricted exposure, recurring reviews will be completed by the government at least every 5 years. Detailed documentation describing the development of each of the five alternatives with the results of the detailed and comparative analyses conducted as part of the FS are available for review in the Administrative Record [see technical document *Final Feasibility Study, Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania* (WESTON, 2012a)]. In the FS, the alternatives were evaluated and compared in

relation to the nine NCP criteria prescribed for remedy selection in accordance with CERCLA. These alternatives are summarized below:

- **Alternative 1 – No Action** — The no action alternative, required to be evaluated per Section 300.403(e)(6) under the NCP, is provided as a baseline for comparison to the other proposed alternatives. This alternative means no action will be taken to locate, remove, and dispose of munitions. This alternative assumes land use in the future will remain consistent with current conditions. Cost - $0.

- **Alternative 2 – Containment and Controls** — Consists of various access control and/or public awareness components. Examples of containment and controls are brochures and fact sheets distributed to recreational users; signs placed at game lands to notify the public of explosive safety hazards if they observe munitions; notifications included with permits and contracts; information added to existing printed materials; and an awareness video provided to groups and organizations using the game lands. Cost - $181,998.

- **Alternative 3 – Surface Removal of Munitions with Containment and Controls** — Removal of MEC detected on the ground surface across the entire 3,262-acre Ricochet Area MRS. This alternative also includes containment and controls similar to those presented in Alternative 2. Cost - $16,182,335.

- **Alternative 4 – Focused Surface and Subsurface Removal of Munitions with Containment and Controls (*ARNG Selected Remedy*)** — Removal of MEC detected on the ground surface in the area identified (see the areas delineated in yellow in Figure 9-1) with more than 0.5 MEC and MD per acre and along trails (estimated to be 1,334 acres of the Ricochet Area MRS). This alternative includes removal of MEC to detection depth at the herbaceous openings. This alternative also includes containment and controls, including MEC **construction support** as needed during timber management activities. Cost - $6,757,826.

- **Alternative 5 – Removal of Munitions to Detection Depth with Containment and Controls** — Removal of MEC detected across the entire 3,262-acre Ricochet Area MRS to instrument detection depth. This alternative also includes containment and controls similar to Alternative 2. Cost - $24,315,156.

The MEC HA methodology (described in Section 7) was used to assess the potential impacts (if any) to explosive hazard risks posed to human health and the environment as a result of cleanup contemplated under each remedial alternative. The input parameters are adjusted in the MEC HA worksheet to account for the potential effects of remedial alternative implementation. The results of this evaluation are summarized in Table 9-1.

Table 9-1

Remedial Alternative Munitions and Explosives of Concern Hazard Assessment Scoring Summary

Site ID: Ricochet Area MRS, Safety Buffer Zone/Ricochet Area	MEC HA Hazard Level Category[1]	MEC HA Score[1]
Alternative 1 – No Action[2]	3	705
Alternative 2 – Containment and Controls	3	705
Alternative 3 – Surface Removal of Munitions with Containment and Control	3	575
Alternative 4 – Focused Surface and Subsurface Removal of Munitions with Containment and Controls - ***ARNG Selected Remedy***	3	575
Alternative 5 – Removal of Munitions to Detection Depth with Containment and Controls	4	395

Notes:

[1] The MEC HA hazard level categories and scores were developed using EPA guidance and are presented in the Final FS report for the Ricochet Area MRS (WESTON, 2012a) to evaluate the explosive hazard associated with alternative implementation.
[2] Represents current use conditions and provides the baseline for alternative comparison.

SECTION 9

FIGURE

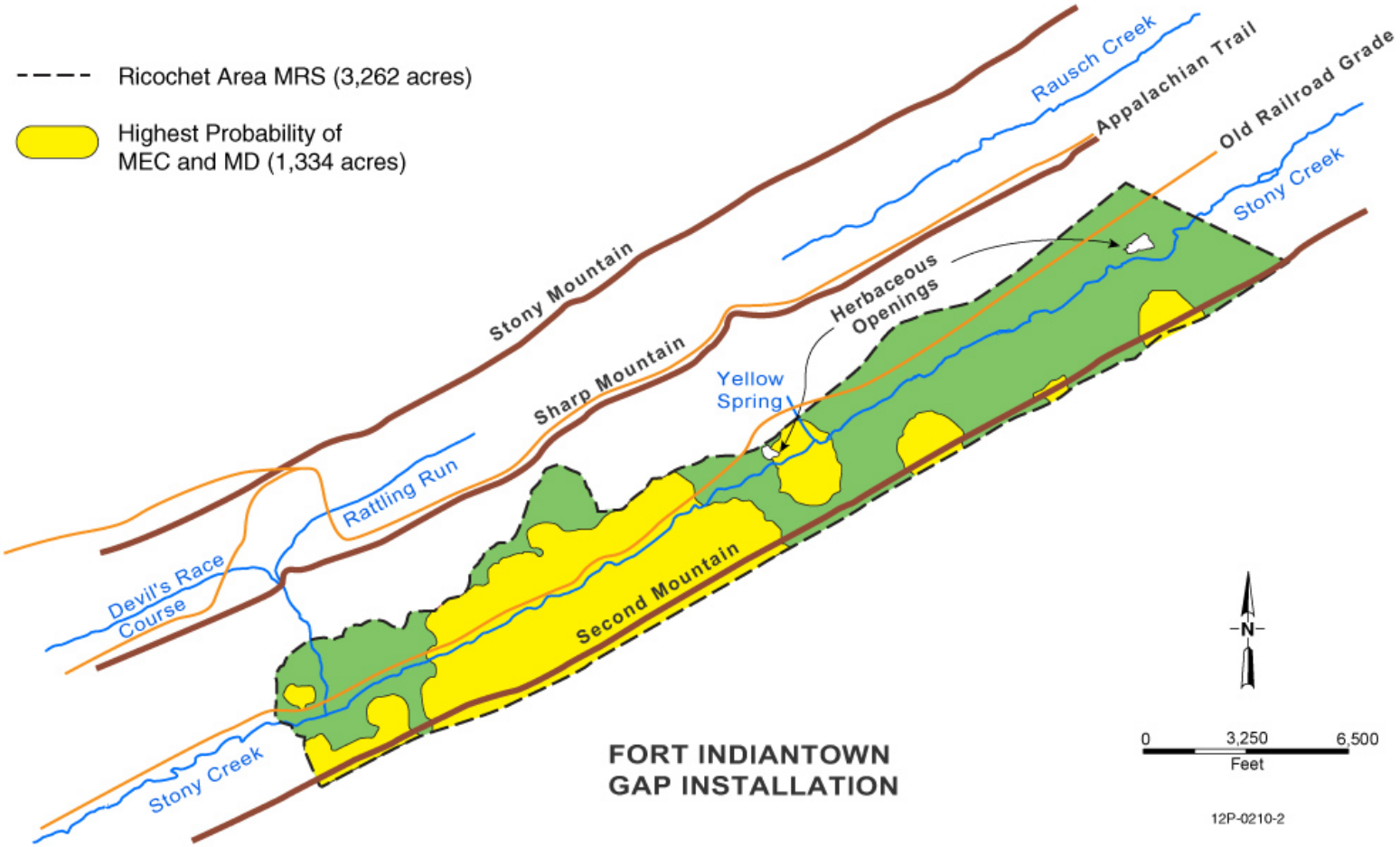


Figure 9-1 Selected Remedy: Alternative 4

10. COMPARATIVE ANALYSIS OF ALTERNATIVES

Nine CERCLA/NCP criteria are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy [40 CFR 300.430(e)(9)(iii)(A)-(I)]. This section presents the relative performance of each alternative in relation to the nine criteria, noting how it compares with the other options under consideration. The nine evaluation criteria are described as follows:

Threshold Criteria:

1. **Overall Protection of Human Health and the Environment** – Evaluates whether a cleanup alternative provides adequate protection and evaluates how risks are eliminated, reduced, or controlled through treatment, engineering controls, or local government controls.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** – Evaluates whether a cleanup option meets federal and state environmental laws, regulations, and other requirements or justifies any waivers.

Balancing Criteria:

3. **Long-Term Effectiveness and Permanence** – Considers any remaining risks after cleanup is complete and the ability of a cleanup option to maintain reliable protection of human health and the environment over time once cleanup goals are met.

4. **Reduction of TMV through Treatment** – Evaluates a cleanup option's use of treatment to reduce the harmful effects of the contaminants, their ability to move in the environment, and the amount of contamination present.

5. **Short-Term Effectiveness** – Considers the time needed to clean up a site and the risks a cleanup option may pose to workers, the community, and the environment until the cleanup goals are met.

6. **Implementability** – The technical and administrative feasibility of implementing a cleanup option, including factors such as the relative availability of goods and resources.

7. **Cost** – Includes estimated capital and annual operations and maintenance costs as well as the present worth cost. (*Present worth cost is the total cost of an alternative over time in terms of today's dollar value.*)

Modifying Criteria:

8. **State Acceptance** – Considers whether the state (Commonwealth of Pennsylvania) agrees with ARNG's analyses and recommendations as described in the PP.

9. **Community Acceptance** – Considers whether the local community agrees with the ARNG's analyses and proposed cleanup plan. The comments ARNG receives on its preferred alternative are important indicators of community acceptance.

10.1 OVERALL PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative 1 is not protective because no action would be taken to prevent human exposure to MEC, which includes UXO and DMM. Alternative 2 is more protective than Alternative 1 because the containment and controls would reduce unacceptable exposure. However, Alternative 2 is less protective than Alternatives 3, 4, and 5 because no UXO and DMM items would be removed. Alternatives 3 and 4 have a MEC HA Hazard Level of 3, with a score of 575, indicating greater protection than Alternatives 1 and 2. Alternative 5 is more protective than Alternatives 3 and 4 because it would remove all detectable UXO and DMM and is supported by the MEC HA Hazard Level of 4 with a score of 395. Alternative 3 would address the immediate exposure risks for surface UXO; however, it would not address the subsurface UXO and DMM at the herbaceous openings. Alternative 4 would be less protective than Alternative 3 because it would be performed over a smaller area but would focus on the locations where there is the highest probability of encountering UXO, and it would provide UXO construction support in all other areas of the MRS as warranted. Subsurface UXO and DMM would be removed in Alternatives 4 and 5, thereby reducing immediate hazards associated with intrusive activities at the herbaceous openings and the future timbering activities.

10.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Pursuant to Section 300.5 of the NCP, ARARs are defined as:

- *Applicable* requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified

by a state in a timely manner and that are more stringent than federal requirements may be applicable.

- *Relevant and Appropriate* requirements means those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not ‘‘applicable’’ to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

Non-promulgated (and not enforceable) **To Be Considered** (TBC) advisories, guidance, and policies that may facilitate development of protective remedies were also considered during remedy selection under the ARAR criterion in accordance with Section 300.400(g)(3) of the NCP. TBCs may be identified, as appropriate, to supplement ARARs where they do not exist or where it has been determined that ARARs are insufficient to ensure protection of human health and the environment at a particular release.

As required in accordance with Section 300.400(g) of the NCP, ARNG, with support from PADEP, identified requirements applicable to the MEC release characterized during the RI and to the remedial alternatives considered during the FS, based on an objective determination of whether the requirements specifically address the hazard, remedial action, location, or other circumstance found at this MRS.

There are no regulations or criteria associated with Alternative 1, and Alternatives 2 through 5 would be implemented and performed to comply with all ARARs and TBCs. Alternative 5 would be more intrusive in nature and would require further attention to impacts on cultural and natural resources. A summary of ARARs and TBCs identified during the RI/FS for the Ricochet Area MRS is appended to this ROD (see Appendix B).

10.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

Alternative 1 is not effective or permanent. Alternative 2 is more effective and permanent than Alternative 1, assuming the cooperation and active participation of the existing powers and authorities of government agencies. The containment and controls recommended as Alternative 2

have been designed to provide effectiveness in the long term. Alternatives 3, 4, and 5 would be more effective and more permanent than Alternative 2 because UXO and DMM would be removed permanently from the MRS. Alternative 4 would be less effective and less permanent over the long term because it would cover a smaller surface area than Alternative 3, but would remove exposure to subsurface UXO and DMM by focused subsurface removals and UXO construction support for timbering activities. Alternative 5 would be the most effective and permanent alternative because all detectable UXO and DMM would be removed permanently, including items in the subsurface.

10.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS THROUGH TREATMENT

Alternatives 1 and 2 will not reduce the TMV of UXO and DMM at the Ricochet Area MRS. Of Alternatives 3, 4, and 5, Alternative 4 would be less effective than Alternative 3 because it would be conducted over a smaller, more focused area and some surface UXO might be missed that would be covered under Alternative 3. Alternative 5 would be effective in reducing the TMV of UXO and DMM because all detectable UXO and DMM would be removed, including items in the subsurface. Subsurface UXO and DMM would be removed at the herbaceous openings and during UXO construction support under Alternative 4 and would be less effective than Alternative 5.

10.5 SHORT-TERM EFFECTIVENESS

Because no construction activities are associated with either alternative, Alternatives 1 and 2 would not present significant additional risk to the community or to workers at the Ricochet Area MRS. Alternatives 3, 4, and 5 would increase risk to the community and to workers during removal of UXO and DMM. Increased risk to the community during removal of UXO and DMM would be reduced by the use of engineering controls and/or evacuations to maintain minimum safe distances. Alternatives 1 and 2 would not cause damage to the environment because no clearing, grubbing, or excavation would be required. Alternatives 3, 4, and 5 would cause damage to the environment because of those activities. Alternative 4 would cause less damage than Alternatives 3 and 5 because no or limited intrusive activities would be required as it would be performed over more focused surface and subsurface removal areas.

10.6 IMPLEMENTABILITY

Alternative 1 would be easily implemented because it requires no action. The containment and controls recommended as Alternative 2 could also be easily implemented because they pose no technical difficulties and the materials and services needed are available. Removals of UXO and DMM to various depths, like those proposed in Alternatives 3, 4, and 5, have been implemented effectively at the Ricochet Area MRS during the RI. Alternative 5 would take longer to implement as it would be performed over a larger area and would require intrusive work to instrument detection depth. Specific activities, including plant surveys, awareness training, and mitigation activities, would be required to protect natural resources and cultural resources, and the requirements would be easier to meet with the less intrusive Alternative 4 approach.

10.7 COST

The total present-worth cost to perform each alternative is as follows:

- Alternative 1 = $0
- Alternative 2 = $181,998
- Alternative 3 = $16,182,335
- Alternative 4 = $6,757,826
- Alternative 5 = $24,315,156

Note: Costs have been rounded to the nearest thousand dollars and do not include costs associated with recurring reviews.

10.8 STATE ACCEPTANCE

Regulatory agency agreement on the recommendation made to select Alternative 4 for the Ricochet Area MRS in the PP has been received and is documented in a letter submitted by PADEP, which is provided as Appendix C to this ROD and has been entered in the Administrative Record for the MRS. Final agreement from PADEP on the remedy as selected and established in this ROD will also be added to the Administrative Record when it is received.

Similarly, PGC reviewed and accepted the PP recommendation for selection of Alternative 4 as the final remedy for the Ricochet Area MRS as documented in a letter received from PGC and provided in Appendix C. Final PGC agreement on the Selected Remedy established in this ROD will be documented and added to the Administrative Record when it is received.

10.9 COMMUNITY ACCEPTANCE

A Responsiveness Summary has been compiled and is appended to this ROD (Appendix A) to document comments received from the public and considered by ARNG with detailed responses for the record. Substantive comments received by the public regarding the remedial action for the Ricochet Area MRS reflect various perspectives on the level of cleanup required for the site. In the comments, individuals expressed preferences for the range of alternatives — from no action to performing removal of MEC to detection depth across the entire MRS. The comments reflect various perspectives of the public that include maintaining the pristine nature of this area of State Game Lands 211 for individuals and groups that would prefer to have the site returned to its natural condition prior to military use.

In general, one commenter was in favor of Alternative 1 – No Action. One commenter was in favor of Alternative 2 – Containment and Controls. Four commenters were in favor of the ARNG-preferred Alternative 4 – Focused Surface and Subsurface Removal of MEC with Containment and Controls. Three commenters were in favor of Alternative 5 – Removal of MEC to Detection Depth with Containment and Controls. The majority of the comments focused on Alternatives 4 and 5. Alternative 4 received the most favorable comments.

10.10 COMPARATIVE ANALYSIS RECOMMENDATION

Alternatives 1 and 2 are not desirable because they do not remove any MEC or MD. Alternative 3 covers a larger area than Alternative 4 but does not address subsurface MEC. Additionally, Alternative 3 is more expensive than Alternative 4 but may not provide additional benefits based on current and future land use. Alternative 5 is the most protective remedy but also the most expensive. In addition, it would result in the largest amount of disturbance to the environment and impact to special status species. Alternative 4 will have a lesser degree of disturbance to the environment than Alternative 5.

Alternative 4 focuses on the locations where there is the highest probability of encountering MEC and MD on the ground surface. By implementing Alternative 4, it is anticipated that most of the MEC and MD at the MRS will be located and removed. Therefore, this alternative will reduce exposure risks inherent during recreational activities performed by the public and maintenance activities performed by PGC personnel. In addition to the surface removal in the

higher MEC/MD density of the MRS, surface and subsurface MEC would be removed from two herbaceous openings. This complete clearance will reduce potential explosives hazards resulting from plowing and disking by PGC personnel who maintain these openings. Finally, UXO construction support would be provided as needed during timber management activities, such as constructing access roads and establishing log landings. Construction support would provide removal of surface and subsurface MEC/MD encountered during these timber management activities.

Coupled with the outreach efforts to minimize the potential for the public to come in contact with MEC/MD, it is believed that the MEC and MD removal conducted for Alternative 4 will address the explosive safety risk, locate and remove most of the MEC/MD, and provide the most cost-effective solution for cleaning up the Ricochet Area MRS.

11. PRINCIPAL THREAT WASTES

Principal threat wastes are "source materials" considered highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. A source material is a material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contaminants to groundwater, surface water, or air, or act as a source for direct exposure.

Because MEC would present a significant risk to human health should exposure occur, it is considered to be a principal threat waste. All of the alternatives, except Alternative 1, would address the principal threat waste. Alternative 2 would address the principal threat waste by reducing the potential for exposure through increased public awareness rather than treatment. Alternatives 3, 4, and 5 would address the principal threat waste by reducing the TMV through treatment (i.e., removal and disposal) and by reducing the potential for exposure through increased public awareness. Alternatives 3 and 4 are similar with respect to addressing the principal threat waste. Alternative 3 addresses more than twice the surface area that is addressed by Alternative 4; therefore, this alternative may result in a greater reduction in the volume of waste. However, the focused removal in Alternative 4 provides subsurface removal in addition to surface removal within portions of the MRS where intrusive activities are anticipated based on current use. Alternative 5 would address the principal threat waste most effectively by removing and disposing of all detectable MEC and by increasing public awareness.

12. SELECTED REMEDY

12.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

Based on the requirements of CERCLA and the NCP, and on a detailed analysis of the remedial alternatives using the nine criteria (which includes public and state comments), ARNG and PGC have selected Alternative 4 - Focused Surface and Subsurface Removal of MEC with Containment and Controls as the remedy for the Ricochet Area MRS. PADEP and PGC concurrence with this selection is provided in Appendix C.

Alternative 4 includes surface detection, removal, and disposal of munitions located in the highest anomaly density portions of the MRS (1,334 acres); detection, removal, and disposal of detectable MEC at the two herbaceous openings maintained by PGC; public education and notification; and UXO construction support for timber management activities. Alternative 4 meets the RAO of minimizing or eliminating the explosive safety risk to the public, PGC personnel, and contractors.

The Selected Remedy is believed to provide the best balance of trade-offs among the alternatives with respect to the CERCLA/NCP criteria. ARNG believes that the Selected Remedy can be easily implemented based on similar investigations conducted previously at the Ricochet Area MRS, and is most cost-effective relative to the other MEC removal alternatives (Alternatives 3 and 5) while still being protective of human health in the long-term. ARNG will implement and perform Alternative 4 to comply with all ARARs and TBCs.

The Selected Remedy is endorsed by PGC, PADEP, and the community.

12.2 DETAILED DESCRIPTION OF THE SELECTED REMEDY

Focused surface removal of MEC includes removal of MEC detected at ground surface either fully exposed or partially exposed using analog detection instruments like the Schonstedt magnetometer that uses flux-gate technology. This removal of MEC will be conducted only in a focused area limited to the portions of the MRS with MEC/MD densities greater than 0.5 surface items per acre (see Figure 9-1). This area is estimated to be 1,344 acres of the Ricochet Area

MRS. In addition, all trails running through the MRS will have a surface removal completed. The following general tasks will be included as part of Alternative 4, MEC surface removal:

- Mobilization
- Survey/positioning
- Brush clearing and grubbing (if needed)
- MEC detection
- MEC removal
- MEC disposal
- MD and non-MD waste stream treatment
- Demobilization

As part of Alternative 4, a focused subsurface MEC removal to detection depth will be performed at the herbaceous openings located within the Ricochet Area MRS (see Figure 9-1). This component of Alternative 4 includes the removal of MEC detected on the ground surface and to detection depth using digital geophysical mapping (DGM) instrumentation like the EM61-MK2 that uses Time-Domain Electromagnetic Induction technology. The EM61-MK2 sensor can typically detect the type of MEC anticipated to be encountered at the Ricochet Area MRS from 4 inches to 67 inches below ground surface. The depth of detection is highly dependent upon site-specific conditions, including munitions item type and size, geology, and overall geophysical conditions.

The subsurface removal will be performed over 10 acres. The following general tasks will be included as part of Alternative 4, MEC subsurface removal at the herbaceous openings of the MRS:

- Mobilization
- Survey/positioning
- Brush clearing and grubbing (if needed)
- DGM for MEC detection
- Digital geophysical data analysis and anomaly selection
- Anomaly reacquisition
- MEC removal
- MEC disposal
- MD and non-MD waste stream treatment
- Demobilization

Containment and controls will be implemented. This will include UXO construction support activities for the timber harvesting activities within the Ricochet Area, specifically the construction of access roads, building of log landings, and other soil-moving activities. UXO construction support will be used to ensure the safety of workers and the public in the event that MEC items are discovered during any future construction activities at the Ricochet Area MRS in areas where a MEC removal was not performed. Qualified UXO Technicians will be employed to provide construction support either on an on-call basis to respond to MEC that was incidentally encountered, or on a standby basis to monitor construction activities on-site while they occur. The level of construction support needed will change in relation to the location and the probability for encountering potential MEC.

It is estimated that over the course of 30 years, six UXO construction support events would be needed to support timbering activities within the Ricochet Area MRS. Each UXO construction support event would last approximately 2 weeks and would support the construction of access roads, building of log landings, and soil moving activities.

Containment and controls recommended for the Ricochet Area MRS include the following:

- Signs.
- Notification during permitting and contracting.
- Brochures/fact sheets.
- Information packages to public officials and emergency management agencies.
- Awareness video.
- Classroom education.
- Internet website.
- Appalachian Trail Guidebook editorials.

CERCLA requires the review of remedial actions no less than every 5 years to ensure that human health and the environment are being protected. Recurring reviews for MEC remedial actions determine whether a remedial action continues to minimize explosives safety risks and continues to be protective of human health, safety, and the environment, and provide an opportunity to assess the applicability of new technology for addressing previous technical impracticability determinations. Recurring reviews will be completed by ARNG and will include the following general steps:

- Prepare Recurring Review Plan.
- Establish project delivery team and begin community involvement activities.
- Review existing documentation.
- Identify/review new information and current site conditions.
- Prepare preliminary Site Analysis and Work Plan.
- Conduct site visit.
- Prepare Recurring Review Report.

12.3 SUMMARY OF ESTIMATED COSTS

The total present-worth cost to perform Alternative 4 at the Ricochet Area MRS is $6,757,826. The estimated costs include initial capital costs to develop the educational materials, 30-year annual costs, and a variable annual discount rate (decreases from 1%) is as follows:

- Estimated Capital Cost: $6,642,946
- Estimated Present-Value Annual Cost: $114,880
- Estimated Total Present-Value Cost: $6,757,826

Detailed cost estimates for Alternative 4 were developed as part of the FS and have been adopted for this ROD and provided as Table 12-1.

The information in this cost estimate is based on the best available information regarding the anticipated scope of the remedy. Changes in the cost elements may occur as a result of new information and data collected during the engineering design of the remedy. Major changes, if they occur, may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Differences, or a ROD amendment.

Table 12-1

Ricochet Area Munitions Response Site Alternative 4 Cost Estimate

CAPITAL COST:

Bid Item No.	Description	QTY	Unit	Team Production (Units/Day)	No. of Teams	Duration (Weeks)	Weekly Cost Per Team	Total
0100	Work Plans	1.00	LS	N/A	N/A	N/A	99,000	$99,000
0110	Explosive Safety Submission	1.00	LS	N/A	N/A	N/A	38,500	$38,500
0200	Mobilization	1.00	LS	N/A	N/A	N/A	53,171	$53,171
0300	Site Management	1.00	WK	1.0	1.0	14	19,576	$280,579
0310	Survey/Positioning	1,334.00	AC	5.0	2.0	27	14,890	$397,257
0320	Brush Clearing	133.40	AC	3.0	1.0	9	10,004	$88,969
0400	MEC Surface Removal	1,334.00	AC	3.0	3.0	30	113,379	$3,361,054
0410	MEC Removal to Detection Depth (M&D)	0.00	AC	2.0	3.0	0	114,534	$0
0420	Digital Geophysical Mapping	11.00	AC	1.0	1.0	2.2	19,914	$43,812
0430	Geophysical Data Analysis	11.00	AC	2.0	1.0	1.1	18,136	$19,950
0440	Anomaly Reacquisition	11.00	AC	100.0	1.0	2.2	4,732	$10,411
0450	MEC Subsurface Removal (DGM)	11.00	AC	100.0	1.0	2.2	34,525	$75,955
0500	MEC Disposal	34.32	EA	0.5	1.0	3	34,195	$117,356
0510	Scrap Disposal	46.00	EA	0.1	1.0	1	17,587	$16,180
0600	Site Restoration	16.31	AC	3.0	1.0	1	36,308	$39,479
0610	Demobilization	1.00	LS	N/A	N/A	N/A	12,925	$12,925
0700	Final Report	1.00	LS	N/A	N/A	N/A	77,000	$77,000
0800	Containment and Controls	1.00	LS	N/A	N/A	N/A	42,350	$42,350
	Sub-Total							$4,773,946
	Contingency	15%						$716,092
	Sub-Total							$5,490,038
	Infrastructure Improvements	2%						$109,801
	Project Management	5%						$274,502
	Remedial Design	8%						$439,203
	Construction Management	6%						$329,402
	Total Capital Cost							**$6,642,946**

Table 12-1

Ricochet Area Munitions Response Site Alternative 4 Cost Estimate (Continued)

PERIODIC COST:

	Description	Year	QTY	Unit	Unit Cost	Total
0900	Containment and Controls - Annual Cost	5 - 30	1	LS	1,265	$1,265
1000	Five Year Review - First Review	5	1	EA	8,800	$8,800
1010	Five Year Review - Years 10,15,20,25 & 30	10 - 30	1	EA	5,500	$5,500
1100	Four to Five Year UXO Construction Support	5 - 30	1	EA	24,072	$24,072

PRESENT VALUE ANALYSIS:

	Cost Type	Year	Total Cost	Total Cost Per Year	Discount Factor (%)	Present Value
	Capital Cost	0	$6,642,946	$6,642,946	1	$6,642,946
0900	Annual O & M Cost	1 - 30	$0	$0	19.350	$0
	Periodic Cost	5	$34,137	$34,137	0.854	$29,153
	Periodic Cost	10	$30,837	$30,837	0.737	$22,727
	Periodic Cost	15	$30,837	$30,837	0.633	$19,520
	Periodic Cost	20	$30,837	$30,837	0.543	$16,745
	Periodic Cost	25	$30,837	$30,837	0.467	$14,401
	Periodic Cost	30	$30,837	$30,837	0.400	$12,335
			$6,831,269			$6,757,826

Total Present Value of Alternative **$6,757,826**

Notes:
AC = acre, EA = each, LS = lump sum, N/A = not applicable, WK = week

Table adopted from capital and present worth cost estimate developed for Alternative 4 and presented in Appendix A of the *Final Feasibility Study for the Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania* (WESTON, 2012a).

12.4 EXPECTED OUTCOME OF SELECTED REMEDY

Based on the information available at this time, ARNG believes that the Selected Remedy for the Ricochet Area MRS, Focused Surface and Subsurface MEC Removal with Containment and Controls, will be protective of human health and the environment, will comply with ARARs, and will be cost-effective. Upon implementation of the remedy, there will be no anticipated change in the use of the land or resources at the MRS.

Containment and controls will be maintained until such time that the hazard associated with the potential remnant UXO in the soil is at levels to allow for unrestricted use and exposure. ARNG is responsible for implementing, maintaining, reporting on, and enforcing containment and control measures. Although ARNG may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, ARNG shall retain ultimate responsibility for the remedy integrity.

13. STATUTORY DETERMINATIONS

Under CERCLA Section 121, the ARNG must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the TMV of hazardous substances as their principal element. The following subsections discuss the remedy in light of these statutory requirements.

13.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The Selected Remedy, Alternative 4, will protect public health and welfare through mitigation of hazards to public health and welfare from exposure to potential residual MEC. This is accomplished in two ways:

- Removal of surface and subsurface MEC from focused areas of the MRS determined to pose the greatest risk to potential receptors due to the nature and extent of MEC identified within the MRS and current land use.
- Education of current users of the area regarding the potential existence of MEC, and its recognition and avoidance; and the provision of UXO construction support for intrusive activities (i.e., timber management activities).

Threats to the environment are not anticipated while the suspected MEC remains in place.

13.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Removal of MEC will be performed to comply with all ARARs and TBCs. Containment and controls will be implemented to comply with all ARARs and TBCs, including DoD and Army safety policies for the clearance and control of property containing MEC or potential MEC. An identification of ARARs and TBCs for the Selected Remedy is provided in Appendix B.

13.3 COST-EFFECTIVENESS

In ARNG's judgment, the Selected Remedy is cost-effective because it represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (NCP §300.430(f)(l)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in TMV through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedy was determined to be proportional to its costs and hence this remedy represents a reasonable value for the money to be spent.

As indicated by the comparative analysis conducted for all remedial alternatives considered during the FS, the Selected Remedy, Alternative 4 (present worth cost estimate of $6,757,826), is the most cost-effective alternative evaluated that is ARAR-compliant and that provides acceptable levels of achievement of the other evaluation criteria.

13.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT POSSIBLE

ARNG has determined that the Selected Remedy, Focused Surface and Subsurface Removal of MEC with Containment and Controls, represents the maximum extent to which a permanent solution can be implemented in a practicable manner in the Ricochet Area MRS. Alternative treatment technologies and/or resource recovery technologies were found to not be appropriate for site conditions. Of those alternatives that are protective of human health and the environment and comply with ARARs and TBCs, ARNG has determined, with agreement from PGC and PADEP, that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria.

13.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

Treatment of MEC consists of removal and disposal. The Selected Remedy, Focused Surface and Subsurface Removal of MEC with Containment and Controls, satisfies the statutory preference for treatment as a principal element of the remedy by removing and disposing of the bulk of surface MEC and detectable MEC at focused locations (herbaceous openings) in current use throughout the MRS.

13.6 FIVE-YEAR REVIEW REQUIREMENTS

Because this remedy may result in hazardous substances, pollutants, or contaminants remaining at the Ricochet Area MRS above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

14. DOCUMENTATION OF SIGNIFICANT CHANGES

The PP for the Ricochet Area MRS was released for public comment from 7 June 2012 to 6 July 2012. The PP identified Alternative 4, Focused Surface and Subsurface Removal of MEC with Containment and Controls, as the proposed remedy for this MRS. No comments were received during the public comment period or public meeting that resulted in changes to this proposed final remedy. This ROD does not document any significant changes to the proposed remedy identified in the PP.

15. REFERENCES

EPA (United States Environmental Protection Agency). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA/540/G-89/004. October 1988.

EPA (United States Environmental Protection Agency). 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents*, EPA 540-R-98-031, July 1999.

National Contingency Plan, 40 Code of Federal Regulations Part 300.

PADER (Commonwealth of Pennsylvania Department of Environmental Resources). 1979. Pennsylvania Wild and Scenic Rivers Program: Stony Creek Study. September 1979.

U.S. Army (United States Department of the Army). 2005. *Memorandum for the Assistant Chief of Staff for Installation Management: Munitions Response Terminology*. 21 April 2005.

WESTON (Weston Solutions, Inc.). 2010. *Community Relations Plan, Remediation Investigation for the Ricochet Area Munitions Response Site in State Game Lands 211, Pennsylvania.* Prepared for the National Guard Bureau and Pennsylvania Army National Guard. February 2010.

WESTON (Weston Solutions, Inc.). 2011. *Final Remedial Investigation Report for the Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania*. Prepared for the Army National Guard Directorate and Pennsylvania Army National Guard. July 2011.

WESTON (Weston Solutions, Inc.). 2012a. *Final Feasibility Study for the Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania*. Prepared for Army National Guard Directorate. January 2012.

WESTON (Weston Solutions, Inc.). 2012b. *Final Proposed Plan, Ricochet Area Munitions Response Site, State Game Lands 211, Pennsylvania*. June 2012.

GLOSSARY OF TERMS

Administrative Record	A collection of documents containing all the information and reports generated during the entire phase of investigation and cleanup at a site, which are used to make a decision on the selection of a response action under CERCLA. This file is to be available for public review and a copy maintained near the site.
Applicable or Relevant and Appropriate Requirements (ARARs)	Federal (or state, if more stringent) environmental statutes, regulations, and other requirements that pertain to the protection of human health and the environment and have been determined to be either directly applicable or relevant and appropriate to the particular cleanup site's hazardous substances, location, or expected cleanup actions.
Buffer Zone	A safety margin on either side, above and below the approved target area extending to a distance at which the hazard distance limit is reached.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA) to investigate and clean up hazardous substances.
Construction Support	Support provided by qualified UXO personnel during construction activities at potential MEC sites to ensure the safety of construction personnel from the harmful effects of MEC.
Decision Document (DD)	A legal public document (e.g., Record of Decision) that describes the cleanup action or remedy selected for a site, the basis for the choice of that remedy, and public comments on alternative remedies. The DD is based on information and technical analysis generated during the RI/FS. See Record of Decision (ROD) below.
Detection Depth	The depth below ground surface at which munitions items can be reliably detected using the best available and most appropriate remote sensing equipment for a given environment. Detection depth is dependent on the equipment, the size/mass of item, the item's depth and orientation, and geological/soil conditions.
Discarded Military Munitions (DMM)	Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations (Army, 2005).
Explosive Safety Risk	The probability for a MEC item to detonate and potentially cause harm to people, property, the environment, or operational capability and readiness as a result of human activities. An explosive safety risk exists if a person can come into contact with a MEC item and act upon it to cause detonation. The potential for an explosive safety risk depends on the presence of three critical elements: a source (presence of MEC), a receptor or person, and an interaction between the source and the receptor (such as picking up the item or disturbing the item by plowing). There is no explosive safety risk if any one element is missing.

GLOSSARY OF TERMS (Continued)

Exposure Pathway	Describes the course a chemical or physical agent takes from the source to the exposed individual. Elements of the exposure pathway are: (1) the source of the released chemical or physical agent; (2) the contaminated medium (e.g., soil); (3) a point of contact with the contaminated medium; and (4) an exposure route (e.g., ingestion, inhalation) at a contact point.
Feasibility Study (FS)	An evaluation of potential remedial technologies and treatment options that can be used to clean up a site.
Firing Point	The point or location at which a weapon system (excluding demolitions) is placed for firing.
Frost Heave	The upthrust of ground caused by the freezing of moist soil.
Inert	A material that is free from explosive or other energetic substance.
Munitions Constituents (MC)	Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (Army, 2005).
Munitions Debris (MD)	Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization or disposal (Army, 2005).
Munitions and Explosives of Concern (MEC)	This term distinguishes specific categories of military munitions that may pose unique explosive safety risks, including: ▪ UXO ▪ DMM ▪ Munitions constituents (e.g., trinitrotoluene, Royal Demolition Explosive [RDX]) present in high enough concentrations to pose an explosive hazard (Army, 2005).
Munitions Response Area (MRA)	Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. A munitions response area is comprised of one or more munitions response sites (Army, 2005).
Munitions Response Site (MRS)	A discrete location within a **munitions response area (MRA)** that is known to require a munitions response (Army, 2005).
National Oil and Hazardous Substances Pollution Contingency Plan (NCP)	The Federal regulation that implements CERCLA. The NCP was revised in February 1990. The purpose of the NCP is to provide the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, or contaminants.
Proposed Plan (PP)	A document that presents a proposed cleanup alternative, rationale for the preference, and requests public input regarding the proposed alternative.
Record of Decision (ROD)	A **decision document** used to select and document the remedy selection decision. The ROD documents the remedial action plan for a site or operable unit and serves the following three basic functions: (1) certifies that the remedy selection process was carried out in accordance with CERCLA and, to the extent practicable, with the NCP; (2) describes the technical parameters of the remedy, specifying the methods selected to protect human health and the environment, including treatment, engineering, and IC components, as well as cleanup levels; and (3) provides the public with a consolidated summary of information about the site and the chosen remedy, including the rationale behind the selection.

GLOSSARY OF TERMS (Continued)

Recurring Reviews	Review required by CERCLA no less than every 5 years to assure that human health and the environment are being protected by the selected remedial action, where the remedial action does not allow for unlimited use and unrestricted exposure.
Remedial Action	Action consistent with a permanent remedy, taken to prevent or minimize the release of hazardous substances.
Remedial Action Objective (RAO)	Objectives established for remedial actions to guide the development of alternatives and focus the comparison of acceptable remedial action alternatives, if warranted. RAOs also assist in clarifying the goal of minimizing risk and achieving an acceptable level of protection for human health and the environment.
Remedial Investigation (RI)	A study of a site that provides information supporting the evaluation for the need for a remedy and/or the selection of a remedy for a site where hazardous substances have been disposed of. The RI identifies the nature and extent of contamination at the facility.
Removal Action	Short-term immediate actions taken to address releases of hazardous substances that may require expedited response.
Superfund Amendments and Reauthorization Act (SARA)	Enacted in 1986, this legislation establishes standards for cleanup activities, requires federal facility compliance with CERCLA, and clarifies public involvement requirements.
To Be Considered Criteria (TBCs)	Criteria used to evaluate remedial alternatives when there are no ARARs, or when ARARs alone may not adequately protect human health and the environment.

APPENDIX A

RESPONSIVENESS SUMMARY

APPENDIX A
RESPONSIVENESS SUMMARY

SECTION 1 – OVERVIEW

Based on an assessment of the site conditions, ARNG and PAARNG, the lead agencies for site activities, selected a remedy for the Ricochet Area Munitions Response Site in State Game Lands 211, Pennsylvania. The PGC and PADEP concur with the selected remedy.

The selected remedy is Alternative 4 – Focused Surface and Subsurface Removal of Munitions with Containment and Controls. ARNG and PAARNG have determined that this response action is necessary to protect human health and the environment based on the current and intended future recreational and maintenance of the site as state game lands.

SECTION 2 – SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

This responsiveness summary responds to all questions and comments raised during the public comment period held from 7 June 2012 to 6 July 2012 following publication of the final Proposed Plan for the Ricochet Area Munitions Response Site in Game Lands 211, including the public meeting on 21 June 2012. The following are the comments received, with the ARNG and PAARNG responses.

GENERAL COMMENTS

COMMENT 1: Am I going to be able to keep you all out of the valley? Probably not! Get on with it! Remember, we are watching! No more double talk! Be honest!

> **RESPONSE 1**: The Department of Defense Military Munitions Response Program, which began in 2001, addresses the potential explosives safety, health, and environmental issues caused by past munitions-related activities at current and former military installations and adjacent properties. The program follows the requirements of the National Contingency Plan as set forth under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and its amendments of 1986. ARNG is required to follow specific procedures and protocol to conduct field work; prepare, review, and finalize remedial investigation and feasibility study reports; present a proposed plan to the public and solicit public comment; prepare, review, and finalize the record of decision that describes the remedy for a site; solicit, review, and hire a remediation contractor; prepare, review, and finalize a remedial action plan; conduct a remedial action to remove munitions and explosives of concern; and explain each technical phase to the public in non-technical language. In fulfilling its obligations under the Military Munitions Response Program, the first priority is the protection of human health, safety, and the environment. The high level of public interest in the Ricochet Area Munitions Response site is appreciated. The technical reports and the public meeting information pertaining to the site are available at the Annville Free Library and on the website--http://www.dmva.state.pa.us/portal/server.pt/community/featured_topics/13476/military_munitions_response_program___ricochet_area_munitions_response_site/669121.

COMMENT 2: I just have two comments on your presentation. First of all, Weston, if you read your report, you lead the reader to believe that the one 155-millimeter HE (high explosive) round was found in the game lands. It was not. It was found on Gap property. It was like the second day you guys were up there. You drove up the top with the surveyor. Holy cow, there's a 155 millimeter round laying there. Look at the field report, it's in there. But, as you look in your text, you keep listing that as one of the MEC rounds found. It's not, it was on Gap property. Clear that up. You should have an asterisk alongside that one.

> **RESPONSE 2:** The 155mm HE projectile was recovered during the survey control setup activities. The item was found right on the border of Fort Indiantown Gap property and the Ricochet Area MRS. Finding this item on the edge of the property required including it in the reports.

COMMENT 3: And the other one was about human receptors. Your figures for that north slope, which Mr. Bills says is crap, there's not that many people on that north slope of Second Mountain, except hunters pushing bear and deer on drives and stuff like that, unless there's Allegheny wood rat researchers in there. But there's not a lot in there. All summer long -- we go up there all summer long. You're not going to find anybody, not that many people what you have figured. Your figures, rail trail, fishing, et cetera, yes. But your figures for human receptor is kind of inflated for the area where the MEC, except for that one round north of the rail trail, was found. MEC, munitions of explosive concern, that's what we're concerned about, not dummy rounds.

> **RESPONSE 3: The Munitions and Explosives of Concern Hazard Assessment (MEC HA) was developed for the entire MRS, not the specific MEC subareas, and included the number of receptors and contact hours for the whole MRS.**

COMMENT 4: I'd like to see a deadline put on this for two years. I think that would be enough time to complete this project. I mean, it's feasible to hire more people with the money being expended for this. So, I'd like to see a deadline put on this for two years, and then after that…leave the land alone.

> **RESPONSE 4**: Such a deadline may sound reasonable to members of the general public; however, it is impracticable when considering the technical phases yet to be completed to clean up the site. As stated in RESPONSE 1, the process takes time to finish each phase correctly and completely. In addition to the technical phases presented in RESPONSE 1, munitions cleanup contractors need to be identified and hired. The contractors need to prepare work plans and health and safety plans for review and eventual finalization. Also, government funding may take time and may occur in a series of partial allocations. After that, the actual cleanup activities would be scheduled and performed to the best of the technical team's ability without interruption to hunting seasons and informal recreational users.

COMMENT IN FAVOR OF ALTERNATIVE 1 – NO ACTION

COMMENT 5: Although I feel it has already been decided that Alternative #4 will be implemented and this is just a formality to make the public feel a part of the decision, I will briefly still offer my comments: History has proven that Alternative 1 (No Action) should be implemented. For more than 60 years safety records show that nobody has been injured or killed by any MEC, on the 3,262-acre MRS, while recreating or working in Stony Creek Valley. The likelihood of somebody getting injured or killed by MEC on the MRS in the future is very slim to none. In addition, there never will be a full 100% clean-up of any MECs in the MRS anyway, so why choose any of the other alternatives?

The costs of the other four Alternatives just doesn't justify the need for a cleanup for a few ricochet projectiles in the MRS. This is a waste of our tax dollars that could be used wisely elsewhere, instead of funding the budget of a corporation or lining the pockets of a few individuals.

Also, this has already gone on long enough. With the other four Alternatives this will continue to be a long drawn-out process and will go on for too many years. Example to this is the Tobyhanna area. I feel this is still another tactic for PA DMVA at FITG to own or gain access to all or portions of SGL 211. It's time to move on and leave Stony Creek Valley as it is, and enjoy the wonders of the valley that God has entrusted us with. In closing, let history speak for itself. No Action NEEDED!!!!!

> **RESPONSE 5**: The Department of Defense is responsible for addressing all properties known or suspected to contain munitions and for responding to munitions and explosives of concern remaining at those properties. Recreational users at the Ricochet Area Munitions Response Site have been fortunate that there have been no reported injuries from munitions and explosives of concern in the past 60 years. However, there are no guarantees that no one could be injured or killed from handling munitions remaining at the site. There are no guarantees that a person might not find a munition and take it home as a souvenir. Such an action would increase the possibility of injury or death to the collector, a friend, or family member. It takes only one incident of injury or death, past or future, to determine that a cleanup is warranted. The "No Action" alternative does not meet the evaluation criteria because it would not remove any munitions and explosives of concern and munitions debris.

COMMENT IN FAVOR OF ALTERNATIVE 2 – CONTAINMENT AND CONTROLS

COMMENT 6: Thank you for allowing me to submit my comments. The following statements in quotations and highlighted with bold text can be attributed to the representatives of the Pennsylvania Army National Guard, National Guard Bureau, WESTON Solutions and the Pennsylvania Game Commission. Before spending millions of taxpayer dollars, I believe it is appropriate to review and evaluate the statements.

"The area is considered a transferred range under the inventory because the Army does not own or control the property" "PAARNG (Pennsylvania Army National Guard) is anticipating acquisition of this land which, at this point, will change from non-operational range to an operational range." The "property" or "land" referred to is State Game Lands 211. These

statements are from installation action plans for Fort Indiantown Gap prior to the MRS contract with Weston Solutions. Please keep these statements in mind as I continue.

"We have no intention of taking the land." "We are not going to close it down or give it to Fort Indiantown Gap. That is not an alternative that we will consider." There is no denying the fact that Fort Indiantown Gap has already attempted to expand by taking Pittman-Robertson land in State Game Lands 211 (Stony Creek Valley). A representative of the Pennsylvania Game Commission involved in the early land swap negotiations stated: **"At one time they did mention some of the land could be condemned because of unexploded ordnance. That kind of put us on our heels."** Also, please keep that statement in mind.

"They found 155mm high explosive round, too, in State Game Lands 211." This false statement was made during the May 2010 meeting. The 155mm HE round was found on the same day that the site office trailer was delivered. Surveyors from Melham Associates were on site to establish controls. The Weston Daily Site Report from March 19, 2010 states: **"Identified one 155mm HE projectile on Second Mountain road on FIG property. Range Control was notified and GPS coordinates of the item were submitted to MSG Kirkpatrick of Range Control."**

Confirmation of this location occurred in October 2010 when NGB instructed Weston to create a table listing the coordinates of the MEC (Munitions and Explosives of Concern) found. The table includes the following statement: **"155mm projectile disposed of by Army EOD. Coordinates in NAD83, UTM Zone 18N, US Survey Feet. This projectile was found on Fort Indiantown Gap property, not in the Ricochet Area Munitions Response Site or Pennsylvania State Game Lands 211."**

"13 (pieces of) MEC were removed from the site and/or destroyed during the RI (Remedial Investigation)." This statement is not quite a lie, but certainly not the truth. As previously noted, the 155mm HE round was not found in the Ricochet Area Munitions Response Site or Pennsylvania State Game Lands 211. The four MK-2A4 primers were found at a depth of 12 inches below ground surface in the Cold Spring food plot. Finding these four primers would present as much danger as finding four rifle cartridges dropped by deer or bear hunters. These four primers were classified as MEC in evaluation of State Game Lands 211. Apparently the site investigation of 8,000 acres did not produce the desired amount of MEC for the parties involved. So a decision was made to misrepresent the results of MEC found in State Game Lands 211.

"Most of the items recovered (58%) were considered wholly inert munitions that never had energetic components. Forty-one percent (41%) of the items previously had energetic components but no energetic materials remained upon discovery. Only one percent (1%) of the items found was MEC with residual explosives constituents and representing an explosive hazard." Over 60 years of activity and no accidents involving MEC have occurred on State Game Lands 211.

"So we will never make a statement that there are no unexploded ordnance out there – ever." The Army National Guard's preferred cleanup alternative will never achieve zero risk from MEC. It is unachievable. In fact spending either $6 million, $16 million, or $24 million on cleanup will not attain a risk free environment from MEC.

"It's not a really high risk site." "It's not a dudded impact area." "There are not enough ordnance items to necessitate a TCRA (Time Critical Removal Action) here." There have been no accidents with MEC involving hunters, anglers and other visitors to State Game Lands 211.

"We don't have a situation like Tobyhanna where there is a really high risk." "Yes, that is correct, the Ricochet Area MRS does not have the extensive ordnance releases that Tobyhanna does." During World Wars I and II, artillery live-fire training was conducted from four firing point and six target areas located on Pennsylvania State Game Lands 127 at Tobyhanna. The target (impact) areas at Tobyhanna have been identified as high risk. There is no comparison – STATE GAME LANDS 211 WAS NEVER A TARGETED AREA.

"I'm not saying that it is not safe to use that area recreationally, it just means there's a risk to which the government, including the state regulators, may not be comfortable." This statement by the National Guard Bureau representative acknowledges that the danger from MEC to hunters and anglers is minimal. The evidence is quite clear. There have been no accidents with MEC involving hunters, anglers and other visitors to State Game Lands 211. However activities such as constructing an access road and harvesting timber along the north slope of Second Mountain could increase the exposure to MEC by Pennsylvania Game Commission personnel and contractors. It is interesting to note that the Army National Guard's preferred cleanup alternative includes MEC construction support as needed during timber management activities. Is this the real reason for insisting on the expenditure of $6,757,826? One very good reason for not disturbing the north slope of Second Mountain is that it provides habitat for the Allegheny woodrat, a threatened species. The Pennsylvania Game Commission has stated that the Allegheny woodrat is one of our best and last indicators of true wilderness and forest fragmentation is a threat to its existence. It seems like a no brainer if the Pennsylvania Game Commission is truly committed to the mission of identifying, preserving and protecting critical and unique habitats for all wildlife species, both birds and mammals.

"The MEC hazard assessment also takes account of the depths and types of items that were found, as well as what kind of land use, what kind of recreational exposure receptors, are present in the area." The calculation of 750,000 hours/year for recreational exposure to MEC is absurd. The four MK-2A4 PRIMERS were found at a depth of 12 inches below ground surface in the Cold Spring food plot. As previously noted, finding these primers would present as much danger as finding rifle cartridges dropped by deer or bear hunters. The 155mm high explosive projectile WAS NOT FOUND in the Ricochet Area Munitions Response Site. It was found on Fort Indiantown Gap property. The majority of the MEC (7 pieces) was found on the north slope of Second Mountain. 750,000 hours/year for recreational exposure to MEC on the north slope of Second Mountain is ridiculous.

"The Pennsylvania Game Commission also must determine what their liability is and what they want to do." Will the Pennsylvania Game Commission eventually forfeit ownership of a portion of State Game Lands 211 because of liability? That is the million dollar question, no pun intended. The representative from Pennsylvania Game Commission made some very revealing remarks at the last public meeting. Unfortunately I cannot quote him because the Army National Guard will not release a transcript of the meeting. He essentially stated that the north slope of Second Mountain is crap and wished the land swap had been completed.

Here are the facts:

- State Game Lands 211 was never an impact area.
- Total amount of MEC found in State Game Lands 211 is overstated.
- Officials conceded that the danger from MEC to hunters and anglers was minimal.
- Over 60 years of activity on State Game Lands 211 and there have been zero accidents involving MEC.
- Pennsylvania Game Commission wants to continue harvesting timber along the north slope of Second Mountain. This appears to be the real reason for insisting on the expenditure of $6,757,826. No timber harvesting means less exposure to MEC. There is positively no need to waste taxpayer money assisting the Pennsylvania Game Commission with timber harvesting of an area that provides habitat for a threatened species.

Based on the facts, my choice for State Game Lands 211 is alternative 2. 3Rs (Recognize, Retreat, and Report) Safety Program – Brochures and fact sheets should be distributed to recreational users. Signs should be placed at the principal entrances to State Game Lands 211 notifying visitors of explosive safety hazards. All permits and contracts should have the information added. Thanks again for the opportunity to submit my comments.

RESPONSE 6: No evidence of a target area or impact area was identified during the remedial investigation of the Ricochet Area MRS. The site is characterized as a ricochet area.

The 155mm HE projectile was recovered during the survey control setup activities. The item was found on the border of Fort Indiantown Gap property and the Ricochet Area MRS. Finding this item on the edge of the property required including it in the reports.

Four MK-2A4 primers were disposed of and included as MEC (subcategory DMM). These items present an explosive safety hazard according to DOD requirements.

The Munitions and Explosives of Concern Hazard Assessment (MEC HA) was developed for the entire MRS, not the specific MEC subareas, and includes the number of receptors and contact hours for the whole MRS.

The dangers to hunters and anglers in the Ricochet Area MRS are related to the level of disturbance their activities may cause to the land and munitions items. Generally hunters and fisherman are not digging, but sitting, walking, or standing in areas. MEC items require some activity or force to hit them for an explosive event.

There have been no injuries from UXO in State Game Lands 211 reported to the installation.

The PGC has harvested and will continue to harvest trees to improve habitat within State Game Lands 211. The ARNG has included containment and controls, specifically MEC construction support for timbering operations, to protect the workers from explosive hazards. Additionally, the containment and controls, including the education and awareness program, will alert recreational users and workers to the explosive safety hazards present at the site.

COMMENTS IN FAVOR OF ALTERNATIVE 4 – FOCUSED SURFACE AND SUBSURFACE REMOVAL OF MUNITIONS WITH CONTAINMENT AND CONTROLS

COMMENT 7a: On behalf of the Stony Creek Valley Coalition, we as a group, recommend Alternative 4. This Alternative is the best way to clean up the entire area. Alternative #5 is too intrusive, and any excavation into the wetlands and vernal pools will do harm to the aquatic life contained therein. Alternative #5 would also be detrimental to the wildlife and habitat throughout the entire area. As always, the Stony Creek Valley Coalition will continue to be ever vigilant in preserving Stony Creek Valley (SGL 211) in its entirety.

COMMENT 7b: Alternative 4 appears to be the most logical and reasonable approach to mitigating the problem … Go For It!

COMMENT 7c: I believe this area is a state treasure, not only for the historic value, but for all of the recreational activities that are currently, and hopefully far into the future, allowed in the area. Based on the information sent to me, I believe Alternative 4, preferred by the Army National Guard, is the most reasonable plan.

COMMENT 7d: I reside in Harrisburg, Dauphin County, Pennsylvania. I am an Army veteran and a retired engineering economist. I'm a member of Harrisburg Hunters and Anglers, Trout Unlimited and Susquehannock Fly Fishers. And I fish Stony Creek on State Game Land 211, frequently. I've attended the majority of the scheduled community interest group meetings and listened to the presentations. I have reviewed all the material handed out at the meetings and/or posted on the public website, including the work plan and the final remedial investigations report. My opinion is that the work plan and the final remedial investigation report were planned and executed in a professional manner and that sound scientific and statistical methods were used throughout. My further opinion is that the recommendations contained in the feasibility study and the final remedial investigation report should be adopted in their entirety to include cleanup alternative number four. Cleanup alternative number four provides the most reasonable approach to removing unexploded ordnance while keeping costs to a minimum.

> **RESPONSE 7**: Thank you for your support of ARNG's preferred alternative. ARNG selected Alternative 4 – Focused Surface and Subsurface Removal of Munitions with Containment and Controls because of the following advantages over the other alternatives:
>
> - Focuses ground surface removal at the locations where there is the highest probability of encountering munitions and explosives of concern and munitions debris.
> - Focuses subsurface removal of munitions at the two herbaceous openings where plowing and disking by Pennsylvania Game Commission personnel who maintain these areas.
> - Anticipates that most of the munitions and explosives of concern and munitions debris will be located and removed, thus reducing exposure risks to persons on the site.
> - Is cost effective – the least expensive of the three physically active cleanup alternatives (Alternative 4 - $6,757,826; Alternative 3 - $16,182,335; and Alternative 5 - $24,315,156).

- Will have fewer disturbances to the environment and special status species than Alternative 5.
- Fully addresses explosive safety risk when coupled with efforts to educate the public on the risks of remaining munitions and explosives of concern and munitions debris at the site.

COMMENTS IN FAVOR OF ALTERNATIVE 5 – REMOVAL OF MUNITIONS TO DETECTION DEPTH WITH CONTAINMENT AND CONTROLS

COMMENT 8a: At the last [public] meeting [October 27, 2011], I voted for Alternative 5 and I continue to support that alternative. Thank you.

COMMENT 8b: My comment would be to go with number five, because I don't want anything to happen to that land. If I go out and got my truck wrecked, you know, I wouldn't get out of the truck and say, okay, just replace two fenders and I'm happy. I'd want the truck back to the original form. And I think that's what we should go for here, thank you.

COMMENT 8c: I am writing these comments on behalf of the Governor Pinchot Group of the PA Chapter of the Sierra Club, in regard to the proposed cleanup at the Ricochet Area Munitions Response site (MRS) in State Game Lands 211, PA. The Governor Pinchot Group includes residents in Lebanon and Dauphin Counties. Members of the Governor Pinchot Group regularly hike, bike and fish in State Game Lands 211. We strongly urge you to implement Cleanup Alternative 5 – "Removal of Munitions to Detection Depth with Containment and Controls." This alternative calls for removal of munitions and explosives of concern (MEC) detected across the entire 3,262-acre Ricochet Area MRS to instrument detection depth. This alternative also includes containment and controls. (This alternative is hereinafter referred to as Alternative 5 complete removal.) The cost is $24,315,156, which although is expensive, is necessary to protect the public that uses the land. Without a true cleanup, the members of the public who use this area for recreation will risk death or serious injury from unexploded munitions, or will be forced to no longer use this valuable recreational area due to the risk.

a. **Alternative 5 complete removal is the only remedy with long term effectiveness and permanence**. Alternative 5 complete removal is the only remedy that calls for removal of all detected munitions and explosives of concern to detection depth, throughout the area. Removal is the only permanent and long term effective remedy for unexploded munitions. It is the only remedy that is truly protective of human health and the environment. This response is the best, and probably only, opportunity for the Government to provide an effective and safe remedy at this site. It is unrealistic to suppose that permanent removal will occur in the future if it is not done now.

b. **The public is invited to use this site and in fact does use the area for a wide range of recreational activity. This area has been threatened before, and the public has demonstrated a strong concern in keeping the Stony Creek area available and accessible to the public**. This area is extensively visited and used by the public. Bicyclists follow the rail trail along Stony Creek. Hikers and casual strollers often use the area. Scout troops visit and camp there. Youngsters learn to fish there. Birders schedule walks through it, and hundreds of cars have passed through the area to view the Fall Foliage. All these people are at risk of injury or

worse in accessing the area. These people do not stay on paths; as they fish, identify trees and plants, and investigate the vernal ponds, they go off the paths and into the woods. Failure to remove the MEC in this area exposes children and adults to serious injury. Failure to remove the munitions and explosive will deter many people from visiting and the recreational value will be diminished. Not all the public, but a portion of it, will be aware of the risks and will decide that they cannot lead nature trips into the area to teach youngsters. This will be a big loss and it is a de facto taking of prime recreational area.

c. **Without a removal, munitions and explosives of concern (MEC) will continue to surface in the area**. Unless the MEC is located and removed as per Alternative 5 complete removal, the movement of the soils during freeze and thaw are likely to continue to bring unexploded munitions and explosives to the surface, appearing in places that previously appeared to be clear. This creates an ever changing and constant risk of exposure to the public.

d. **Without removal of the MEC, warnings and posting of the three R's are inadequate to protect the public. The three R's of recognize, retreat, and report, while helpful to some, are largely inadequate to protect the public**. PA has experience with unexploded ordnance in other areas, such as Tobyhanna State Park. Despite postings and warnings, members of the public have failed to recognize the danger posed by unexploded ordnance. People have picked up unexploded ordnance, taken it home for souvenirs or as an object of interest, and have taken it to park offices. Paths that seem clear revealed ordnance after spring thaws and mud changes. People are not aware of the dangers, and the munitions are an attractive nuisance to children, who are fascinated to see munitions and armaments, and are eager to touch and explore anything that looks like an artifact or a weapon. Removal is the only way to protect people in a recreational area to which they are accustomed to exploring off road and off path.

e. **Alternative 5 complete removal to detection depth is the only alternative that is truly compliant with applicable or relevant and appropriate requirements**. All the proposed remedies, except for Alternative 5 complete removal, propose to leave munitions and explosives of concern, including unexploded ordnance and munitions constituents, in the area. Leaving unexploded ordnance does not meet the Background standard of the Land Recycling and Environmental Remediation Standards Act, nor does it meet a statewide health standard. There is no safe standard for unexploded ordnance. Finally, leaving UXO and other MEC also cannot qualify as a site specific remedy. Without locating all the UXO, it is impossible to contain the MEC. If the MEC is not contained within an explosion proof containment, the risk remains. If the MEC is not paved over and otherwise contained the risk remains. Paving over this ecological treasure and recreational asset would be a destruction of the area. Clearly, containment is not appropriate for this site – only removal is appropriate. Failure to remove the MEC means that the dangerous nuisance remains, that the public continues to be exposed to serious bodily injury or death, and that the very purpose of the area is diminished.

In conclusion, we want to be able to use this recreational area. We want to be able to continue to educate our children about nature by accessing it. We do not want to worry that our child's next step in the forest could place him in danger. The local community that uses this area will appreciate the Army's assuming responsibility to remove the munitions and explosives of concern that were the unintended result of Army activities. Removal as per Alternative 5 complete removal is the only permanent and effective remedy for this site, and it is needed to restore this area to its intended and previous use.

RESPONSE 8: Alternative 5 allows for the most thorough remedy of the five alternatives; however, Alternative 5 cannot be considered "complete." ARNG cannot guarantee 100% removal of munitions and explosives of concern and munitions debris within the Ricochet Area MRS. The Department of Defense will always be liable for properties where target, overshot, and ricochet areas were located. Alternative 5 includes containment and controls (public awareness programs) as in Alternatives 2, 3, and 4. This ongoing public awareness program protects the recreational users from munitions that may not have been detected and removed. The surface risks are mitigated with Alternatives 3 and 4. Alternative 4 also provides additional protection for the workers within the Ricochet Area MRS by providing subsurface removals in the herbaceous openings and MEC construction support during timbering activities.

Since 1998, when the Fort Indiantown Gap installation became a National Guard garrison, artillery firing angles used by the Pennsylvania Army National Guard prevent overshots and ricochets from entering the Ricochet Area Munitions Response Site. The future use of the site remains the same as current use: State Game Lands for hunters, anglers, and informal recreational activities. Should the future use of the site be proposed for something different, the area residents have the organizational experience, skills, and backing to make known their concerns and wishes for this wilderness area.

Implementing a continuous public awareness program will be challenging to the Pennsylvania Game Commission and Fort Indiantown Gap; however, it is part of the Alternative 5 description as well as Alternatives 2, 3, and 4. The public can be informed through, but not limited to, the following methods: licensing procedures; service, civic, and recreational organization programs; and a variety of websites and printed materials. The public can learn the responsible actions (the three R's of recognize, retreat, and report) to take in the possible but unlikely event of encountering munitions and explosives of concern remaining at the site under any alternative.

Alternative 5 has the greatest level of removal depth. However, this removal will not remove 100% of the munitions items. As stated earlier, munitions will remain and the containment and controls will protect the recreational users and workers within the Ricochet Area MRS. Alternative 4 is more cost effective because it removes the current surface items in the high density areas and still provides the ongoing containment and controls for the protection of recreational users and workers from future exposure.

APPENDIX B

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CRITERIA

APPENDIX B

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED CRITERIA

Three categories of ARARs are evaluated for the Ricochet Area MRS, along with TBCs. The ARAR categories are chemical-specific, location-specific, and action-specific.

Chemical-specific ARARs are health-based or risk-based numerical values that establish the acceptable amount or concentration of a chemical that may remain in, or be discharged to, the ambient environment. Preliminary chemical-specific ARARs were identified in the RI to provide benchmarks with which to compare MC sampling results for metals and explosives at the Ricochet Area. The benchmarks were used in the human health and ecological screening level risk assessments in the RI. However, the results of the risk assessments indicated no specific MC associated with the Ricochet Area. Therefore, chemical-specific ARARs are not identified for the Ricochet Area MRS.

Location-specific ARARs generally are restrictions placed on the concentration of hazardous substances or the conduct of activities to prevent damage to unique or sensitive areas, such as floodplains, wetlands, historic places, and sensitive ecosystems or habitats. Several location-specific ARARs have been identified. These location-specific ARARs will be reviewed prior to implementation of removal action alternatives at the Ricochet Area MRS. The location-specific ARARs include protection of historical and archaeological resources and protection of wildlife and habitat resources, including endangered species, fish, migratory birds, and wetlands.

Action-specific ARARs are usually technology- or activity-based requirements or limitations placed on actions taken with respect to removal actions or requirements to conduct certain actions to address particular circumstances at a site.

TBCs are used when there are no ARARs or when ARARs alone may not adequately protect human health and the environment.

ARARs and TBCs identified for the Ricochet Area MRS are summarized in **Table B-1.**

Table B-1 Applicable or Relevant and Appropriate Requirements and To Be Considered Criteria

ARAR/TBC	Citation/Description	Applicability or Relevance
Chemical-Specific ARARs		
Not applicable		
Location-Specific ARARs		
None identified		
Action-Specific ARARs		
25 Pa. Code 102.11 – Erosion and sediment control best management practices (BMPs); General requirements	(a) A person conducting or proposing to conduct an earth disturbance activity shall design, implement and maintain BMPs to minimize the potential for accelerated erosion and sedimentation in order to protect, maintain, reclaim and restore water quality and existing and designated uses. Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Program Manual (Manual), Commonwealth of Pennsylvania, Department of Environmental Protection, No. 363-2134-008 (January1996), as amended and updated. (b) BMPs and design standards other than those listed in the Manual may be used when a person conducting or proposing to conduct an earth disturbance activity demonstrates to the Department or a county conservation district that the alternate BMP or design standard minimizes accelerated erosion and sedimentation to achieve the regulatory standards in subsection (a).	MEC removal activities may require excavation of some kind, mainly by using hand tools. 25 Pa. Code 102 requires persons proposing or conducting earth disturbance activities to develop, implement, and maintain BMPs to minimize the potential for accelerated erosion and sedimentation.

Table B-1 Applicable or Relevant and Appropriate Requirements and To Be Considered Criteria (Continued)

ARAR/TBC	Citation/Description	Applicability or Relevance
40 CFR 264 Subpart X – Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities; miscellaneous units	264.601- 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.	It is anticipated that MEC disposal (by detonation) will be required as part of remedial alternatives discussed in this FS. Should the need for disposal/treatment arise, it could require the use of technologies defined as "miscellaneous units" in Subpart X, including open burning/open detonation (OB/OD) units, shredders, crushers, etc. Subpart X outlines procedures for issuing permits to miscellaneous units that treat, store, or dispose of hazardous waste. Miscellaneous units include OB/OD units, enclosed combustion devices, carbon and catalyst regeneration units, thermal desorption units, shredders, crushers, filter presses, and geologic repositories. Subpart X does not specify minimum technology requirements or monitoring requirements for miscellaneous units. Subpart X specifies an environmental performance standard that must be met through conformance with appropriate design, operating, and monitoring requirements.
TBCs		
Memo, DoD and EPA, Interim Final, 7 March 2000 – "DoD and EPA Interim Final Management Principles for Implementing Response Actions at Closed, Transferring, and Transferred (CTT) Ranges"	A permanent record of the data gathered to characterize a site and a clear audit trail of pertinent data analysis and resulting decisions and actions are required. To the maximum extent practicable, the permanent record shall include sensor data that are digitally-recorded and geo-referenced.	This document provides interim guidance for ongoing response actions addressing MEC at the Ricochet Area.

APPENDIX C

LETTERS OF AGREEMENT

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL CLEANUP AND BROWNFIELDS

December 18, 2012

Ms. Joan Anderson, Project Manager
Department of Military and Veterans Affairs
Bureau of Environmental Management
Environmental Compliance Division
Building 0-11, Fort Indiatown Gap
Annville, PA 17003-8249

Re: Record of Decision (ROD)
Ricochet Area Munitions Response Site
State Game Lands (SGL) 211
East Hanover Township, Dauphin County and
Cold Spring Township, Lebanon County

Dear Ms. Anderson:

The Department of Environmental Protection has received and reviewed the November, 2012 Record of Decision (ROD) for the Ricochet Area Munitions Response Site (MRS) in East Hanover Township, Dauphin County and Cold Spring Township, Lebanon County. This ROD presents the selected remedial action for Focused Surface and Subsurface Removal of Munitions and Explosives of Concern (MEC) with Containment and Controls, which addresses the following area of contamination:

A Remedial Investigation (RI)/Feasibility Study (FS) characterized the nature and extent of MEC and Munitions Constituents (MC) on the ground surface and subsurface. During the RI, all MEC and MC recovered were located within a 3,263-acre area between the Stony Creek valley and the ridgeline of Second Mountain. Analytical results for soil samples collected at MEC locations showed no significant MC detections. Explosives and munitions-related metals concentrations were not detected above background levels or PADEP standards. The human health risk assessment concluded that no remedial action was necessary for MC to protect public health, welfare, or the environment based on the current and intended future use of the site. The ecological risk assessment concluded that the potential risk for MC in soil to populations (i.e., plants and wildlife) is low.

A total of 13 MEC items were recovered, nine determined to be unexploded ordnance (UXO). In addition, 12 Munitions Debris (MD) items were recovered. Approximately 1,334 acres of the MRS were identified as having UXO and MD densities greater than 0.5 items per acre. The remainder of the MRS has less than 0.5 per acre. In general, 95% of the UXO and MD were recovered in the 0- to 6-inch bgs interval, with 66% of the items recovered at the surface and 9% of the items located between 6 inches and 12 inches bgs.

The selected remedy for the Ricochet MRS includes the following major components:

- MEC detected either fully or partially exposed at the ground surface will be removed in areas with the highest probability of encountering MEC.
- Two herbaceous openings within the MRS that are planted with forages and regularly maintained by PGC personnel as feeding sites for wild game will undergo a subsurface removal action to remove MEC to the depth of detection.
- Containment and controls will be implemented to reduce MEC exposure through behavior modification, including, but not limited to, brochures/fact sheets, signs and awareness videos.

The Department hereby concurs with EPA's proposed remedy with the following conditions:

- **The Department will be given the opportunity to review and comment on documents and concur with decisions related to the design and implementation of the remedial action, to assure compliance with Pennsylvania's Applicable, Relevant and Appropriate Requirements (ARARs) and to be considered requirements (TBCs).**
- **The Department will have the opportunity to review and comment before any modification to the ROD and the issuance of an Explanation of Significant Difference (ESD).**
- **This concurrence with the selected remedial action is not intended to provide any assurances pursuant to CERCLA Section 104(c)(3), 42 U.S.C. 9604(c)(3).**

Thank you for the opportunity to comment and concur on this EPA Record of Decision. If you have any questions regarding this matter, please do not hesitate to contact me.

Sincerely,

George Hartenstein

George Hartenstein
Director
Environmental Cleanup & Brownfields

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
FIELD REGIONS

February 8, 2013

Ms. Joan Anderson
Department of Military and Veterans Affairs
Bureau of Environmental Management
Environmental Compliance Division
Building 0-11, Fort Indiantown Gap
Annville, PA 17003-8249

Dear Ms Anderson:

The Pennsylvania Game Commission has received the draft final Record of Decision(ROD) for the Ricochet Area (FTIG-003 –R-01) Munitions Response Site on State Game Land 211 in Dauphin County. The Pennsylvania Game Commission supports the selection of Alternative 4 as described in the above referenced ROD for managing remediation of munitions and explosives of concern(MEC) and munitions constituents(MC)

In Alternative 4, all areas with the highest probability of MEC(as depicted in ROD FTIG-003-R-01) will be explored at the ground level for either fully or partially exposed MEC. In addition to this, approximately 10 acres of herbaceous openings on SGL 211(as depicted in ROD FTIG-003-R-01) will undergo a subsurface removal action to remove MEC to the depth of detection. This additional level of removal action in this heavily used and maintained area will reduce exposure risks to the public and Pennsylvania Game Commission personnel.

In addition to the above actions, the following containment and controls will be implemented:

1. Signage of activities on SGL 211.
2. Notification to the PGC during permitting and contracting.
3. Production of Brochures and Fact Sheets to be distributed to the public.
4. Information package to public officials and emergency management agencies.
5. Awareness video, classroom education, and an internet website.
6. Appalachian Trail Guidebook editorial.

NORTHWEST REGION
P.O. BOX 31
FRANKLIN, PA 16323
1-877-877-0299

SOUTHWEST REGION
4820 ROUTE 711
BOLIVAR, PA 15923
1-877-877-7137

NORCHCENTRAL REGION
P.O.BOX 5038
JERSEY SHORE, PA 17740
1-877-877-7674

SOUTHCENTRAL REGION
8627 WILLIAM PENN HGWAY.
HUNTINGDON, PA 16652
1-877-877-9107

NORTHEAST REGION
P.O.BOX 220
DALLAS, PA 18612
1-877-877-9357

SOUTHEAST REGION
448 SNYDER ROAD
READING, PA 19605
1-877-877-9470

WWW.PGC.STATE.PA.US

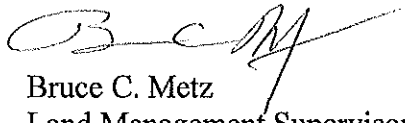
The Pennsylvania Game Commission also supports a statutory review to be conducted within five years after initiation of the remedial action to insure that the remedy is protective to human health and the environment.

As part of the implementation of Alternative 4, the Pennsylvania Game Commission requires a work schedule to be presented by all contractors; this schedule must reduce to the extent possible all conflicts with all major hunting seasons. Access to the site on SGL 211, will need to be coordinated with Land Management Group Supervisor Scott Bills. All signage for this project to be placed on SGL 211 must be reviewed and approved by the Pennsylvania Game Commission.

As part of our concurrence with Alternative 4, the Pennsylvania Game Commission must have the opportunity to review and approve any modification to the ROD.

Should you have any questions, please contact me.

Sincerely,



Bruce C. Metz
Land Management Supervisor
Southeast Region
Pennsylvania Game Commission