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August 30, 2013

Mr. Richard Meadows
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via FedEx

SUBJECT: SUBMITTAL OF FINAL SITE INSPECTION REPORT FOR FORMERLY USED DEFENSE SITES – MILITARY MUNITIONS RESPONSE PROGRAM
SITE: **WEST VIRGINIA MANEUVER AREA (WVMA)**
MRS03 JENNINGSTON TRAINING AREA
RANDOLPH AND TUCKER COUNTIES, WEST VIRGINIA
FUDS PROPERTY NO.: G03WV0013
FUDS PROJECT NO.: G03WV001307
CONTRACT NO. W912PP-11-C-0007, TASK ORDER 0001

Dear Mr. Meadows:

Please find enclosed six (6) paperbound copies along with six (6) copies in PDF on CD-ROM of the Final Site Inspection Report for the WVMA MRS03 Jenningston Training Area in Randolph and Tucker Counties, WV for your records.

This document is prepared by Eco & Associates, Inc. (Eco) in conjunction with Parsons Infrastructure and Technology Group, Inc. (Parsons) under U.S. Army Corps of Engineers (USACE) Contract W912PP-11-C-0007, Task Order 0001.

Please do not hesitate to contact me at (714) 289-0995 if there are questions regarding the presentation of this document or its contents.

Sincerely,
ECO & ASSOCIATES, INC.

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Enclosures

SITE INSPECTION REPORT

FORMERLY USED DEFENSE SITE
MILITARY MUNITIONS RESPONSE PROGRAM
SITE INSPECTION PHASE

•FINAL•

August 2013

West Virginia Maneuver Area
MRS03 Jenningston Training Area
Randolph and Tucker Counties, West Virginia

Contract No.: W912PP-11-C-0007
Task Order: 0001

FUDS Property No.: G03WV0013
FUDS Project No.: GO3WV001307

Prepared for:
United States Army Corp of Engineers
Huntington District
502 8th Street
Huntington, West Virginia 25701

and

United States Engineering and Support Center
Hunstville, Alabama

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Eco & Associates, Inc. (Eco) has completed the Final Site Inspection Report for the MRS03 Jenningston Training Area in Randolph and Tucker Counties, WV. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. The independent technical review verified compliance with established policy principles and procedures, using justified and valid assumptions. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.

August 30, 2013

Eco Team Member(s)

Significant concerns and the explanation of the resolution are as follows:

None

As noted above, all concerns resulting from independent technical review of the project have been considered.

August 30, 2013

Eco Program Manager(s)

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ABBREVIATIONS & ACRONYMS

‘	foot
“	inch
°	degree
µg/L	micrograms per liter
APPL, Inc.	Agriculture & Priority Pollutants Laboratories, Inc.
bgs	below ground surface
C	Celsius
CCC	Civilian Conservation Corps
CELRD	USACE Great Lakes and Ohio River Division
CELRH	USACE Huntington District
CELRL	USACE Louisville District
CENWW	USACE Walla Walla District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRREL	Cold Regions Research and Engineering Laboratory
CSEM	conceptual site exposure model
CSM	conceptual site model
CVI	Canaan Valley Institute
CWM	chemical warfare materiel
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DQO	data quality objective
DSN	Dolly Sods North
DSSA	Dolly Sods Scenic Area
DSW	Dolly Sods Wilderness
e.g.	*exempli gratia* (Latin, “for the sake of example”)
Eco	Eco & Associates, Inc.
EcoSSL	Ecological Soil Screening Level
EDR	Environmental Data Resources, Inc.
ELAP	Environmental Laboratories Accreditation Program
EOD	Explosive Ordnance Disposal
ER	Engineer Regulation
ESL	Ecological Screening Level
ESV	ecological screening value
et seq.	*et sequentes* (Latin, “and the following”)
F	Fahrenheit
FUDS	Formerly Used Defense Site
GIS	Geographic Information System
GPS	Geographic Positioning System
HE	high explosives

HQ	hazard quotient
HRS	Hazard Ranking System
i.e.	*id est* (Latin, "that is")
INPR	Inventory Project Report
J	Analyte detected, estimated concentration
LANL	Los Alamos National Laboratory
MC	munitions constituents
MCL	Maximum Contaminant Levels
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
N	North
NCDC	National Climatic Data Center
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NELAC	National Environmental Laboratory Accreditation Conference
NOAA	National Oceanic and Atmospheric Administration
PA	Preliminary Assessment
Parsons	Parsons Infrastructure and Technology Group, Inc.
PQL_sa	sample-specific practical quantitation limit
PSAP	Programmatic Sampling and Analysis Plan
PWP	Programmatic Work Plan
QA	quality assurance
QC	quality control
QR	qualitative reconnaissance
RBC	Risk-Based Concentration
RI/FS	remedial investigation and feasibility study
ROE	right-of-entry
RSL	Regional Screening Level
SI	site inspection
SLERA	Screening Level Ecological Risk Assessment
SLRA	screening-level risk assessment
SR	smoke round
SS-WP	Site-Specific Work Plan
SVT	site visit team
T&E	Threatened and Endangered
TPP	technical project planning
U	Analyte was analyzed for but not detected above the sample-specific practical quantitation limit
U.S.	United States
UJ	Analyte not detected, reported PQL_sa may be inaccurate or imprecise
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordnance
W	West
WSA	Watershed Atlas
WV	West Virginia
WVDCH	West Virginia Division of Culture and History
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Department of Health and Human Resources
WVDNR	West Virginia Division of Natural Resources
WVGES	West Virginia Geological and Economic Survey
WVMA	West Virginia Maneuver Area
WVWSC	West Virginia Water Science Center

GLOSSARY OF TERMS

inhabited structure	Permanent or temporary structures, other than military munitions related structures that are routinely occupied by one or more persons for any portion of a day.
military munitions	All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges; and devices and components thereof.
munitions and explosives of concern (MEC)	Military munitions that may pose unique explosives safety risks, including unexploded ordnance, discarded military munitions, or munitions constituents present in high enough concentrations to pose an explosive or other health hazard.
munitions constituents (MC)	Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.
munitions debris (MD)	Remnants of munitions (e.g., penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.
munitions response	Response actions, including investigation, removal actions, and remedial actions, to address the explosive safety, human health, or environmental risks presented by unexploded ordnance, discarded military munitions, or munitions constituents, or to support a determination that no removal or remedial action is required.
munitions response area	Any area on a defense site that is known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents. Examples include former ranges and munitions burial areas. A munitions response area includes one or more munitions response sites.
munitions response site (MRS)	A discrete location within a munitions response area that is known to require a munitions response.

projectile	Object projected by an applied force and continuing in motion by its own inertia. This includes bullets, bombs, shells, grenades, guided missiles, and rockets.
unexploded ordnance (UXO)	Military munitions that have been primed, fuzed, armed, or otherwise prepared for action; that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and that remain unexploded whether by malfunction, design, or any other cause.

EXECUTIVE SUMMARY

OBJECTIVE

The objective of this site inspection (SI) is to determine whether the West Virginia Maneuver Area (WVMA) Jenningston Training Area Munitions Response Site (MRS) located within the WVMA/Dolly Sods Formerly Used Defense Sites (FUDS) (FUDS Property No. G03WV0013, FUDS Project No. G03WV001307, Jenningston Training Area ["MRS03"]) in Randolph and Tucker Counties, West Virginia, warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). According to the 2009 Preliminary Assessment (PA), the Jenningston Training Area was under military control from 1943 to 1944 and was used to provide division training consisting of rock climbing exercises, troop maneuver problems, and pack mule training. The potential munitions used at the site include 155mm high explosive (HE) projectiles; 105mm HE and smoke round (SR) cartridges; 81mm HE and SR cartridges; 75mm HE and SR shells; 60mm HE and SR shells; 4.2-inch HE and SR shells; 3.25-inch target rockets; fragmentation, smoke, and practice hand grenades; practice antitank mines; demolition charge blocks, demolition firing devices, blasting caps, time fuses, and general small arms ammunition (.22, .30, .38, .45, and .50 caliber). The SI at the former Jenningston Training Area MRS was performed to confirm the MRS location and to evaluate evidence for the presence of munitions and explosives of concern (MEC), munitions debris (MD) and the presence of elevated metals concentrations that are consistent with the identified munitions constituents (MC) contaminants of concern at the FUDS. To accomplish this objective, qualitative reconnaissance (QR) and metals sampling were performed at the Jenningston Training Area MRS within the WVMA/Dolly Sods FUDS.

TECHNICAL PROJECT PLANNING MEETING

The technical project planning (TPP) process determined that the collection of one surface soil sample and one surface water/sediment coupled sample would be sufficient to meet the SI project objectives. The TPP team also concluded that biased samples would be collected using Cold Regions Research and Engineering Laboratory (CRREL) "seven-point wheel" composite sampling technique and also established the screening levels to be used for human health and ecological risk assessment.

EVALUATION AND FINDINGS

The SI evaluation included 23.59 miles of QR and soil, surface water, and sediment sampling within the MRS boundary (Figure ES.1). Agriculture & Priority Pollutants Laboratories, Inc. (APPL, Inc.) in Clovis, California analyzed the sediment and soil samples for explosives, selected metals, and pH. Metals selected for analysis were non-essential nutrient metals that are indicative of suspected munitions. Essential nutrients and trace elements were not selected for analysis. The surface water samples were analyzed for explosives and selected metals only. No explosives were detected in the surface water,

sediment, or soil samples collected at the MRS. The maximum detected concentrations of the metals within the soil, surface water and sediment did not exceed the selected background concentrations.

Explosive Hazard

The site visit team (SVT) did not find MEC or MD indicative of MEC during the QR at the Jenningston Training Area MRS. However, in 2006, shipping containers for 60mm and 81mm mortars were found in a vertical cave by contractors from the U.S. Forest Service in the western portion of the MRS near Three Springs Run within the Otter Creek Wilderness Area. It was determined that the identification of shipping containers alone does not indicate the potential for mortars within the MRS. Based on the use of the area as a Maneuver Area, documented training activities consisted of mountain marching and rock scaling. No known training activities within the MRS required actual munitions. Without the presence of munitions debris relating to the ordnance item within the shipping containers (mortars), it is an indication that the shipping containers were merely used for training purposes, not transport or use of munitions. In addition, an area close to the location of the recovered shipping containers was used for pack mule training. The training activities associated with pack mule training used items simulating munitions size and weight, rather than actual munitions. Live ordnance was at a premium and was needed in the European and Pacific theaters. As a result, ordnance containers (such as shipping containers) were used. They were filled with either sand or other materials equaling the weight of the container if it had contained munitions. No MEC or MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03. Table ES.1 and Figure ES.1 summarize the results of the SI.

TABLE ES.1
SUMMARY OF RESULTS
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WEST VIRGINIA

MRS	ACREAGE	MEC ASSESSMENT(1)	METALS ASSESSMENT(2)	RECOMMENDATION
Jenningston Training Area	40,000	**No** MEC is not expected due to no known training activities utilizing munitions conducted within the MRS.	**No** Exposure pathways for human and ecological receptors are considered incomplete. No unacceptable human health and ecological risks are expected.	No Further Action

Notes:
(1) "No" in this column indicates that MD indicative of potential MEC presence has not been confirmed, resulting in an NFA recommendation for the MRS.
(2) "No" in this column indicates the absence of metals at levels indicating a potential risk to human health or ecological receptors, resulting in a recommendation for further metals sampling for the MRS.

Chemical Hazard

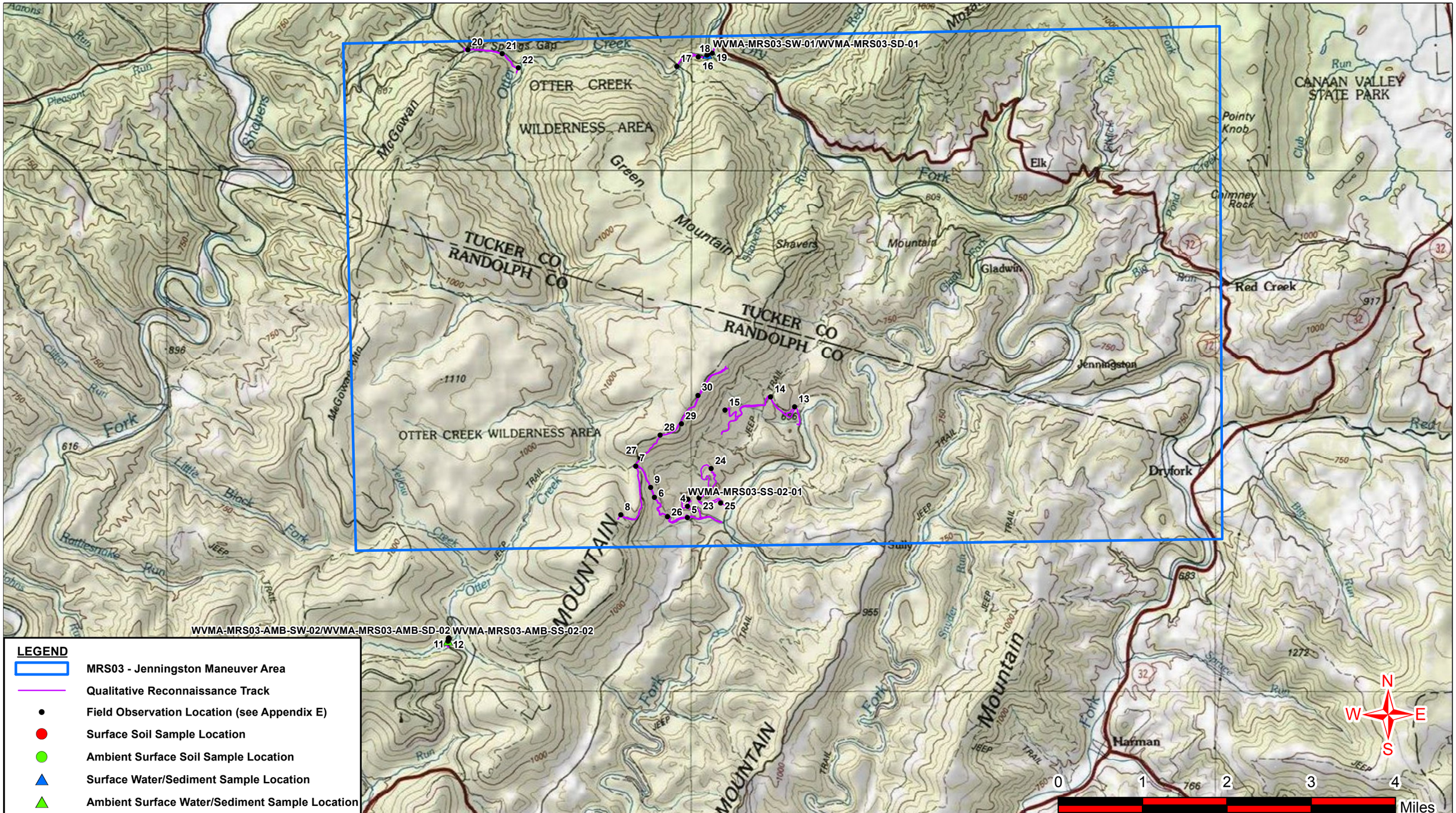
An exposure pathway for a chemical release is not considered complete unless all four of the following elements are present (U.S. Environmental Protection Agency [USEPA] 1989):

1. A source and mechanism for chemical release
2. An environmental transport and/or exposure medium
3. A receptor exposure point
4. A receptor and a likely route of exposure at the exposure point

No explosives were detected and no metals were detected above the selected background values in the samples. MC exposure pathways are considered incomplete for all receptors.

RECOMMENDATIONS

Based on the analytical results and exposure pathways evaluated during this SI, no further action (including a removal action) is warranted. No explosives were detected and no metals were detected above the selected background values. Additionally, there has been no confirmed munitions use during training activities at the Jenningston Training Area MRS.



Prepared by:

Eco & Associates, Inc.
and
PARSONS

GENERAL SITE OVERVIEW

MRS03 - Jennington Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
ES.1

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND

Eco and Associates, Inc. (Eco) received Contract No. W912PP-11-C-0007, Task Order No. 0001, from the United States Army Corps of Engineers (USACE) Engineering and Support Center, Huntsville to perform a site inspection (SI) of the Jenningston Training Area, Munitions Response Site (MRS), one of seven MRSs identified within the West Virginia Maneuver Area (WVMA)/Dolly Sods Formerly Used Defense Site (FUDS) Property No. G03WV0013 (Figure 1.1). The 40,000-acre Jenningston Training Area (MRS03) (FUDS Project No. G03WV001307) is included within the 2,180,367 acres of the WVMA/Dolly Sods FUDS acquired by the Department of the Army for military training during WWII. The Jenningston Training Area MRS is located in Tucker and Randolph Counties, near the south central portion of the WVMA FUDS. The U.S. Geological Survey (USGS) map coordinates for the subject MRS are 38° 59' 21.85" N and 79° 37' 18.33" W. Figure 1.2 shows the site location.

The Department of Defense (DoD) established the Military Munitions Response Program (MMRP) to address DoD sites suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC). Under the MMRP, the USACE is conducting environmental response activities at FUDS for the Army, the DoD's executive agent for the FUDS program.

Pursuant to USACE Engineer Regulation (ER) 200-3-1 (USACE 2004b) and the Management Guidance for the Defense Environmental Restoration Program (DERP) (March 2012), the USACE is conducting FUDS response activities. All work is performed in accordance with the following:

- The DERP statute (10 U.S. Code [USC] 2701 et seq.)
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, 42 USC 9601, et seq.)
- Executive Orders 12580 and 13016
- The National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 Code of Federal Regulations [CFR] Part 300)

The USACE is conducting SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

While not all MEC and MC constitute CERCLA hazardous substances, pollutants, or contaminants, the DERP statute authorizes the DoD to respond to releases of MEC and MC. DoD policy states that such responses shall be conducted in accordance with CERCLA and the NCP.

This report summarizes the work performed during the SI and describes any MEC and elevated metals concentrations that are consistent with the identified MC contaminants of concern identified at the FUDS. The SI is limited exclusively to MEC and metals contamination issues and does not consider unrelated hazardous and toxic waste concerns that the FUDS may pose. Per ER 200-3-1 guidance for conducting an SI, "The SI is not intended as a full-scale study of the nature and extent of contamination or explosive hazards"; it only requires collection of sufficient and appropriate information as defined in the Technical Project Planning (TPP) Memorandum for this site (Appendix B).

1.2 PROJECT OBJECTIVES

The primary objective of the MMRP SI is to provide information regarding whether further response action under CERCLA is appropriate. The SI collects sufficient and appropriate information the USACE utilizes to determine whether future DoD action is warranted. The SI Report also provides the following:

1. Determination of the potential need for a removal action;
2. Collection or development of additional data, as appropriate, for Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA); and
3. Collection of data, as appropriate, to characterize the release for effective and rapid initiation of the remedial investigation and feasibility study (RI/FS), if appropriate.

An additional objective of the MMRP SI is to collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

1.3 PROJECT SCOPE

The primary project planning documents used to perform the SI include the Site-Specific Work Plan (SS-WP) Addendum for the Jenningston Training Area MRS (Eco 2011b), the South Pacific Division Range Support Center Programmatic Work Plan (Parsons 2010), and the Programmatic Sampling and Analysis Plan (PSAP, USACE 2005). The performance work statement for this project is provided in Appendix A.

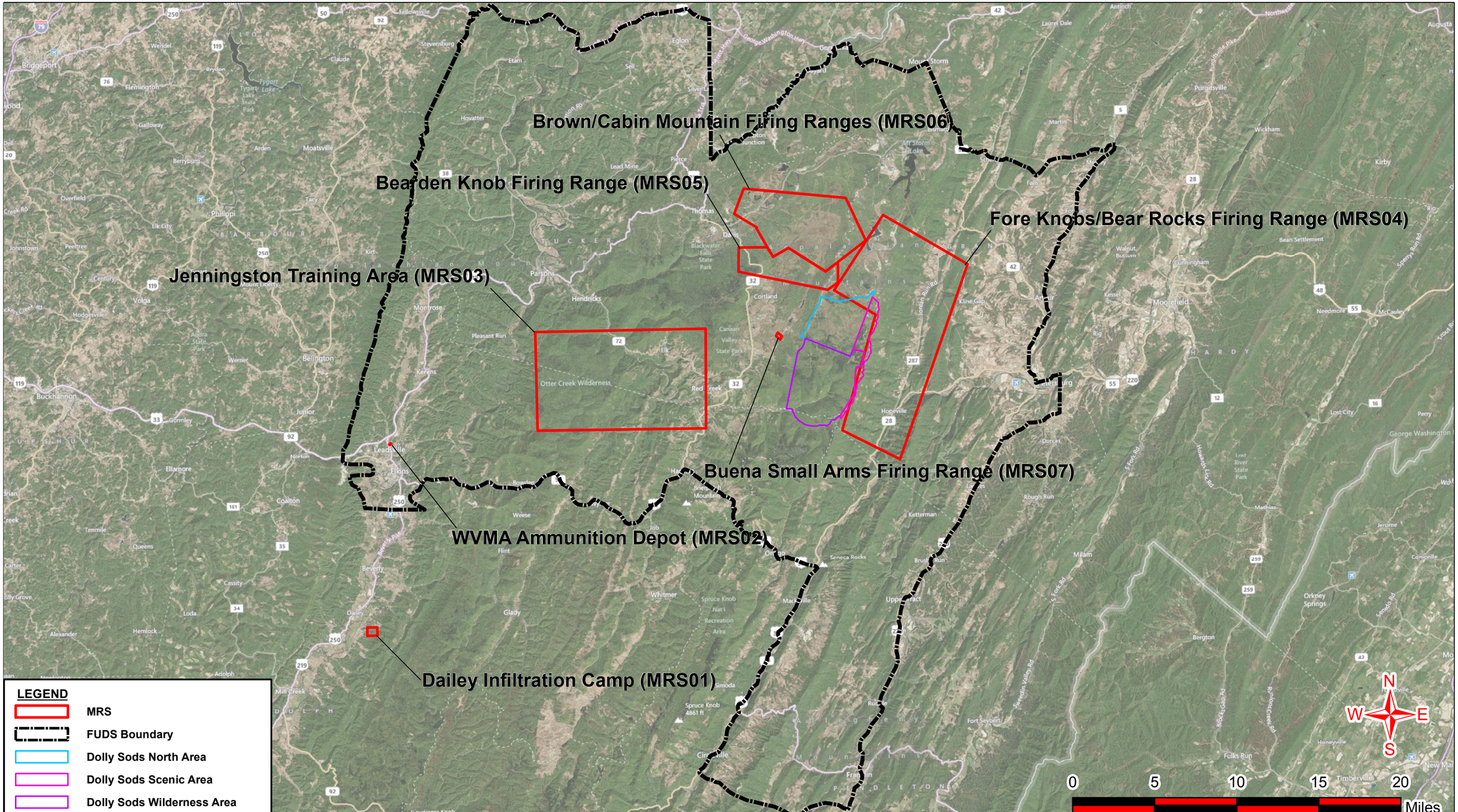
The USACE Huntington District (CELRH) held a TPP meeting on April 7, 2011, that included representatives of the USACE Huntington District, the USACE Walla Walla District (CENWW), the West Virginia Department of Environmental Protection (WVDEP), the U.S. Forest Service, the U.S. Fish and Wildlife Service (USFWS), the Canaan Valley Institute (CVI), Eco, and Parsons. A final TPP Memorandum was issued on September 22, 2011 (Eco 2011a).

For background metals concentrations, the TPP team determined that, in the absence of a site-specific background evaluation, the detected concentrations from ambient samples to be collected would be used to estimate the background metals concentrations in soil, surface water, and sediment for the MRS. The TPP Team agreed that one ambient sample per media for this MRS would be collected.

The TPP Team determined that the comparison criteria for soil sample results would be the WVDEP Risk-Based Concentrations (RBCs), Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) supplemented with USEPA regional screening levels (RSLs) for residential soil. The comparison criteria for surface water samples would be the WVDEP Requirements Governing Water Quality Standards supplemented with USEPA National Recommended Water Quality Criteria and USEPA regional screening levels (RSLs) for tap water. The comparison criteria for groundwater samples would be WVDEP Requirements Governing Water Quality Standards then WVDEP RBCs supplemented with USEPA maximum contaminant levels (MCLs), National Primary Drinking Water Standards and USEPA RSLs for tap water.

For ecological screening levels, the TPP team determined that the comparison criteria for soil sample results would be USEPA Ecological Soil Screening Levels (EcoSSL). In absence of EcoSSLs, values obtained from the Los Alamos National Laboratory (LANL) EcoRisk Database, and USEPA Region 3 Ecological Screening Levels would be used. The comparison criteria for sediment will be USEPA Region 3 Ecological Benchmarks, Freshwater Sediment Screening Benchmark, National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables, the LANL EcoRisk Database, and USEPA Region 3 ESLs. For surface water, the comparison criteria will be WV Requirements

Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria, USEPA Region 3 Freshwater Screening Benchmark, and the LANL EcoRisk Database.



Prepared by:
Eco & Associates, Inc.
and
PARSONS

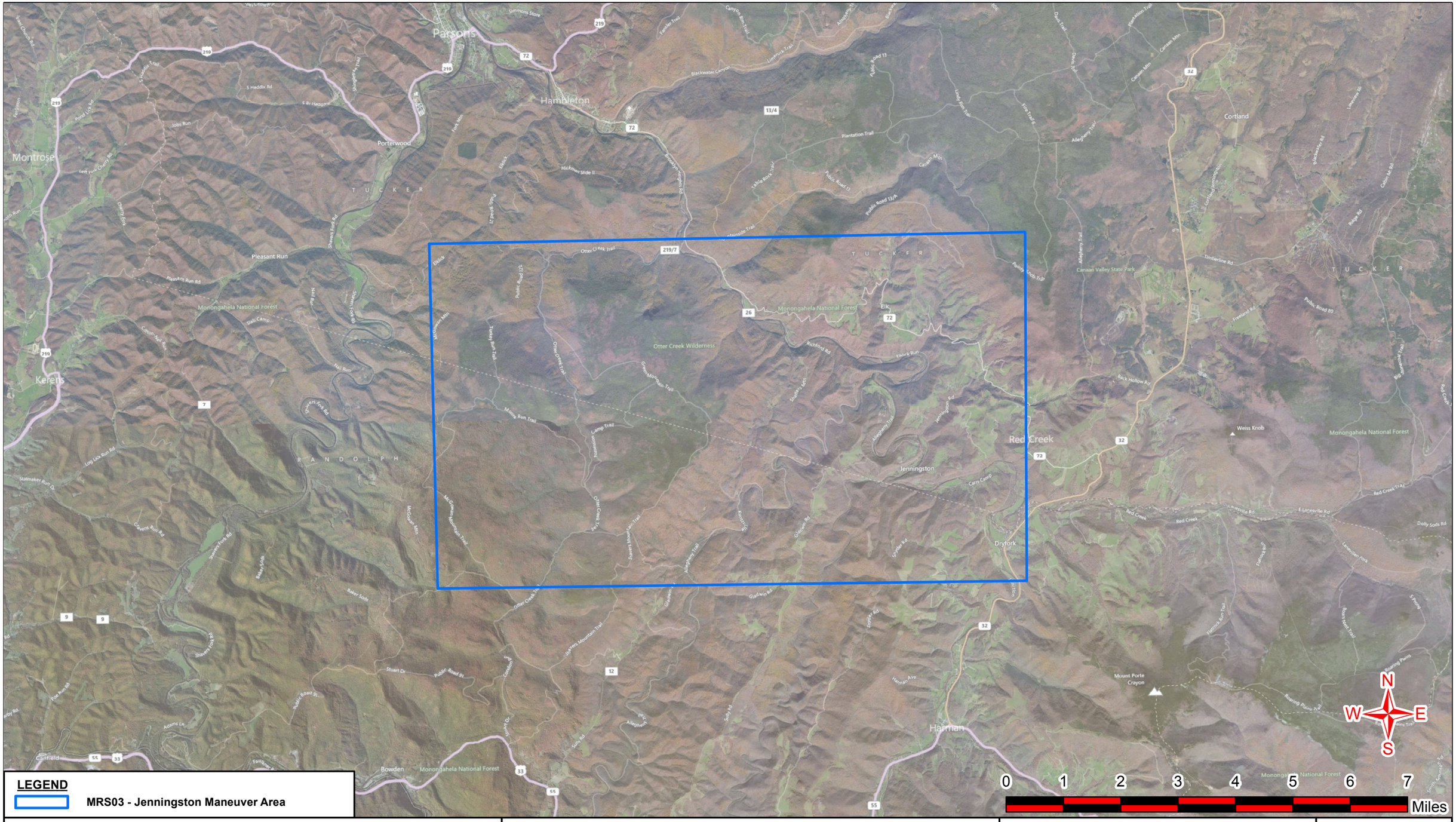
MRS Location Map

West Virginia Maneuver Area
FUDS Property No. G03WV0013

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
1.1



Prepared by:

Eco & Associates, Inc.
and
PARSONS

SITE LOCATION

MRS03 - Jennington Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
1.2

CHAPTER 2
PROPERTY DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The Jenningston Training Area MRS is located in Tucker and Randolph Counties, West Virginia. The site is located approximately 9 miles northeast of the City of Elkins (Figure 2.1). The total FUDS acreage is 2,180,367 acres, including the 40,000-acre Jenningston Training Area MRS. The FUDS acreage also includes six other MRSs, each covered by a different SI but listed under the same FUDS Property No. G03WV0013. The WVMA/Dolly Sods FUDS was used from 1943 to 1944 and was returned to the various private landowners and U.S. Forest Service in 1950. The majority of land comprising the Jenningston Training Area MRS is currently owned by the U.S. Department of Agriculture (USDA) and is managed by the U.S. Forest Service as the Monongahela National Forest. The remaining parcels are owned by private individuals.

2.2 SITE LOCATION AND SETTING

2.2.1 TOPOGRAPHY AND VEGETATION

The Jenningston Training Area MRS is located within the Appalachian Plateau physiographic province (USGS 2002, West Virginia Geologic and Economic Survey [WVGES] 2004). Figure 2.1 shows the site elevation, which ranges from approximately 3,900 feet above mean sea level (msl) to approximately 1,900 feet above msl. The MRS consists of Shavers Mountain and the Otter Creek Wilderness on the west side, and an area of lower elevation on the east side extensively dissected by the Dry Fork, Glady Fork, and Laurel Fork Rivers. The northeastern portion of the MRS is composed of the highlands bordering the southwest edge of the Canaan Valley. The MRS is bordered by Mozark Mountain to the north, Chimney Rock and the community of Dryfork to the east, McGowan Mountain and the Otter Creek Wilderness to the west, and the community of Sully to the south. The MRS is contained within the Mozark Mountain, Parsons, Harman, and Bowden 7.5-minute topographic quadrangles.

The majority of the Jenningston Training Area MRS consists of forested land covered with evergreen trees and a variety of hardwood and softwood trees. The forest floor is covered with shrubs, grass, ferns, and wildflowers. Vegetation observed during the SI was consistent with these descriptions, as shown in site photographs taken during the site visit (see Appendix E).

2.2.2 SOIL

A wide variety of soil types are located in the 40,000-acre Jenningston Training Area MRS. The soil underlying the sampling locations consists of Gilpin channery silt loam and Cateache channery silt loam (USDA 2011b). However, based on observations made during soil sampling activities, the soil from all sample locations is very similar and is not anticipated to affect the analytical results.

Gilpin channery silt loam is a well-drained soil found on mountain slopes. It consists of channery silt loam within the upper 6 inches and with very channery silt loam and very channery silty clay loam to a depth of approximately 36 inches. Loam is a soil type composed of various mixtures of silt, sand, and clay that generally contains greater than 60% silt and less than 40% clay. Channery soils are soils that

contain no more than 15% of rock fragments up to 6 inches long on their long axis. Gilpin channery silt loam underlies the area where soil sample WVMA-MRS03-AMB-SS-02-02 was collected.

Cateache channery silt loam is a well-drained soil also found on mountain slopes. The soil is almost identical to Gilpin soil but is considered to have more organic material in the upper inch and more clay below 3 inches. Both soils are considered channery and are approximately 36 inches deep with bedrock below. The Cateache soil is located in the area where soil sample WVMA-MRS03-SS-02-01 was collected. The geology of the study area is further discussed in Subsection 5.1.1 of this report.

2.2.3 CLIMATE

The Allegheny Mountain Province has distinct seasons of approximate equal length. It has a humid continental climate with the exception of a marine modification in the lower panhandle. Average annual temperatures range from below 50°F (10°C) in the north to about 64°F (18°C) in the south to about 48°F (9°C) in areas of high altitude. Average annual precipitation varies from more than 80 inches in the high mountain areas to 35 inches in the valleys (National Climatic Data Center [NCDC] 2007). Annual precipitation is plentiful and evenly distributed with short, infrequent periods of water deficit. Average high temperatures in the MRS region range from a high of approximately 82°F (28°C) in July to a low of approximately 18°F (8°C) in January. The temperatures in May, when field work was performed, ranged from a high of approximately 72°F (22°C) to a low of approximately 44°F (7°C) (Climate-Charts 2011).

2.2.4 SIGNIFICANT AND INHABITED STRUCTURES

Due to the large area of the MRS, numerous roads, trails, and a variety of inhabited structures are present within the MRS (Figure 2.1). Inhabited structures are permanent or temporary structures, other than military munitions-related structures, that are routinely occupied by one or more persons for any portion of a day. Although the region is sparsely populated, the unincorporated communities of Jenningston, Dryfork, Elk, and Gladwin are located within the MRS. For these small communities, the inhabited structures consist mainly of private residences with commercial structures limited to small stores and gas stations. The team also observed numerous inhabited structures (more than 26) within two miles of the MRS in the unincorporated communities of Harman, Hendricks, and within Canaan Valley State Park. The closest large incorporated community is the town of Parsons approximately 3.5 miles north of the MRS and the City of Elkins approximately 9 miles southwest of the MRS.

2.2.5 DEMOGRAPHICS

The Jenningston Training Area MRS is located in Randolph and Tucker Counties, West Virginia. According to U.S. Census 2010, the population density of Randolph County is 27 persons per square mile and the population density of Tucker County is 17 persons per square mile (U.S. Census Bureau 2011). The census data indicate that 6,884 people live within an approximate 4-mile buffer of the WVMA Jenningston Training Area MRS, with 510 of those people living within the census blocks covering the MRS itself (Table 2.1). The SVT observed numerous inhabited structures within 2 miles of the MRS, mainly located within and surrounding the communities of Harman, Hendricks, and within the Canaan Valley State Park. In addition, the SVT identified abundant residences within the MRS boundaries, especially in the communities of Elk, Gladwin, Dry Fork, and Jenningston (Figure 2.2). Based on the large size of the MRS and the uncertainty regarding the location of DoD operations in the area, it is difficult to determine if anyone lives within an area affected by DoD use of the site.

TABLE 2.1
POPULATION WITHIN 4-MILE BUFFER OF THE
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

MRS	ONSITE	0 TO ¼ MILE	¼ TO ½ MILE	½ TO 1 MILE	1 TO 2 MILES	2 TO 3 MILES	3 TO 4 MILES	TOTAL
Jenningston Training Area	510	464	500	486	615	1,545	3,274	6,884

Source: U.S. Census 2010 data. The population within the FUDS, MRS, or any buffer area is determined using a conservative approach to calculate the population of an area by including the total number of people for any census block that falls within or overlaps the site boundary, MRS boundary, or buffer line.

2.2.6 CURRENT AND FUTURE LAND USE

A large portion of the Jenningston Training Area MRS is owned by the USDA and managed by the U.S. Forest Service as the Monongahela National Forest. The forest is used for outdoor recreation and agriculture. The remainder of the MRS is owned by private individuals and consists of residential, commercial, and agricultural properties, including the unincorporated communities of Jenningston, Dryfork, Elk, and Gladwin. No change in land use is expected for the portion of the MRS preserved as wilderness area but change in land use for the privately owned parcels cannot be ruled out in the future.

2.3 SITE OWNERSHIP AND HISTORY

The former WVMA consisted of approximately 2,180,367 acres of land covering portions of Grant, Pendleton, Preston, Randolph, and Tucker counties in northeastern West Virginia generally near the town of Davis. Maneuver rights, secured by the Rents and Claims Board, Fifth Service Command, secured 350,416 acres of public lands (all part of the Monongahela National Forest), 48,557 acres of leased property for inclusion in the Impact Area, and 1,781,394 acres of so-called “lesser interests”. According to a warning order notice, dated March 26, 1945, these “lesser interests” were covered by “trespass agreements”. The land owners had granted use of these lands to the Army verbally; there are no records that describe the “trespass agreements” or the areas that they covered (USACE 1990). A letter, dated July 15, 1943 from the Secretary of War to the Secretary of Agriculture stated that there is a military necessity for the use of portions of the Monongahela National Forest for Army Maneuver purposes. In a response letter dated August 4, 1943 from the Secretary of Agriculture to the Secretary of War, the Department of Agriculture grants permission for the Army to use all Monongahela National Forest land in Preston, Grant, Randolph, Tucker, and Pendleton counties in West Virginia, a total coverage of 341,266 acres (USACE 2009).

Prior to DoD use, the area of the WVMA was mainly used for logging and agriculture purposes. Extensive logging began during the late 1800s and slowed considerably in the late 1910s to early 1920s. Following DoD use, much of the area was the same as it had been prior to the maneuvers, reverting to agriculture uses (farming, grazing), recreational activities (hunting, fishing), mining, and timbering. Local family farms and grazing fields dotted the landscape prior to, during, and following DoD use, occupying most open areas including valley floors and bare mountaintops. Once logging in the area slowed, the land’s primary use shifted to agricultural and recreational uses. Farming, grazing, hunting and fishing were all activities that flourished prior to and following World War II. Today the area is used for a wide

variety of outdoor activities including hiking, skiing, rock climbing, rafting, hunting, and fishing (USACE 2009).

Based upon lease records and other information contained in the 2009 Preliminary Assessment (PA), areas where live artillery fire was conducted were informally designated the WVMA Impact Area and are generally limited to the Dolly Sods region. The Jenningston Training Area MRS is not currently considered a part of the WVMA Impact Area. A record of the lease agreements associated with the WVMA is contained in the PA (USACE 2009).

The purpose of the Jenningston Training Area was to provide division training consisting of rock climbing exercises and troop maneuver problems. The training was conducted in a 40,000 acre area centered on the town of Elk. In addition, a pack mule training school was operated in the vicinity of the town of Gladwin. The school provided instruction on the use of pack mules for transportation of equipment and supplies. Although a site visit to the area of the former school conducted on September 13, 2007 did not encounter any evidence of the former pack mule training facility, evidence of military use of the Jenningston Training Area has been encountered. In 2006, shipping containers for 60mm and 81mm mortars were found in a vertical cave located near Three Springs Run within the Otter Creek Wilderness Area. It was determined that the identification of shipping containers alone does not indicate the potential for mortars within the MRS. Based on the use of the area as a Maneuver Area, documented training activities consisted of mountain marching and rock scaling. No known training activities within the MRS required actual munitions. Without the presence of munitions debris relating to the ordnance item within the shipping containers (mortars), it is an indication that the shipping containers were merely used for training purposes, not transport or use of munitions. In addition, an area close to the location of the recovered shipping containers was used for pack mule training. The training activities associated with pack mule training used items simulating munitions size and weight, rather than actual munitions. Live ordnance was at a premium and was needed in the European and Pacific theaters. As a result, ordnance containers (such as shipping containers) were used. They were filled with either sand or other materials equaling the weight of the container if it had contained munitions. As a conservative measure for the purpose of the SI, since no other information on the use of MEC at the MRS was available, it was assumed that the munitions potentially at the site included all of the munitions utilized at the FUDS including: 155mm high explosive (HE) projectiles; 105mm HE and smoke round (SR) cartridges; 81mm HE and SR cartridges; 75mm HE and SR shells; 60mm HE and SR shells; 4.2-inch HE and SR shells; 3.25-inch target rockets; practice antitank mines; fragmentation, smoke, and practice hand grenades; demolition charge blocks, demolition firing devices, blasting caps, time fuses, and general small arms ammunition (.22, .30, .38, .45, and .50 caliber) (Table 2.2).

2.4 SITE OPERATIONS AND WASTE CHARACTERISTICS

2.4.1 MUNITIONS RESPONSE SITE-SPECIFIC DESCRIPTION AND OPERATIONS

The Jenningston Training Area MRS consisted of 40,000 acres within a 2,180,367-acre FUDS (USACE 2009). The majority of the land is currently owned by the U.S. Department of Agriculture and managed by the U.S. Forest Service as the Monongahela National Forest. The forest is used for outdoor recreation and agriculture. The remainder of the MRS is owned by private individuals and consists of residential, commercial, and agricultural properties, including the unincorporated communities of Jenningston, Dryfork, Elk, and Gladwin. The PA indicates a MRSPP score of 7 for the Jenningston Training Area MRS.

2.4.2 REGULATORY COMPLIANCE

The USACE is conducting the SI at the Jenningston Training Area MRS as part of FUDS response activities pursuant to and in accordance with the guidance, regulations, and legislation listed in Subchapter 1.1.

2.5 PREVIOUS INVESTIGATIONS

Ordnance clearance operations began almost immediately after military use of the FUDS ended in 1944. Initial clearance operations in 1946 focused on known target areas that were located across the Dolly Sods region, a high plateau located in the eastern central portion of the WVMA. The property was returned to the private landholders and the U. S. Forest Service upon completion of the initial clearing operations. A follow-up operation was conducted by the 549th Ordnance Explosive Ordnance Disposal (EOD) from Baltimore, MD in 1953 in which EOD found and destroyed six live rounds but determined that the previous clearance operations were "good". However, unconfirmed reports of encounters with ordnance by the public continued in the Dolly Sods area. Subsequent site reconnaissance and clearance operations, conducted in 1984, 1991, and 1997 to 1998, continued to encounter ordnance. As before, the clearance operations were focused in the Dolly Sods Region in publicly used areas such as trails and campgrounds. Since then, recurring reviews of the clearance operations have been conducted to ensure that the previous operations continue to protect the safety of the public (USACE 2009). It should be noted that no clearance operations have ever been conducted in the vicinity of the Jenningston Training Area MRS. Other than the mortar shipping containers encountered in 2006, there have been no historical encounters of any DoD-related items within MRS03.

As part of the USACE DERP FUDS program, a PA of the entire WVMA was prepared by the CELRH in 2009. Information used to prepare the PA included military records, historical documents, historical newspaper reports, interviews with local residents, interviews with former Army officials stationed at the site, and historic aerial photographs. Based upon a review of the information above, the CELRH identified a total of 7 MRSs warranting further investigation including the Jenningston Training Area MRS which is the subject of this SI Report.

In December 2010, an INPR was prepared by the USACE Louisville District (CELRL) requesting approval of the on-going Dolly Sods MMRP project and proposing the 7 MRSs identified in the PA. The USACE Great Lakes and Ohio River Division (CELRD) granted approval of the Dolly Sods MMRP project and the 7 new MRSs in December 2010 including the Jenningston Training Area - MRS03.

2.5.1 PRELIMINARY ASSESSMENT – FEBRUARY 2009

As stated above, a PA of the entire WVMA was prepared by the CELRH in 2009. Information used to prepare the PA included military records, interviews with former Army officials stationed at the site, historical documents, historical newspaper reports, interviews with local residents, and historic aerial photographs. In addition, a site visit was conducted on September 13, 2007 during preparation of the PA. The site visit observed the area of the former pack mule training facility as well as troop training and encampment areas near the communities of Sully and Kerens. No evidence of military use was observed during the site visit. Based upon a review of the information above, the CELRH identified a total of 7 MRSs warranting further investigation including the Jenningston Training Area MRS which is the subject of this SI Report.

The PA indicates a MRSPP score of 7 for the Jenningston Training Area MRS. MRS Priority scoring ranges from 1 (highest priority, reserved for chemical warfare materiel [CWM] sites) through 8 (lowest priority).

2.5.2 INVENTORY PROJECTION REPORT – DECEMBER 2010

An Inventory Project Report (INPR) for the WVMA was prepared by the CELRL in December 2010. The INPR requested "after the fact" approval for the Dolly Sods MMRP project and proposed 7 new MRSs including the Jenningston Training Area MRS described in this SI Report. In December 2010, the CELRD granted "after the fact" approval for the Dolly Sods MMRP project and approved the 7 new MRSs including the Jenningston Training Area MRS.

2.5.3 ADDITIONAL WVMA ACTIVITIES

No additional activities have been conducted for the Jenningston Training Area MRS. However, additional activities have been conducted for portions of the WVMA that did not include the area of the MRS. These activities include:

- Findings and Determination of Eligibility/Inventory Project Report – May 1990, January 1992 (USACE 1990, 1992)
- Feasibility Study Dolly Sods Wilderness: Final Workplan for Surface and Subsurface Investigation and On-Site Disposal of Ordnance (M&E 1991)
- Archives Search Report – September 1995 (USACE 1995a, 1995b)
- Environmental Assessment of Ordnance Removal Action in the Dolly Sods Wilderness Area – September 1995 (NBE 1995)
- Environmental Assessment of Ordnance Removal Action in the Dolly Sods North Area – September 1997 (NBE 1997)
- Action Memoranda for OE Removal Actions – 1996 to 1997 (USACE !996, 1997)
- Ordnance Removal Actions – Dolly Sods Wilderness (DSW), Dolly Sods North (DSN), and Dolly Sods Scenic Area (DSSA) – 1997 to 1998 (NBE 1995, 1997)
- OE Recurring Review – June to August 2004 (USACE 2004c)

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

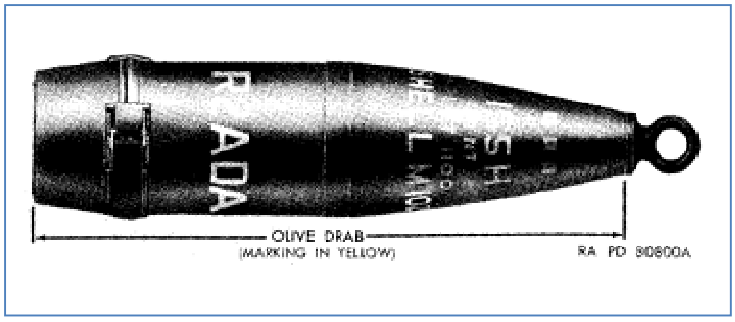
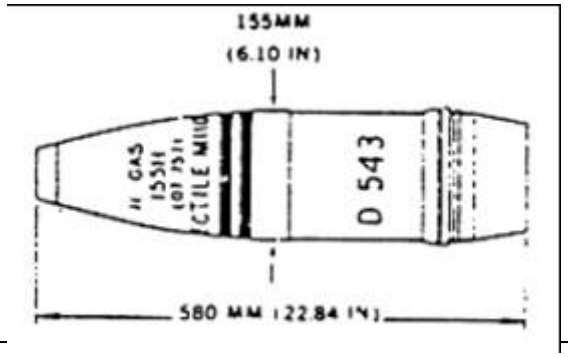
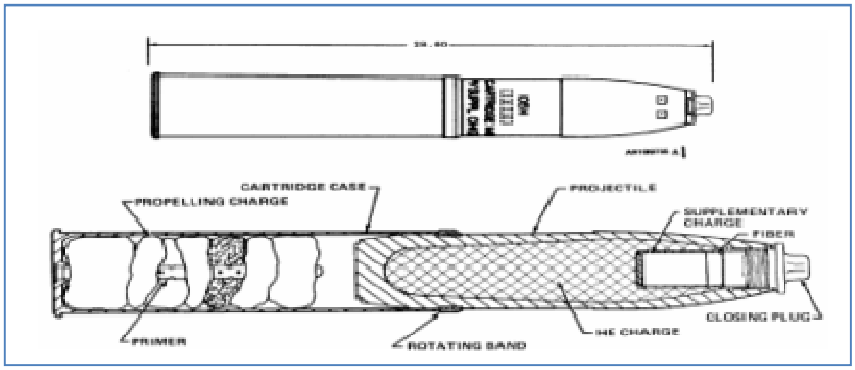
Munitions	Photograph/Diagram
Projectile, 155mm, HE, M102	
Projectile, 155mm, White Phosphorus (WP), M110	
Cartridge, 105mm, HE, M1	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jennington Training Area MRS

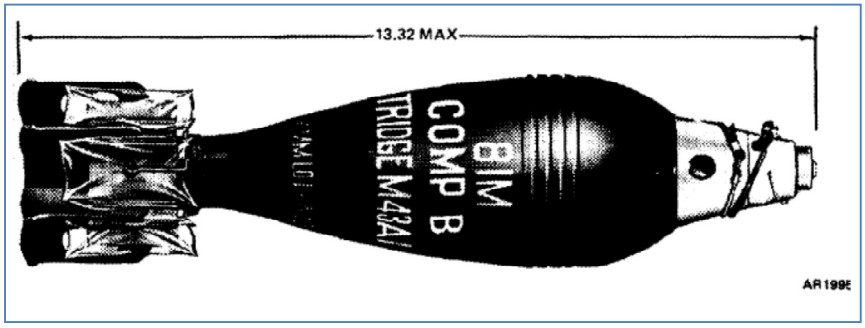
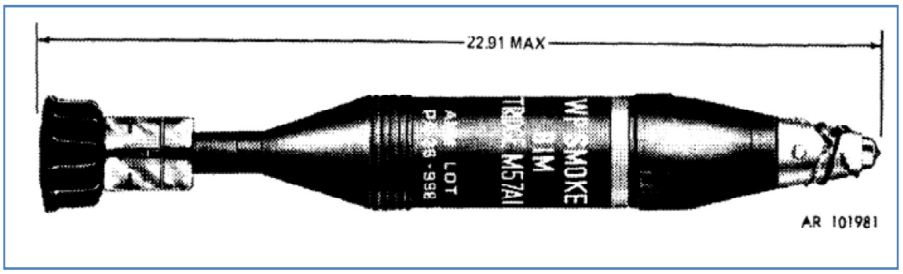
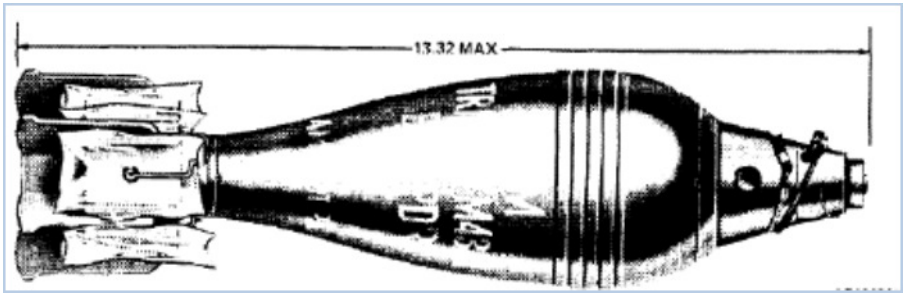
Munitions	Photograph/Diagram
Cartridge, 105mm, Smoke, HC, M84	
Cartridge, 81mm, HE, M43	
Cartridge, 81mm, Smoke, WP, M57	
Cartridge, 81mm, Target Practice (TP), M43	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jennington Training Area MRS

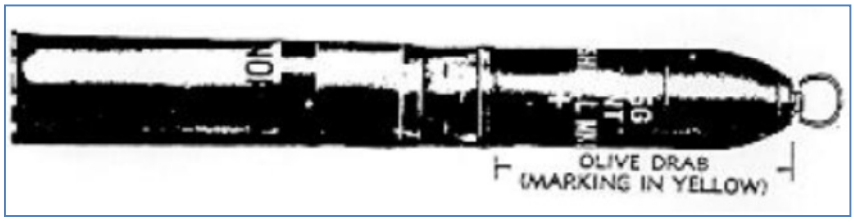
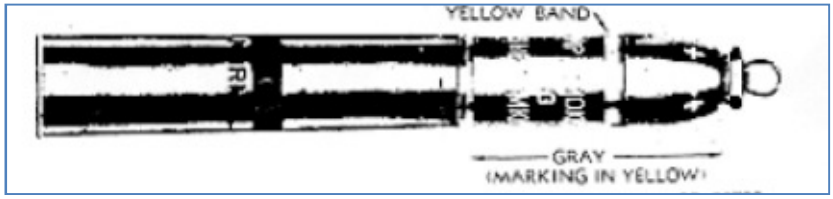
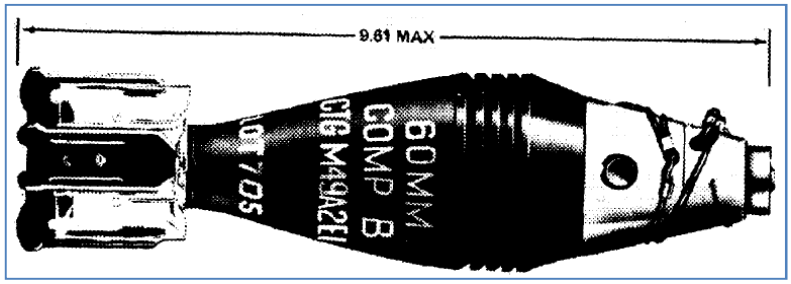
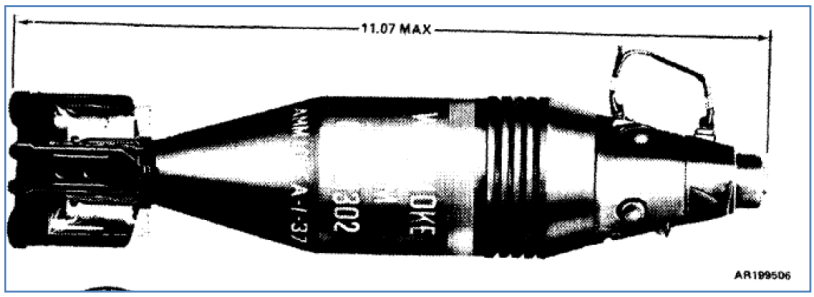
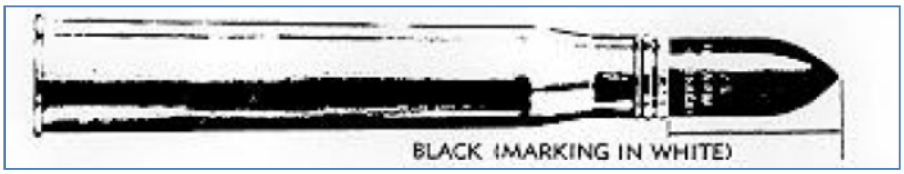
Munitions	Photograph/Diagram
Shell, 75mm, HE, MkI	
Shell, 75mm, Smoke, WP, MkII	
Shell, 60mm, High Explosive (HE), M49A2	
Shell, 60mm, Smoke, White Phosphorous (WP), M302	
Cartridge, 57mm, **AP-T, M70**	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

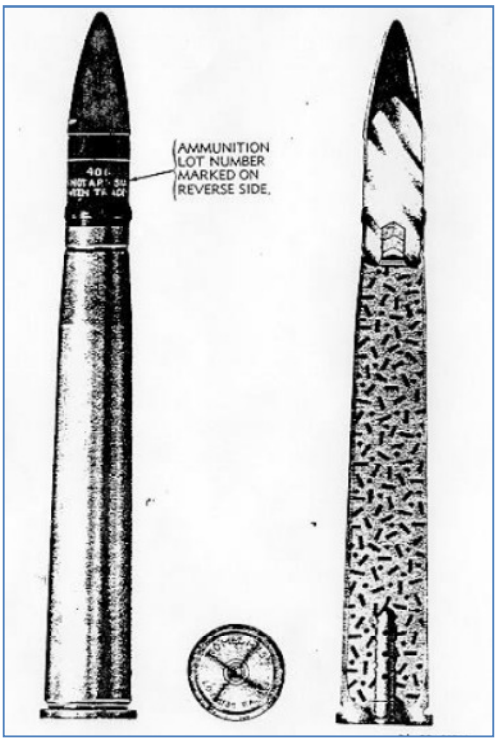
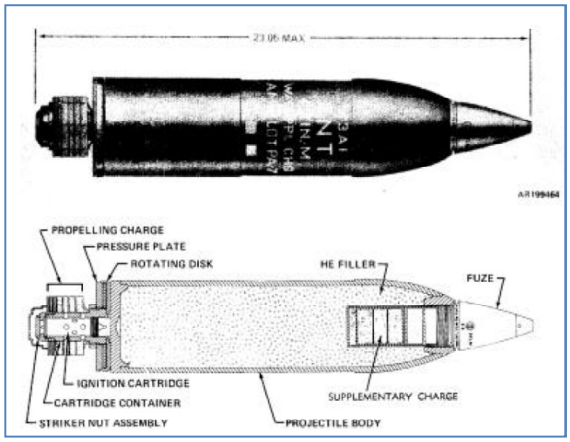
Munitions	Photograph/Diagram
Cartridge, 40mm, Armor Piercing-Tracer (AP-T), **M81**	
Shell, 4.2-inch, HE, M3, M3A1	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

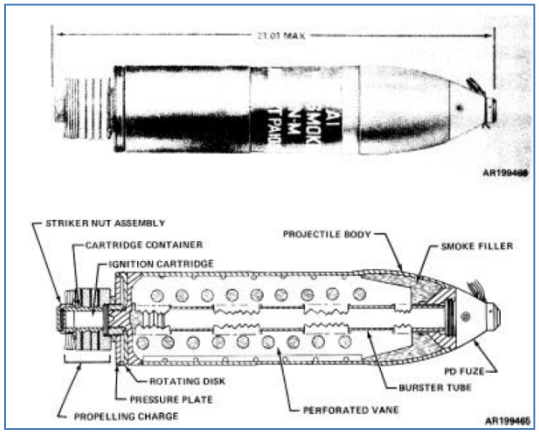
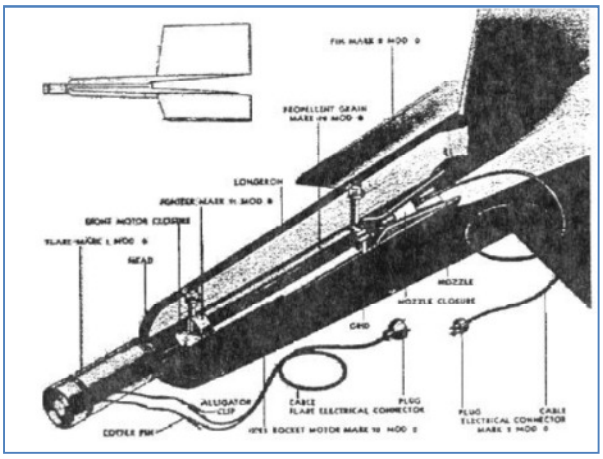
Munitions	Photograph/Diagram
Shell, 4.2-inch, Smoke, M2 **(1918 – 1944)**	
Rocket, 3.25-inch, Target, **Mk 1 through Mk 4**	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

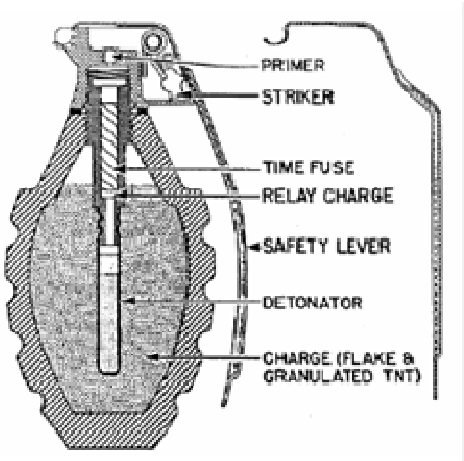
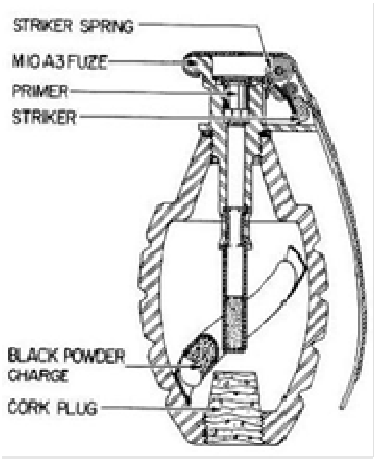
Munitions	Photograph/Diagram
Grenade, Hand, Fragmentation, MkII	
Grenade, Hand, Practice, MkII	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

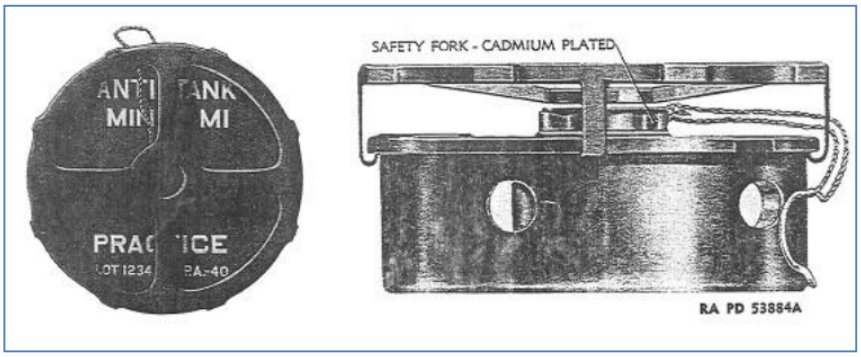
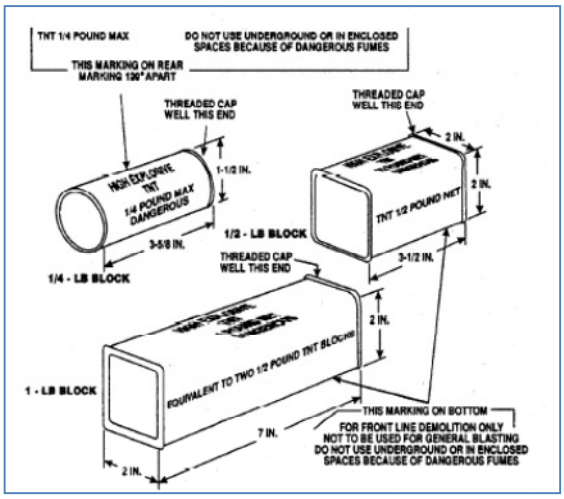
Munitions	Photograph/Diagram
Mine, Antitank, Practice, M1	
Charge, demolition, block, ¼ lb, ½ lb, 1 lb	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

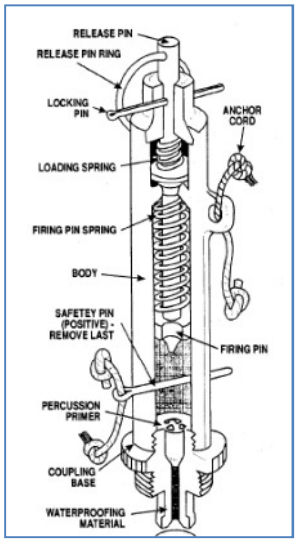
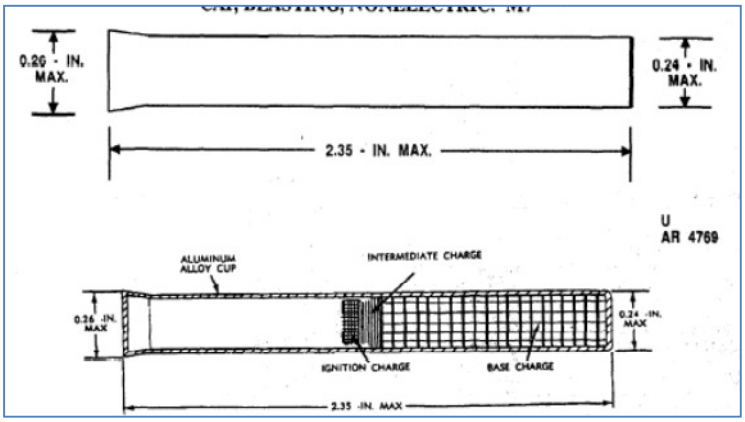
Munitions	Photograph/Diagram
Firing device, demolition, pull, M1	
Cap, blasting, non-electric, M7	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

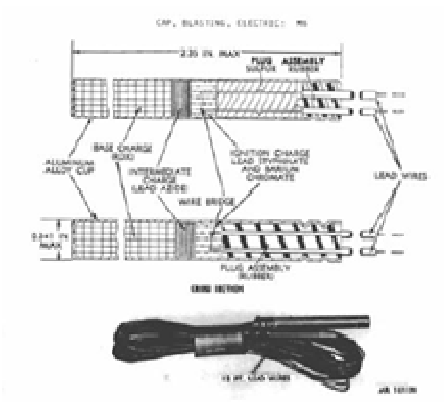
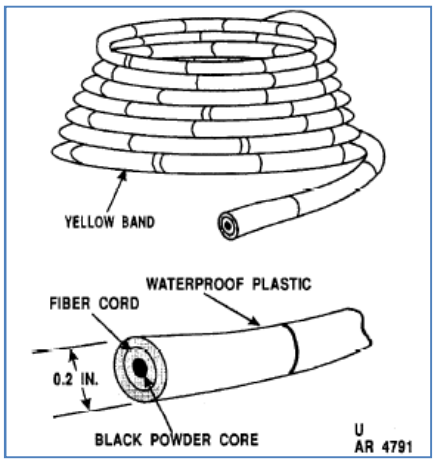
Munitions	Photograph/Diagram
Cap, blasting, electric, M6	
Fuse, blasting, time, M700	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

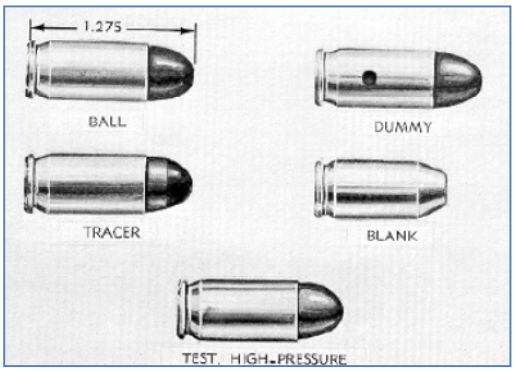
Munitions	Photograph/Diagram
Small arms, ammunition, general; Cartridge, .50 caliber, Machine Gun	
Small arms, ammunition, general; Cartridge, .45 caliber	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jennington Training Area MRS

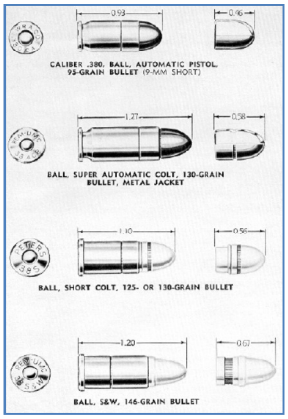
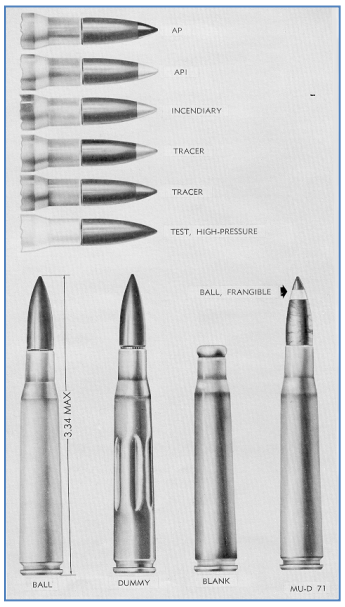
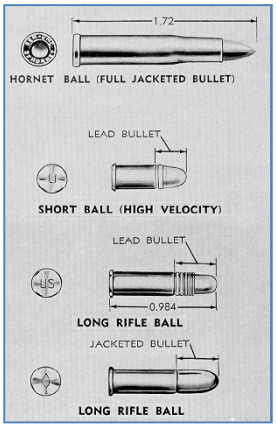
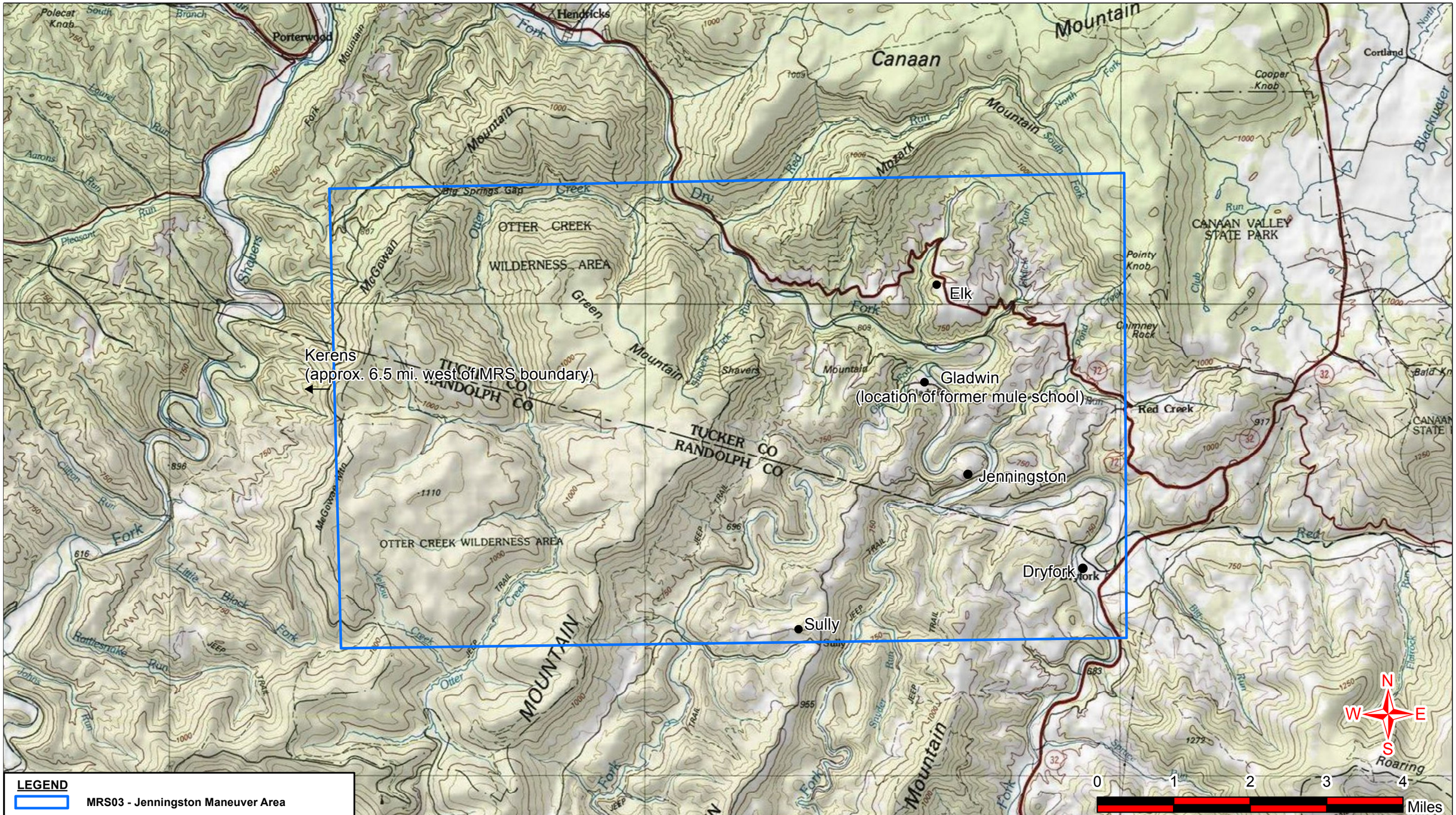
Munitions	Photograph/Diagram
Small arms, ammunition, general; Cartridge, .38 caliber	
Small arms, ammunition, general; Cartridge, .30 caliber **(includes Carbine)**	

TABLE 2.2
SUSPECTED MUNITIONS
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Munitions	Photograph/Diagram
Small arms, ammunition, general; Cartridge, .22 caliber	



Prepared by:
Eco & Associates, Inc.
and
PARSONS

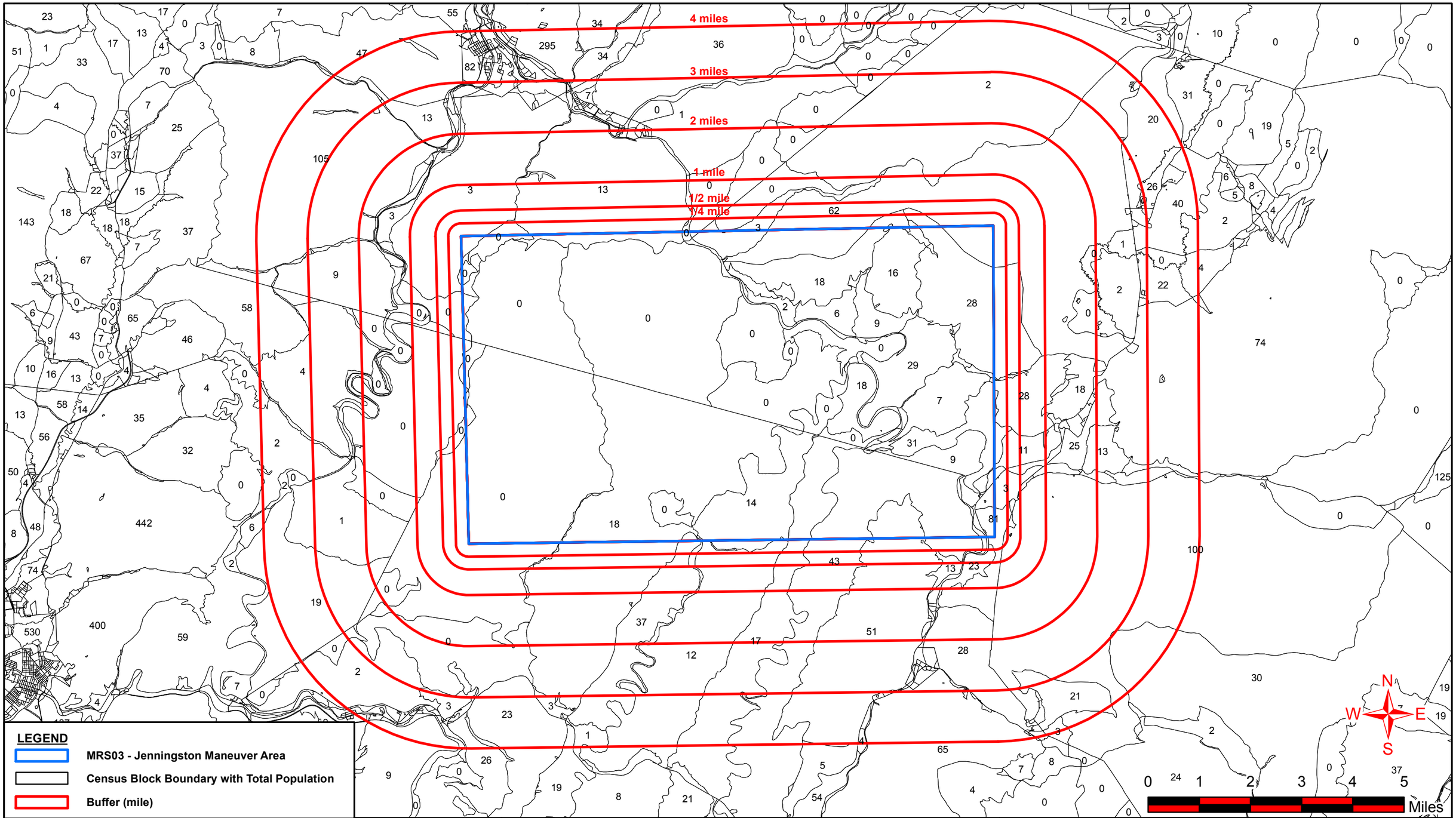
SITE SETTING

MRS03 - Jenningston Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
2.1



Prepared by:

Eco & Associates, Inc.
and
PARSONS

CENSUS DATA

MRS03 - Jennington Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
2.2

CHAPTER 3
SITE INSPECTION TASKS

3.1 HISTORICAL RECORD REVIEW

A document review of the Jenningston Training Area MRS was conducted. The historic information relevant to the Jenningston Training Area MRS included the INPR and the PA. The findings of the historical review, including site use and potential munitions used, are described in Chapter 2.

3.2 TECHNICAL PROJECT PLANNING

The Jenningston Training Area MRS falls under the purview of the CELRH, which facilitated a TPP meeting on April 7, 2011. Participants included representatives of the CELRH, the CENWW, the WVDEP, the U.S. Forest Service, the USFWS, the CVI, Parsons, and Eco. The TPP Team developed the technical approach presented in the Final TPP Memorandum (Eco 2011a; see Appendix B of this report). Key TPP findings and decisions are summarized below:

- It was noted that mortar shipping canisters were found in the vicinity of Dry Fork by contractors for the U.S. Forest Service. After conducting additional research during preparation of the SS-WP, it was determined that the canisters were found uphill from Three Springs Run near Glady Fork. During the SI, a representative of the U.S. Forest Service directed the SVT to the location where the canisters were found so that soil samples could be collected.
- Portions of the MRS are within the Monongahela National Forest and the Otter Creek Wilderness, both of which are considered ecologically sensitive areas. Additionally, the MRS contains wetland areas and federally designated critical habitat for the Virginia big-eared bat. Based on this information, the MRS is considered an important ecological place. The proposed screening levels to be used for the ecological risk assessment are described as follows:

  Soil: USEPA EcoSSLs. In absence of EcoSSLs, values obtained from the LANL EcoRisk Database, and USEPA Region 3 Ecological Screening Levels (ESLs).

  Sediment: USEPA Region 3 Ecological Screening Benchmarks, Freshwater Sediment Screening Benchmark, National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables, LANL EcoRisk Database, and USEPA Region 3 ESLs.

  Surface Water: West Virginia (WV) Requirements Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria, USEPA Region 3 Freshwater Screening Benchmark, and LANL EcoRisk Database.
- The proposed screening levels to be used for the human health risk assessment are described as follows:

  Soil and Sediment: WVDEP RBCs, Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) supplemented with USEPA RSLs.

Surface Water: WV Requirements Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria and USEPA Regional Screening Levels for tap water.

Groundwater: WV Requirements Governing Water Quality Standards (47CSR2) then WV RBCs, Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) supplemented with USEPA Maximum Contaminant Levels, National Primary Drinking Water Standards and USEPA Regional Screening Levels for tap water.

- Civilian Conservation Corps (CCC) camps may have been located within portions of the MRS. The U.S. Forest Service may have information regarding locations. Based upon research conducted during preparation of the SS-WP, Camp Laurel Fork was located in Glady from 1933 to 1937. Two camps were operated in Alpena from 1933 to 1938. No evidence of CCC camps was encountered during the QR conducted for the SI.
- Samples should only be taken in areas with trash pits, unless areas of concern are identified during the QR. Further research conducted during preparation of the SS-WP clarified the definition and location of the "trash pits". According to the research, the "trash pit" refers to the vertical cave where mortar shipping canisters were found in 2006. Since then, confusion has ensued as a result of some U.S. Forest Service workers referring to the "cave" and some workers referring to the "trash pit". The "quarry" is also used to describe the location. All three of these names are used to describe the area where the mortar shipping containers were found.
- If samples indicate contamination, then water downstream of the location should be sampled. It was originally planned to collect the biased surface water/sediment sample set from Glady Fork below the cave where the shipping containers were found. However, it was subsequently determined that the shipping containers would have minimal impact on the surface water in the area. Therefore, the biased samples were relocated to a location near the edge of the MRS, down gradient from suspected areas of DoD use. If soil samples are impacted and the risk assessment determines further investigation is appropriate, then additional samples can be collected if warranted.
- The U. S. Forest Service indicated that the Otter Creek Wilderness Area on the western portion of the MRS should be avoided due to the remoteness of the area. The TPP Team agreed that the site visit activities would only take place in the eastern portions of the MRS. After completion of the SS-WP, the CELRH expressed concern that a large portion of the MRS would remain uninvestigated if the Otter Creek Wilderness was not included in the QR. Subsequently, the QR was revised to include the ridge of Shavers Mountain as well as the Otter Creek drainage if it was determined that the QR could be conducted safely. Based on weather and site conditions, QR was conducted along a portion of Shavers Mountain and a portion of the Otter Creek drainage near the northern edge of the MRS.
- The TPP Team agreed that any drums and refuse that are observed during the site visit should be photographed but not sampled. However, no drums or significant refuse was observed during the SI.
- The TPP Team concurred that no known cultural resources exist within the MRS. No cultural resources other than some stone foundations were observed within the MRS.
- The TPP Team agreed that the MRS boundaries would be revised to closely match the acreage listed in the PA (40,000 acres).

3.3 NON-MEASUREMENT DATA COLLECTION

The WVGES and the United States Geologic Survey provided geological and hydrogeological data, including information about wells on and near the MRS. The West Virginia Water Science Center (WVWSC) provided well information for West Virginia (WVWSC 2011). The West Virginia Department of Health and Human Resources (WVDHHR) provided information regarding water well permits and locations of wellhead protection areas and surface water protection zones. Information regarding surface water intakes for drinking water systems in the area was provided by the USACE during preparation of the 2009 PA (USACE 2009).

According to the National Register Information System, National Historic Landmark Program, and National Heritage Area Program websites, no cultural or archaeological resources are known within the MRS. The West Virginia Division of Culture and History lists no previously recorded archaeological sites within the MRS boundary (West Virginia Division of Culture and History [WVDCH] 2011a). The SVT encountered no cultural resources during the QR.

The following printed and electronic information sources were consulted for the Jenningston Training Area MRS:

- USGS – topographic maps
- USGS – *Ground Water Atlas of the United States*, http://pubs.usgs.gov/ha/ha730/index.html
- USFWS, National Wetlands Inventory – Wetlands Mapper, http://www.fws.gov/wetlands/Data/mapper.html
- USFWS, Endangered Species Program – Threatened and Endangered (T&E) Species System, http://ecos.fws.gov/tess_public/pub/stateListingIndividual.jsp?state=WV&status=listed
- USFWS, National Wildlife Refuge System – Refuge List by State, http://www.fws.gov/refuges/profiles/bystate.cfm
- U.S. Forest Service, http://www.fs.fed.us
- Natural Resources Conservation Service, http://websoilsurvey.nrcs.usda.gov/app/
- National Historic Landmarks Program – Lists of National Historic Landmarks, http://www.nps.gov/nhl/designations/listsofNHLs.htm
- National Heritage Areas Program – Explore Our National Heritage Areas, http://www.nps.gov/history/heritageareas/
- National Oceanic and Atmospheric Administration, http://coastalmanagement.noaa.gov
- National Park Service, http://www.nps.gov/applications/parksearch/geosearch.cfm
- National Register Information System, http://www.nr.nps.gov/

3.4 SITE-SPECIFIC WORK PLAN

The SS-WP augments the Programmatic Work Plan (PWP) and Programmatic Sampling and Analysis Plan (PSAP), as warranted, to present pertinent site-specific information and procedural adjustments that could not be readily captured in the programmatic documents or that resulted from TPP Team agreements that required modifying the preliminary SI technical approach. The PWP and PSAP are umbrella

documents that set overall programmatic objectives and approaches, whereas the SS-WP provides site-specific details and action plans. The PWP, PSAP, and SS-WP accompanied the SVT during SI activities.

The SS-WP includes the project description, the field investigation plan, the sampling and analysis plan, the environmental protection plan, and the accident prevention plan specific to the Jenningston Training Area MRS. The field investigation plan developed a technical approach to guide sample collection and analysis for MEC and elevated metals concentrations that are consistent with the identified MC contaminants of concern to ensure that the results were sufficient to determine whether additional investigations or remedies are necessary for the MRS. Key elements of the technical approach include the conceptual site model (CSM) to help determine types of samples and their locations, data quality objectives (DQOs) to ensure that the data acquired are sufficient to characterize MEC and metals contamination at the FUDS, and QR to confirm known target locations and to evaluate the potential presence of MEC or elevated metals in those target locations.

The sampling and analysis plan discusses procedures for soil sample acquisition from locations biased toward the highest potential for MEC contamination; quality control (QC) and quality assurance (QA) for the sampling process; sample shipment to an approved, independent laboratory; and laboratory analysis of the samples. The environmental protection plan presents procedures for avoiding, minimizing, and mitigating potential impacts on environmental and cultural resources during the site visit. The accident prevention plan supplements the programmatic accident prevention plan with site-specific emergency contact information and directions to the nearest hospital.

3.5 DEPARTURES FROM PLANNING DOCUMENTS

The following departures from the approved SS-WP Addendum were based on field conditions and/or right-of-entry (ROE) issues. The potential impact to the data quality for each departure from the plan is also discussed below.

- The TPP Team decided that the Otter Creek Wilderness Area should be avoided due to difficulty accessing the Wilderness Area. After reviewing the SS-WP however, CELRH suggested that QR be conducted on Shavers Mountain and portions of the Otter Creek drainage rather than along Glady Fork as proposed in the SS-WP. The CELRH determined that this change was warranted based on the potential for additional MEC that may have been transported by the pack mule teams during training operations. This departure is anticipated to improve the quality of data for this MRS.
- As determined during a meeting with representatives of the U.S. Forest Service on May 10, 2012, QR was not conducted along the upper and lower Otter Creek drainages due to safety concerns associated with crossing the Otter Creek during high water levels and the potential for flash flooding during impending thunderstorms. Therefore, QR in the Otter Creek Wilderness was limited to the area of Shavers Mountain. No impact on data quality is anticipated from this departure.

CHAPTER 4
MUNITIONS AND EXPLOSIVES OF CONCERN FINDINGS

4.1 GENERAL INFORMATION

4.1.1 QUALITATIVE RECONNAISSANCE AND SAMPLE LOCATIONS

The primary task of the SI is to assess the presence of MEC, MD, and elevated metals contamination. To assess the presence of MEC and MD, the SVT conducted QR by walking 23.59 miles on May 12, 13, 15, and 16, 2012. No MEC or MD was encountered by the SVT.

The QR consisted of visual reconnaissance of the site surface to identify indicators of suspect areas, including earthen berms, distressed vegetation, stained soil, ground scars or craters, target remnants, and visible metallic debris. Due to the absence of any indicators of suspect areas, QR activities followed the proposed paths presented in the Work Plan. Table 4.1 presents the MEC (including potential chemical constituents) potentially present at the site based on the PA. Appendix J includes the MEC CSM.

The TPP Team agreed to the location and the number of samples prior to the site visit. All samples were collected as planned. The UXO Technician III used a Schonstedt GA-52Cx magnetometer to screen each location before sampling. Per the PWP, the UXO Technician III performed QC and battery checks prior to use to confirm that the instrument was working properly.

The SVT recorded field observations during the QR at significant site features. Figure 4.1 shows the QR route and observation locations. The observation location numbers correspond to the photo station numbers in the photograph documentation log in Appendix E. The QR route generally followed the proposed path. However, some QR transects were not conducted due to weather and trail conditions, as described in Section 3.5 above.

As shown in Appendix E, the SVT noted 30 observations throughout the SI, such as topography, soil color, drainage, and the presence of any barriers. Table 4.2 summarizes pertinent field observations. Appendix D includes related field forms.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Projectile, 155mm, HE, M102	**Propellant:** Dibutylphthalate, Dinitrotoluene (DNT), Diphenylamine, Nitrocellulose[5] **Flash Reducer/Ignition Charge:** Potassium Nitrate, Potassium Sulfate, Sodium Nitrate, Sulfur **Primer [7]:** Aluminum, Antimony Sulfide, Barium Nitrate, Calcium Silicide, Copper, Lead Dioxide, Lead Styphnate, Nitrocellulose, PETN, Tetrazene, Zinc, Zirconium **Projectile/Rotating Band:** Steel/Copper Alloy - Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Sulfur, Zinc **Projectile Filler:** TNT or Amatol - Ammonium Nitrate, TNT **Fuze, Projectile, PD, M46:** Steel/Brass - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Carbon, Copper, Mercury Fulminate, Potassium Nitrate, Sodium Nitrate, Tetryl, Zinc **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Iron, Lead, Lead Azide, Potassium Chlorate, Sulfur, Zinc **Fuze, Projectile, PD, M47:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Carbon, Copper, Lead Azide, Potassium Nitrate, Sodium Nitrate, Tetryl, Zinc **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Iron, Lead, Lead Azide, Potassium Chlorate, Sulfur, Zinc **Fuze, Projectile, PD, M51:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Tetryl **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Lead Azide, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur	**Metals [3]** Aluminum, Copper, Lead, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
	Fuze, Projectile, Time Super Quick, M54: Aluminum Alloy, Copper Alloy – Aluminum, Bizmuth, Copper, Iron, Lead, Silicon, Sulfur, Zinc **Fuze Filler:** Tetryl **Fuze Primer [7]:** Barium Nitrate, Copper, Lead Azide, Lead Styphnate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur, Tetrazene **Fuze, Projectile, Mechanical Time (MT), M67:** Aluminum Alloy, Copper Alloy – Aluminum, Bizmuth, Copper, Iron, Lead, Silicon, Sulfur, Zinc **Fuze Filler:** Lead Azide, Tetryl **Fuze Primer [7]:** Barium Nitrate, Copper, Lead Azide, Lead Styphnate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur, Tetrazene	
Projectile, 155mm, White Phosphorus (WP), M110	**Projectile/Rotating Band:** Steel/Copper Alloy - Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Sulfur, Zinc **Projectile Filler:** Tetryl, White Phosphorus (WP) **Fuse, Projectile, Point Detonating (PD), M51:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuse Filler:** Tetryl **Fuse Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Lead Azide, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur	**Metals [3]** Copper, Lead, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Cartridge, 105mm, HE, M1	**Cartridge Case:** Copper Alloy - Copper, Iron, Lead, Zinc **Propellant:** Dibutylphthalate, Dinitrotoluene[6], Diphenylamine, Lead Carbonate, Nitrocellulose[5] **Primer [7]:** Antimony sulfide, Carbon, Lead Thiocyanate, Potassium Chlorate, TNT **Projectile/Rotating Band:** Steel, Copper Alloy - Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Sulfur. Zinc **Projectile Filler:** Amatol or Composition B or TNT - Ammonium Nitrate, Cyclotrimethylenetrinitramine (RDX), TNT **Fuze, Projectile, PD, M51:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Tetryl **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Lead Azide, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur	**Metals [3]** Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Cartridge, 105mm, Smoke, HC, M84	**Cartridge Case:** Brass - Copper, Iron, Lead, Zinc **Propellant:** Dibutylphthalate, Dinitrotoluene[6], Diphenylamine, Nitrocellulose[5] **Primer [7]:** Antimony Sulfide, Arsenic, Bismuth, Boron, Carbon, Lead Thiocyanate, Lead Carbonate, Potassium Chlorate, Potassium Nitrate, Sulfur, Tin, TNT **Projectile/Rotating Band:** Steel, Copper Alloy - Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Sulfur. Zinc **Projectile Filler:** Burster, Black Powder, White Smoke Mixture – Aluminum Powder, Hexachloroethane, Iron Oxide, Nitrocellulose, Potassium Nitrate, Silicon, Sulfur, Zinc Oxide **Fuze, Projectile, Time Super Quick, M54:** Aluminum Alloy, Copper Alloy – Aluminum, Bizmuth, Copper, Iron, Lead, Silicon, Sulfur, Zinc **Fuze Filler:** Tetryl **Fuze Primer [7]:** Barium Nitrate, Copper, Lead Azide, Lead Styphnate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur, Tetrazene	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Cartridge, 81mm, HE, M43	**Propelling Assembly:** Kraft Paper, Steel - Iron, Manganese, Paper, Phosphorus, Sulfur, Zinc **Propellant:** Diethylphthalate, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate **Primer [7]:** Antimony Sulfide, Copper, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, TNT, Sulfur, Zinc **Projectile: Steel** - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler:** TNT or Comp B - Cyclotrimethylenetrinitramine (RDX), TNT **Fuze, PD, M52, M525:** Aluminum Alloy - Aluminum, Copper, Iron, Lead, Magnesium, Zinc	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
	Fuze Filler: RDX , (Cyclotrimethylenetrinitramine), Tetryl **Fuze Primer [7]:** Antimony Sulfide, Barium Nitrate, Lead Azide, Lead Styphnate, Tetrazene	
Cartridge, 81mm, Smoke, WP, M57	**Propelling Assembly:** Kraft Paper, Steel - Iron, Manganese, Paper, Phosphorus, Sulfur, Zinc **Propellant:** Diethylphthalate, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate **Primer [7]:** Antimony Sulfide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, TNT, Sulfur **Projectile:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler:** Aluminum, Barium Stearate, Copper, Magnesium, Nickel, Silicon, Tetryl, Tin, Titanium, White Phosphorus **Fuze, PD, M52, M525:** Aluminum Alloy - Aluminum, Copper, Iron, Lead, Magnesium, Zinc **Fuze Filler:** RDX , (Cyclotrimethylenetrinitramine), Tetryl **Fuze Primer [7]:** Antimony Sulfide, Barium Nitrate, Lead Azide, Lead Styphnate, Tetrazene	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Cartridge, 81mm, Target Practice (TP), M43	**Propelling Assembly:** Kraft Paper, Steel - Iron, Manganese, Paper, Phosphorus, Sulfur, Zinc **Propellant:** Diethylphthalate, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate, **Primer[7]:** Antimony Sulfide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Trinitrotoluene (TNT) **Projectile:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler:** Plaster, Black Powder – Plaster, Potassium Nitrate, Sodium Nitrate, Sulfur **Fuze, Point Detonating (PD), M52 series:** Aluminum Alloy, Zinc Alloy - Aluminum, Bismuth, Cadmium, Copper, Iron, Magnesium, Manganese, Nickel, Phosphorus, Silicon, Sulfur, Tin, Zinc **Fuze Filler:** Tetryl **Fuze Primer[7]:** Antimony Sulfide, Silicon Carbide, Copper, Lead Azide, Potassium Chlorate, Zinc	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** A full explosives panel will be analyzed for from media collected at the MRS.
Shell, 75mm, HE, MkI	**Cartridge Case:** Copper - Copper, Zinc **Propellant:** Dibutylphthalate, Dinitrotoluene[6], Diphenylamine, Nitrocellulose[5], Nitroglycerin, Sulfur, TNT **Primer [7]:** Antimony Sulfide, Barium Nitrate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, TNT **Projectile: Steel** - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler:** Amatol, Tetryl, TNT - Ammonium Nitrate, Tetryl, TNT **Fuze, Projectile, PD, M46:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Carbon, Copper, Mercury Fulminate, Potassium Nitrate, Sodium Nitrate, Tetryl, Zinc **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Iron, Lead, Lead	**Metals [3]** Copper, Manganese, Mercury Fulminate, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
	Azide, Potassium Chlorate, Sulfur, Zinc	
Shell, 75mm, Smoke WP, MkII	**Cartridge Case:** Copper - Copper, Zinc **Propellant:** Dibutylphthalate, Dinitrotoluene[6], Diphenylamine, Nitrocellulose[5], Nitroglycerin, Potassium Chlorate **Primer [7]:** Antimony Sulfide, Barium Nitrate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT **Projectile/Rotating Band:** Steel/Copper Alloy - Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Sulfur, Zinc **Projectile Filler:** Tetryl, White Phosphorus **Fuze, Projectile, PD, M46:** Steel/Brass - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Carbon, Copper, Mercury Fulminate, Potassium Nitrate, Sodium Nitrate, Tetryl, Zinc **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Iron, Lead, Lead Azide, Potassium Chlorate, Sulfur, Zinc	**Metals [3]** Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Shell, 60mm HE, M49A2	**Propelling Assembly:** Kraft Paper, Steel - Iron, Manganese, Paper, Phosphorus, Sulfur, Zinc **Propellant:** Diethylphthalate, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate **Primer [7]:** Antimony Sulfide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, TNT **Projectile: Steel** - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler:** TNT **Fuze, Point Detonating (PD), M52 series:** Aluminum Alloy, Zinc Alloy - Aluminum, Bismuth, Cadmium, Copper, Iron, Magnesium, Manganese, Nickel, Phosphorus, Silicon, Sulfur, Tin, Zinc **Fuze Filler:** Tetryl **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Lead Azide, Potassium Chlorate, Zinc	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Shell, 60mm, Smoke, White Phosphorus (WP), M302	**Propelling Assembly:** Kraft Paper, Steel - Iron, Manganese, Paper, Phosphorus, Sulfur, Zinc **Propellant:** Diethylphthalate, Dinitrotoluene, Diphenylamine, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate **Primer [7]:** Antimony Sulfide, Lead Sulphocyanate, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Cyclotrimethylenetrinitramine (RDX), TNT **Projectile:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler:** Cyclotrimethylenetrinitramine (RDX), Stearic Acid, White Phosphorus **Fuze:** Aluminum Alloy, Brass, Plastic - Aluminum, Copper, Iron, Manganese, Plastic, Silicone, Zinc **Fuze Filler:** RDX, (Cyclotrimethylenetrinitramine), Stearic Acid, Tetryl	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
	Fuze Primer [7]: Antimony Sulfide, Barium Nitrate, Silicon Carbide, Copper, Lead Azide, Lead Styphnate, Potassium Chlorate, Zinc	
Cartridge, 57mm, Armor Piercing–Tracer (AP-T), M70	**Cartridge Case:** Brass, Steel – Carbon, Copper, Iron, Manganese, Phosphorus, Sulfur, Zinc **Propellant:** Dibutylphthalate, Dinitrotoluene[6], Diphenylamine, Nitrocellulose[5] **Primer [7]:** Antimony Sulfide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sulfur, TNT, **Projectile:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Tracer [8]:** Aluminum Alloy, Magnesium, Strontium Nitrate, Polyvinyl Chloride	**Metals [3]** Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Cartridge, 40mm, Armor Piercing-Tracer (AP-T), M81	**Cartridge case:** Brass - Copper, Iron, Lead, Zinc **Propellant:** Dibutylphthalate, Dinitrotoluene[6], Diphenylamine, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate, Sulfur **Primer [7]:** Antimony Sulfide, Lead Thiocyanate, Potassium Chlorate, Potassium Nitrate, Sodium Nitrate, Sulfur, TNT **Projectile/Rotating Band:** Steel/Copper Alloy - Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Sulfur, Zinc **Projectile Filler:** Solid steel **Tracer [8]:** Aluminum, Barium Peroxide, Calcium Resinate, Magnesium, Polyvinyl Chloride, Strontium Nitrate	**Metals [3]** Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Shell, 4.2-inch, HE, M3, M3A1	**Propelling Charge:** Diethylphthalate, Ethyl Centralite, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate **Primer [7]:** Antimony Sulfide, Barium Nitrate, Copper, Iron, Lead, Lead Styphnate, Nitrocellulose, Tetrazene, Zinc **Projectile/Rotating Disc:** Steel/Copper Alloy – Carbon, Copper, Lead Iron, Manganese, Phosphorus, Sulfur, Zinc **Projectile Filler:** TNT **Fuze, PD, M557:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze Filler:** Tetryl **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide, Copper, Iron, Lead Azide, Lead Thiocyanate, Potassium Chlorate, TNT, Zinc	**Metals [3]** Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Shell, 4.2-inch, Smoke, M2 (1918 – 1944)	**Propelling Charge:** Diethylphthalate, Ethyl Centralite, Nitrocellulose[5], Nitroglycerin **Primer [7]:** Antimony Sulfide, Barium Nitrate, Lead Styphnate, Potassium Nitrate, Tetrazene **Projectile:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Projectile Filler: FM or FS Smoke** - Chlorsulfonic Acid, Sulfur trioxide, Titanium Tetrachloride **Fuze:** Aluminum, Copper, Iron, Lead Azide, Magnesium, Manganese, Nickel, Potassium Chlorate, Silicon, Tin, Zinc, Tetryl **Fuze Primer [7]:** Antimony Sulfide, Silicon Carbide	**Metals [3]** Aluminum, Copper, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Rocket, 3.25-inch, Target, Mk 1 through Mk 4	**Rocket Motor:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Propellant:** Diazodinitrophenol, Nitrocellulose[5], Nitroglycerin, Potassium Chlorate, Potassium Nitrate, Potassium Perchlorate **Flare:** Aluminum, Barium Nitrate, Hexachlorbenzene, Magnesium, Potassium Perchlorate	**Metals [3]** Aluminum **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media
Grenade, Hand, Fragmentation, MkII	**Munition Case:** Cast Iron **-** Carbon, Iron, Manganese, Phosphorus, Sulfur **Munition Filler:** EC Blank Powder or Trinitrotoluene (TNT) -Aurine Dye, Barium Nitrate, Diphenylamine, Nitrocellulose[5], Potassium Nitrate, Trinitrotoluene (TNT) **Fuze, Grenade, Delay, M204:** Zinc Alloy, Aluminum Alloy **-** Aluminum, Barium Chromate, Chromium, Lead Azide, Nickel, PETN (Pentaerythritol Tetranitrate), Potassium Perchlorate, Cyclotrimethylenetrinitramine (RDX), Tetryl, Titanium, Zinc, Zirconium **Fuze Primer[7]:** Antimony Sulfide, Calcium Silicide, Lead Thiocyanate, Potassium Chlorate, Tetrazene, Trinitrotoluene (TNT)	**Metals [3]** Aluminum, Barium, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Grenade, Hand, Practice, MkII	**Grenade Body:** Cast Iron – Aluminum, Carbon, Chromium, Cobalt, Copper, Iron, Manganese, Molybdenum, Nickel, Phosphorus, Silicon, Sulfur, Vanadium, Zinc **Grenade Filler:** Black Powder – Potassium Nitrate, Sodium Nitrate, Sulfur **Fuze, Grenade, Delay, M205:** Zinc Alloy/Aluminum Alloy – Aluminum, Cadmium, Chromium, Copper, Iron, Lead, Magnesium, Silicon, Tin, Zinc **Primer/Delay**[7]: Aluminum, Antimony Sulfide, Barium Chlorate, Barium Nitrate, Calcium Silicide, Lead Styphnate, Lead Thiocyanate, Nickel, Potassium Chlorate, Potassium Nitrate, Potassium Perchlorate, Silicon, Sodium Nitrate, Sulfur, Tetrazene, Trinitrotoluene (TNT), Zinc, Zirconium	**Metals** [3] Aluminum, Zinc **Explosives** [4] As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Mine, Antitank, Practice, M1	**Case:** Steel (Inert) - Carbon, Iron, Manganese, Phosphorus, Sulfur **Fuze, Practice, M1:** Aluminum, Carbon, Copper, Iron, Zinc **Fuze Filler:** Nitrocellulose[5], Nitroglycerin, Potassium Chlorate, Red Phosphorus, **Primer** [7]**:** Potassium Nitrate, Sulfur	**Metals** N/A **Explosives** [4] As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Charge, demolition, block, ¼ lb, ½ lb, 1 lb	**Case**: Cardboard, Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Filler**: Trinitrotoluene (TNT)	**Metals** N/A **Explosives** [4] As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Firing device, demolition, pull, M1	**Case:** Steel - Carbon, Iron, Manganese, Phosphorus, Sulfur **Primer [7]:** Antimony Sulfide, Barium Nitrate, Carbon, Iron, Lead Styphnate, Manganese, Phosphorus, Sulfur, Tetrazene	**Metals** N/A **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Cap, blasting, electric, M6	**Case:** Aluminum Alloy – Aluminum, Chromium, Copper, Iron, Magnesium, Silicon, Zinc **Filler:** RDX **Primer[7]:** (Ignition and Intermediate charges): Barium Chromate, Lead Azide, Lead Dinitro-Ortho-Cresol, Lead Styphnate, Nitrocellulose(5), Potassium Chlorate	**Metals [3]** Aluminum, Chromium, Copper, Magnesium, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Cap, blasting, non-electric, M7	**Case:** Aluminum Alloy – Aluminum, Chromium, Copper, Iron, Magnesium, Silicon, Zinc **Filler**: RDX **Primer [7]:** (Ignition and Intermediate charges): Lead Azide, Lead Styphnate	**Metals [3]** Aluminum, Chromium, Copper, Magnesium, Zinc **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Fuse, blasting, time, M700	**Case:** Polyethylene Plastic **Filler:** Potassium Nitrate, Sulfur	**Metals** N/A **Explosives [4]** As a conservative measure, a full explosives panel will be analyzed for from media collected at this MRS.
Small arms ammunition, general: Cartridge, .50 caliber, Machine Gun	**Cartridge case:** Brass – Copper, Zinc **Propellant:** Calcium Carbonate, Dibutylphthalate, Diphenylamine, Dinitrotoluene[6], Nitrocellulose[5], Nitroglycerin, Potassium Nitrate, Potassium Sulfate, Sodium Sulfate **Primer [7]:** Aluminum Powder, Antimony Sulfide, Barium Nitrate, Calcium Silicide, Copper, Iron, Lead, Lead Styphnate, Lead Thiocyanate, Potassium Chlorate, PETN, Tetrazene, Zinc **Projectile**: Antimony, Carbon, Copper, Iron, Lead, Manganese, Molybdenum, Sodium Carbonate Monohydrate, Silicon, Sulfur, Zinc **Tracer [8]:** Barium Peroxide, Calcium Resinate, Magnesium Powder, Polyvinyl Chloride, Potassium Perchlorate, Strontium Nitrate, Strontium Oxalate, Strontium Peroxide, Zinc Stearate	**Metals [3]** Antimony, Copper, Lead **Explosives [4]** A full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
Small arms ammunition, general: Cartridge, .45 caliber	**Cartridge case:** Copper Alloy – Copper, Iron, Lead, Zinc **Propellant:** Diphenylamine, Dinitrotoluene[6], Nitrocellulose[5], Nitroglycerin, Potassium Nitrate, Potassium Sulfate **Primer [7]:** Antimony Sulfide, Barium Nitrate, Calcium Silicide, Copper, Iron, Lead Styphnate, Lead Thiocyanate, Nitrocellulose[5], PETN, Potassium Chlorate, Tetrazene, Trinitrotoluene (TNT), Zinc **Projectile**: Antimony, Carbon, Copper, Iron, Lead, Manganese, Phosphorus, Silicon, Sulfur, Zinc	**Metals [3]** Lead **Explosives [4]** A full explosives panel will be analyzed for from media collected at this MRS.
Small arms ammunition, general: Cartridge, .38 caliber	**Cartridge case:** Copper Alloy – Copper, Iron, Lead, Zinc **Propellant:** Dinitrotoluene[6], Diphenylamine, Ethyl Centralite, Nitrocellulose[5], Nitroglycerin, Potassium Sulfate **Primer [7]:** Aluminum Powder, Antimony Sulfide, Barium Nitrate, Calcium Silicide, Copper, Iron, Lead Oxide, Lead Styphnate, Nitrocellulose[5], PETN, Tetrazene, Zinc **Projectile**: Antimony, Copper, Iron, Lead, Zinc	**Metals [3]** Lead **Explosives [4]** A full explosives panel will be analyzed for from media collected at this MRS.
Small arms ammunition, general: Cartridge, .30 caliber (includes carbine)	**Cartridge case:** Copper Alloy – Copper, Iron, Lead, Zinc **Propellant:** Calcium Carbonate, Copper, Dibutylphthalate, Diphenylamine, Dinitrotoluene[6], Ethyl Centralite, Lead, Iron, Nitrocellulose[5], Nitroglycerin, Potassium Nitrate, Sodium Sulfate, Zinc **Primer [7]:** Aluminum Powder, Antimony Sulfide, Barium Nitrate, Copper, Iron, Lead, Lead Styphnate, PETN, Tetrazene, Zinc **Projectile**: Antimony, Carbon, Copper, Iron, Lead, Manganese, Silicon, Sulfur, Zinc **Tracer [8]:** Barium Peroxide, Calcium Resinate, Magnesium Powder, Polyvinyl Chloride, Strontium Nitrate, Strontium Oxalate, Strontium	**Metals [3]** Antimony, Copper, Lead **Explosives [4]** A full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) [2]	MC Analysis [1]
	Peroxide, Zinc Stearate	
Small arms ammunition, general: Cartridge, .22 caliber	**Cartridge case:** Copper Alloy – Copper, Iron, Lead, Zinc **Propellant:** Dibutylphthalate, Diphenylamine, Nitrocellulose[5], Nitroglycerin **Primer [7]:** Antimony Sulfide, Barium Nitrate, Calcium Silicide, Copper, Iron, Lead, Lead Styphnate, Nitrocellulose[5], Pentaerythritol Tetranitrate (PETN), Tetrazene, Zinc **Projectile**: Antimony, Copper, Iron, Lead, Zinc	**Metals [3]** Lead **Explosives [4]** A full explosives panel will be analyzed for from media collected at this MRS.

TABLE 4.1
CHEMICAL COMPOSITION OF POTENTIAL MEC AND MUNITIONS CONSTITUENTS
WEST VIRGINIA MANEUVER AREA/DOLLY SODS FUDS JENNINGSTON TRAINING AREA MRS

Munitions Type/ Model	Composition (Case and Filler) (2)	MC Analysis (1)

Notes:

(1) MC selected for analysis are typically non-essential nutrient metals and indicative of known or suspected DOD munitions used at this MRS.

(2) MC not selected for analysis are essential nutrient metals, Semi-Volatile Organic Compounds (SVOCs) or materials that represent a very small percentage of the munitions weight.

(3) Lead, antimony, and copper have been selected as programmatic SI "indicator" heavy metals and reflect general former small arms range evaluation strategy and parallel the screening level decision-making objectives of SI. This 3-metals list was developed based on an extensive review of historical SAR studies, fate and transport mechanisms (specifically as they relate to shallow surface soil sampling), compositional prevalence, toxicity, environmental persistence and reactivity, and representativeness. This baseline list may be augmented, as appropriate, following TPP based on justifications of unique site specific considerations such as soils, geology, vegetation, topography, hydrology, land use, or ammunition type.

(4) A full Explosives panel will be analyzed for from media collected at the MRS. As a conservative measure, all explosives will be included when analyzing for explosive MC.

(5) Nitrocellulose is not considered toxic, has no risk-based screening values and there are no chemical analysis techniques that quantify nitrocellulose separately from the natural common essential nutrient nitrate. Based on this, nitrocellulose analysis will not be conducted during this SI.

(6) Dinitrotoluene products include: 2,4-and 2,6-dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-and 3-nitrotoluene; 4-Amino-2,6-dinitrotoluene; 4-nitrotoluene.

(7) Primer materials represent a very small percentage of the munition's weight. Therefore, analysis of primer constituents will not be conducted. However, if a primer constituent is associated with a larger component of the munition, then analysis of that constituent may be conducted.

(8) Tracer element materials represent a very small percentage of the munitions weight and is consumed while the projectile travels to the target, therefore, tracer element constituents will not be analyzed for at this MRS (if a tracer element constituent is associated with a larger component of the munition it may be analyzed for).

Source: Munitions information was supplied by the 2009 PA, Munitions Items Disposition Action System (MIDAS) database, and USACE Range Operations Reports RO-01.

TABLE 4.2
SUMMARY OF QUALITATIVE RECONNAISSANCE OBSERVATIONS
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

MRS	MEC	MD	OTHER OBSERVATIONS
Jenningston Training Area	None observed	None observed	A few pieces of trash were observed below the 4WD road leading to Three Springs Run. None of the debris appeared DoD related so no samples were collected. A representative from the U.S. Forest Service directed the SVT to the cave where mortar shipping containers were discovered in 2006. No MEC or MD indicative of MEC was observed. Numerous clearings along the eastern face of Shavers Mountain were encountered by the SVT. Based on observations made by the team, it was determined that the clearings were the result of relatively recent logging operations. The remains of two stone foundations were observed adjacent to the lower Otter Creek drainage near the Dry Fork River. Two campsites along the trail that follows the ridge of Shavers Mountain.

4.1.2 DATA QUALITY OBJECTIVES

4.1.2.1 Introduction

DQOs are qualitative and quantitative statements that clarify study objectives and specify the type and quality of the data necessary to support decisions. The development of DQOs for a specific site takes into account factors that determine whether the quality and quantity of data are adequate for project needs, such as data collection, uses, types, and needs. While developing these DQOs in accordance with the process presented in Chapter 3, paragraph 3.1.2 of the PWP, Eco followed the Guidance on Systematic Planning Using the Data Quality Objectives Process (USEPA 2006).

The goal of the TPP process is to achieve stakeholder, USACE, and applicable state and federal regulatory concurrence with the DQOs for a given site. The TPP Team approved the Jenningston Training Area MRS DQOs at the TPP meeting on April 7, 2011. Appendix B of this SI Report presents the TPP documentation, including the DQO worksheets approved in the TPP Memo. The updated DQO worksheets for the MRS are included in this chapter after the appropriate DQO discussions.

As stated in Subchapter 1.2 of this SI Report, data must be sufficient to do the following: 1) determine whether a removal action is necessary, 2) enable HRS scoring by the USEPA, 3) characterize the release for RI/FS initiation, and 4) complete the MRSPP.

DQOs cover four project objectives that SI data must satisfy: 1) evaluate potential presence of MEC, 2) evaluate potential presence of elevated metals concentrations that are consistent with the identified MC contaminants of concern, 3) collect data needed to complete MRSPP scoring sheets, and 4) collect information for HRS scoring.

4.1.2.2 Munitions and Explosives of Concern Data Quality Objective

The MEC DQO was achieved by evaluating potential presence of MEC within the Jenningston Training Area MRS boundary. The SVT searched for visual evidence of MEC and MD along the QR transects. They identified no MEC and no MD in the Jenningston Training Area MRS. Table 4.3 presents the MEC DQOs.

4.1.2.3 Munitions Constituents Data Quality Objective

The MC DQO was achieved by evaluating the potential presence of elevated metals within the MRS boundary. Table 4.1 summarizes the MC associated with the ordnance potentially used at the Jenningston Training Area MRS. The TPP Team agreed on the list of analytes for sample analysis based on the munitions potentially used at the site. Chapter 5 presents the sampling and analysis results. Appendix G presents the QA and QC reports generated during the data validation process. No concerns regarding data quality were noted. Table 4.4 presents the MC DQOs.

4.1.2.4 Munitions Response Site Prioritization Protocol Data Quality Objective

The MRSPP DQO was achieved by obtaining sufficient information to complete the MRSPP scoring sheets. Specific input data were collected, and the three modules for the MRSPP were populated as part of the SI. Appendix K includes the scoring sheets. Table 4.5 presents the MRSPP DQOs.

4.1.2.5 Hazard Ranking System Data Quality Objective

The HRS DQO was achieved by including information in the SI report necessary for the USEPA to populate the HRS score sheets. Source documents for the HRS information include the INPR; the PA; the sampling results reported in Chapter 5 of this SI Report; and information from local and state agencies regarding population, groundwater wells, and drinking water wells. Table 4.6 presents the HRS DQOs.

TABLE 4.3
MEC DATA QUALITY OBJECTIVE WORKSHEET

SITE: West Virginia Maneuver Area/Dolly Sods FUDS
PROJECT: MMRP Site Inspection/Jenningston Training Area MRS

DQO Element Number *	DQO Element Description *	Site-Specific DQO Statement	Objective met? (Y or N)
Intended Data Use(s):			
1	Project Objective(s) Satisfied	Evaluate potential presence of munitions or explosives of concern (MEC)	Y
Intended Need Requirements:			
2	Data User Perspective(s)	Risk, remedy	Y
3	Contaminant or Characteristic of Interest	MEC, MD	Y
4	Media of Interest	N/A	N/A
5	Required Locations or Areas	Jenningston Training Area MRS	Y
6	Number of Samples Required	N/A	N/A
7	Reference Concentration of Interest or Other Performance Criteria	Visual identification of MEC or munitions debris during qualitative reconnaissance (QR)	Y
Appropriate Sampling and Analysis Methods:			
8	Sampling Method	QR with magnetometer (Schonstedt) for avoidance	Y
9	Analytical Method	N/A	N/A

* Refer to EM 200-1-2, Paragraph 4.2.1

TABLE 4.4
MC DATA QUALITY OBJECTIVE WORKSHEET

SITE: West Virginia Maneuver Area/Dolly Sods FUDS
PROJECT: MMRP Site Inspection/Jenningston Training Area MRS

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement	Objective Met? (Y or N)
Intended Data Use(s):			
1	Project Objective(s) Satisfied	Evaluate potential release of elevated metals concentrations that are consistent with the identified munitions constituents (MC) contaminants of concern.	Y
Intended Need Requirements:			
2	Data User Perspective(s)	Risk, remedy	Y
3	Contaminant or Characteristic of Interest	See Table 4.1	Y
4	Media of Interest	Surface soil, and surface water and sediments	Y
5	Required Sampling Locations or Areas and Depths	Samples were collected as determined by the TPP Team. Soil sample depth is 0-2 inches.	Y
6	Number of Samples Required	1 discretionary biased surface soil sample and 1 ambient surface soil sample. 1 biased surface water/sediment sample set and 1 ambient surface water/sediment sample set	Y

TABLE 4.4
MC DATA QUALITY OBJECTIVE WORKSHEET

SITE: West Virginia Maneuver Area/Dolly Sods FUDS
PROJECT: MMRP Site Inspection/Jenningston Training Area MRS

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement	Objective Met? (Y or N)
7	Reference Concentration of Interest or Other Performance Criteria	Selected human health screening values for soil and sediment are from the USEPA 'protection for groundwater' risk-based screening levels, supplemented with USEPA Region 3 Screening Levels. Selected Human health screening values for surface water are from *Requirements Governing Water Quality Standards Rule*, supplemented by USEPA Region 3 levels for tap water (or MCLs if no value for tap water was found). Selected ecological screening values are from USEPA EcoSSLs, supplemented by Los Alamos National Laboratory's EcoRisk Database values and the relevant USEPA Ecological Screening Benchmarks.	Y
Appropriate Sampling and Analysis Methods:			
8	Sampling Method	CRREL Seven-point wheel sampling method in accordance with the SS-WP, PSAP and PSAP Addendum	Y

TABLE 4.4
MC DATA QUALITY OBJECTIVE WORKSHEET

SITE: West Virginia Maneuver Area/Dolly Sods FUDS
PROJECT: MMRP Site Inspection/Jenningston Training Area MRS

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement	Objective Met? (Y or N)
9	Analytical Method	Explosives: soil samples were dried, sieved, and ground with pestle and mortar according to SW846 8330A and analyzed by HPLC according to SW846-8330B Selected metals: samples were dried and sieved according to SW846-3050B and analyzed by ICP according to SW846-6010B pH: SW846-9045D	Y

* Refer to EM 200-1-2, Paragraph 4.2.1

TABLE 4.5
MRSPP Data Quality Objective Worksheet

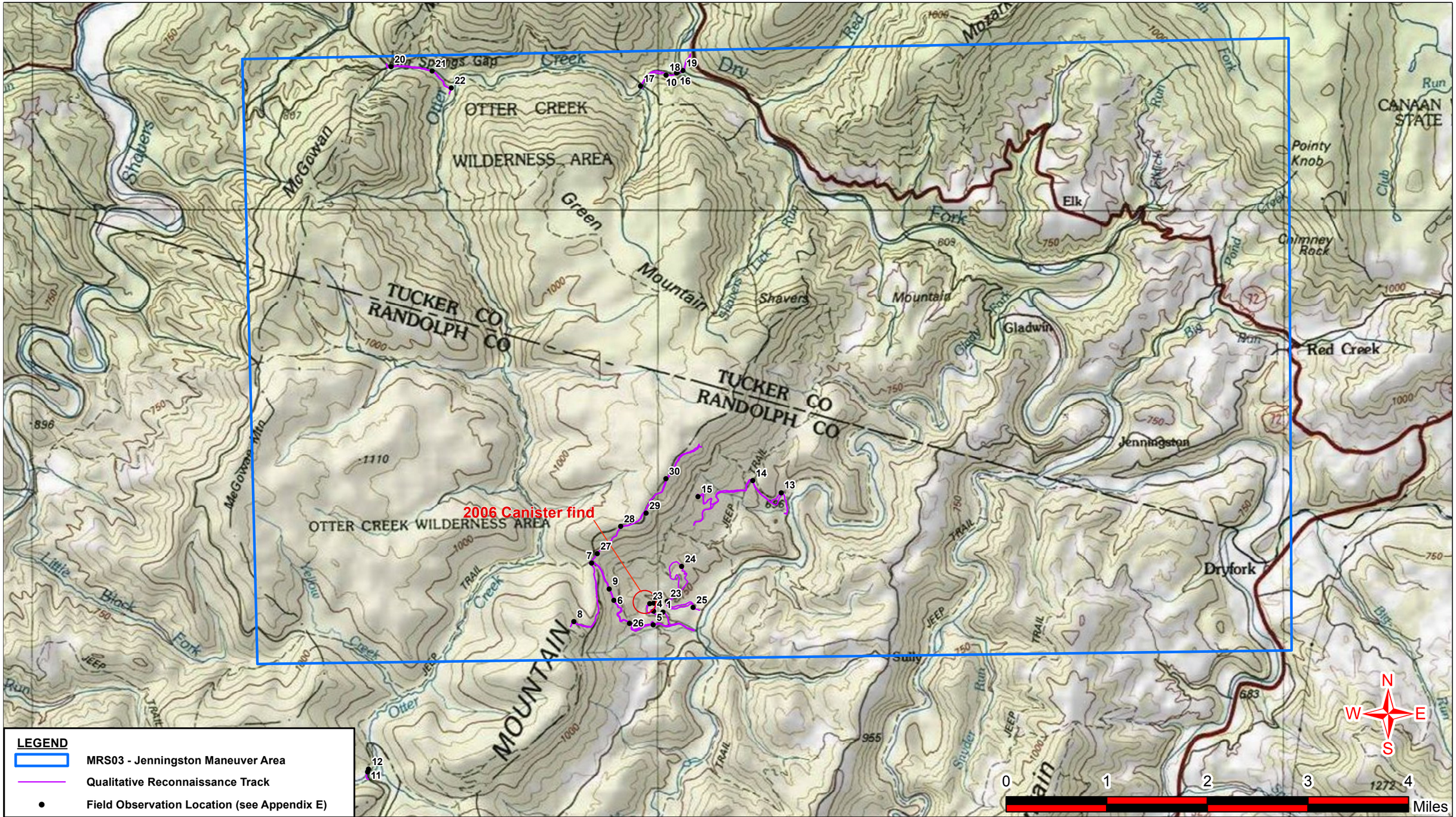
Site: West Virginia Maneuver Area/Dolly Sods FUDS
Project: MMRP Site Inspection/Jenningston Training Area MRS
DQO Statement Number: 3 of 4

Module	Table #	Table Description	Known Data	Current Data Gap	Data Source
Explosive Hazard Evaluation (EHE)	1	Munitions Type	X		Historical records or field findings
	2	Source of Hazard	X		Historical maps
	3	Location of Munitions	X		Historical records or field findings
	4	Ease of Access	X		Field findings
	5	Status of Property	X		Historical records
	6	Population Density	X		U.S. Census Bureau
	7	Population Near Hazard	X		Field findings
	8	Types of Activities/Structures	X		Regional zoning
	9	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	10	Determining the EHE	X		Scores from Tables 1 through 9
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration	X		Historical records or field findings
	12	Sources of CWM	X		Historical records or field findings
	13	Location of CWM	X		Historical records or field findings
	14	Ease of Access	X		Historical records or field findings
	15	Status of Property	X		Historical records
	16	Population Density	X		U.S. Census Bureau
	17	Population Near Hazard	X		Field findings
	18	Types of Activities/Structures	X		Regional zoning
	19	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	20	Determining the CHE	X		Scores from Tables 11 through 19
Health Hazard Evaluation (HHE)	21	Groundwater Data	X		N/A
	22	Surface Water - Human Endpoint	X		Surface water sampling results
	23	Sediment - Human Endpoint	X		Sediment sampling results
	24	Surface Water - Ecological Endpoint	X		Surface water sampling results
	25	Sediment - Ecological Endpoint	X		Sediment sampling results
	26	Surface Soil	X		Surface soil sampling results
	27	Supplemental Contaminant Hazard Factor	X		All MC sampling results
	28	Determining the HHE	X		Scores from Tables 21 through 27
	29	MRS Priority	X		Scores from Tables 10, 20, and 28
	A	MRS Background Information	X		DoD databases

TABLE 4.6
HRS Data Quality Objective Worksheet

Site: West Virginia Maneuver Area/Dolly Sods FUDS
Project: MMRP Site Inspection/Jenningston Training Area MRS

Data Description	Known Data	Current Data Gap	Data Source
Source Type	X		Historical records or field findings
Estimated Volume or Area	X		Field findings
Hazardous Substance	X		Constituents of suspected munitions
Groundwater Sample Concentration		X	N/A
Groundwater Use	X		Well records and municipal data
Surface Water Sample Concentration	X		Sample results
Surface Water Pathways	X		Field findings
Soil Sample Concentration	X		Sample results
Soil Pathways	X		Field findings
Sensitive Environments	X		State Historic Preservation Office, U.S. Fish and Wildlife Service, various government agencies
Attractiveness/Accessibility	X		Field findings and land use records



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QUALITATIVE RECONNAISSANCE AND FIELD OBSERVATIONS

MRS03 - Jennington Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
4.1

4.2 JENNINGSTON TRAINING AREA MUNITIONS RESPONSE SITE

4.2.1 HISTORICAL USE OF MILITARY MUNITIONS

The Jenningston Training Area MRS consists of 40,000 acres within a 2,180,367-acre FUDS. Historical records, summarized in the 2009 PA, indicate that the Jenningston Training Area MRS was used from 1943 to 1944 as an infantry division troop maneuver area. Activities conducted in the area consisted of rock climbing exercises and troop maneuver training. As a conservative measure, in the absence of munitions information specific to this MRS, the SI considered all munitions used throughout WVMA as potential for the purpose of the SI. The comprehensive list of munitions included: 155mm HE projectiles; 105mm HE and SR cartridges; 81mm HE and SR cartridges; 75mm HE and SR shells; 60mm HE and SR shells; 4.2-inch HE and SR shells; 3.25-inch target rockets; practice antitank mines; fragmentation, smoke, and practice hand grenades; demolition charge blocks, demolition firing devices, blasting caps, time fuses, and general small arms ammunition (.22, .30, .38, .45, and .50 caliber)[USACE, 2009.].

4.2.2 INSPECTION ACTIVITIES

To assess potential MEC contamination within the Jenningston Training Area MRS, the SVT conducted approximately 23.59 miles of QR within the MRS (Figure 4.1). The QR was conducted on trails that the military may have used to train pack mule teams. The training activities associated with pack mule training used items simulating munitions size and weight, rather than actual munitions. The team observed no MEC and no MD or any other features of interest other than those described above.

Surface soil, surface water, and sediment samples were collected as planned and described in the approved SS-WP, except for those deviations from the plan described in Section 3.5 above. One biased surface soil sample was collected adjacent to the vertical cave where the discarded mortar shipping containers were historically encountered. Also, one ambient soil sample was collected. In addition, one biased surface water/sediment coupled set and one ambient surface water/sediment coupled sample set were collected. See Figure 5.2 for sample locations.

The SVT collected 30 observations during the site visit. The observation points were numbered chronologically and can be cross-referenced between their location (identified in Figure 4.1 and the observations and photographs collected (available in Appendix E). No MEC and no MD was observed during the SI (see Appendix D). The SVT identified several features within the MRS that included the following:

- Foundation remains
- One small vertical cave
- Wilderness campsites
- Minor trash and debris (not DoD-related)

No archeological or cultural resources were identified during the site visit except as described above.

CHAPTER 5
EXPOSURE PATHWAYS AND RECEPTORS

5.1 INTRODUCTION

This chapter evaluates the potential presence of exposure pathways and receptors, based on site-specific conditions. It is necessary to evaluate site-specific conditions and land use to assess risks posed to potential receptors under current and future land use scenarios. Exposure pathways for groundwater, surface water and sediment, soil, and air are evaluated. The conceptual site exposure model (CSEM) for the Jenningston Training Area MRS (Appendix J) summarizes which potential receptor exposure pathways are (or may be) complete and which are (and are likely to remain) incomplete. An exposure pathway for a chemical release is not considered to be complete unless all four of the following factors (in italics) are present (USEPA1989). An example regarding a hypothetical groundwater pathway is included.

Exposure Factor	Example
Source and mechanism for contaminant release	A site has known MEC from which metals have leached and contaminated surface soil.
Environmental transport and/or exposure medium	Elevated metals concentrations that are consistent with the identified MC contaminants of concern in soil at the site is mobile and can contaminate groundwater.
Point of exposure at which the contaminant can interact with a receptor	A well drawing from the contaminated aquifer is located at the site.
Receptor and a likely route of exposure at the exposure point	A residential use of groundwater from the on-site well as a source of drinking water.

In this hypothetical example, all four factors are present and, therefore, the groundwater exposure pathway is complete. If any single factor was not present (e.g., elevated metals were not present in soil, or the resident obtained drinking water from another source), the pathway would be incomplete.

This chapter presents the information required to evaluate whether exposure pathways at the site are complete. It also addresses those metals that require further consideration in a screening-level risk assessment (SLRA). Chapter 6 assesses the potential significance of complete pathways (i.e., whether there is an unacceptable risk).

5.2 GENERAL INFORMATION

General information regarding the geology, hydrogeology, and hydrology of the West Virginia Maneuver Area/Dolly Sods FUDS is presented below, followed by a discussion of MRS-specific characteristics and sampling results from the Jenningston Training Area MRS.

5.2.1 REGIONAL GEOLOGIC AND HYDROGEOLOGIC SETTING

The WVMA/Dolly Sods FUDS is located to the west of the Allegheny Front with approximate centralized coordinates of latitude 39° 07' 08" N and longitude 79° 27' 09" W. The Allegheny Front is a complex boundary between two geologic provinces in the Appalachian Highlands. The geology changes abruptly from the folded and faulted surficial strata of the Valley and Ridge province to the east and the gentler faulted strata of the Appalachian Plateaus province to the west. East of the Allegheny Front the strata are found to dip steeply on the limbs of many anticlines, many of which are asymmetrical, with more steeply dipping to overturned western limbs. West of the Front the strata dip much less steeply, usually less than 30 degrees and surface faulting is rare. This western side of the Front forms a high plateau of essentially horizontal strata and is capped predominantly with resistant sandstones and conglomerates. Spruce Knob, located approximately 15 miles south of the FUDS, is the tallest mountain in the Alleghenies and West Virginia's highest elevation at 4,861 feet (WV Geologic and Economic Survey 2004).

The Jenningston Training Area MRS is a relatively large area located south of the Canaan Valley in the Allegheny Mountain Section of the Appalachian Plateau physiographic province (USGS 2002). The MRS consists of Shavers Mountain and the Otter Creek Wilderness on the west side, and a lower area on the east side extensively dissected by the Dry Fork, Glady Fork, and Laurel Fork Rivers. The northeastern portion of the MRS is composed of the highlands bordering the southwest edge of the Canaan Valley. The geologic structure of the Otter Creek area is a syncline with the center formed by Pennsylvanian strata of the New River, Kanawha, and Allegheny Formations and the Conemaugh Group. The eastern slope of Shavers Mountain is made up of the western dipping limb of the syncline and is composed of Mississippian shale, limestone, and sandstone. The eastern portion of the MRS is underlain by an eroded anticline with a core of Devonian shale and sandstone of the Hampshire Formation (USGS 2012).

The communities of Gladwin, Elk, Jenningston, and Dry Fork are the primary populated areas within the Jenningston Training Area MRS. These communities are underlain by Devonian strata that yield sufficient quantities of groundwater locally but are not considered principle aquifers in the region (USGS 2012). Therefore, groundwater wells in the populated parts of the MRS are most likely drawing from fractured bedrock with highly variable yields.

5.2.2 REGIONAL GROUNDWATER USE

Based on information in the PA, groundwater is the primary water source for residences within the Jenningston Training Area MRS. However, because the region is sparsely populated, groundwater use will be limited to domestic use from private wells producing from fractured bedrock aquifers (USACE 2009).

The Jenningston Training Area MRS overlaps Devonian-aged strata most likely producing water from fractured bedrock (USGS 2012). There are 90 water wells within a 4-mile buffer of the MRS boundary. Four wells are located within the MRS boundaries. Based on the well report, the groundwater depths ranged from 7.65 feet below ground surface (bgs) to 241.18 feet bgs within the 4-mile buffer (Environmental Data Resources [EDR] 2012).

The SVT observed numerous inhabited structures within the MRS, especially on the eastern portion of the MRS near the communities of Dry Fork, Gladwin, Elk, and Jenningston. It is likely that most of these structures utilize private groundwater wells as a source of domestic water.

5.2.3 REGIONAL HYDROLOGIC SETTING

Because of the size of the West Virginia Maneuver Area/Dolly Sods FUDS, it spans five watersheds within the larger Monongahela and Potomac groundwater basins: the Tygart Valley watershed, the Cheat watershed, the Youghiogheny watershed, the North Branch Potomac watershed, and the South Branch Potomac watershed (USEPA 2009a, 2009b, 2009c, 2009d, 2009e).

The Jenningston Training Area MRS lies south of Canaan Valley and encompasses portions of Otter Creek, the Dry Fork River, the Glady Fork River, and the Laurel Fork River. The four rivers within the MRS combine near the north central portion of the MRS, then flow northwest toward the City of Parsons. At Parsons, the Dry Fork River joins Shavers Fork to form the Cheat River. The Cheat River flows north to form the Monongahela River and eventually, the Ohio River (Watershed Atlas [WSA] 2011).

The SVT encountered surface water within the Otter Creek drainage, Condon Run, Glady Fork and Dry Fork, as well as in other smaller streams and drainages. The USEPA indicated that 11 surface water intakes are within 15 miles of the MRS, and that no tribal drinking water sources are within 4 miles of the MRS (USEPA 2012).

5.2.4 REGIONAL SENSITIVE ENVIRONMENTAL RESOURCES

According to the USFWS T&E Species System database, the State of West Virginia supports 17 federally listed T&E species consisting of 11 animals and 6 plants (USFWS 2011b). The USFWS Elkins, WV Office indicates there are 17 T&E species occurring in the Allegheny Mountains including: running buffalo clover (*Trifolium stoloniferum*), shale barren rock cress (*Arabis serotina*), small whorled pogonia (*Isotria medeoloides*), northeastern bulrush (*Scirpus ancistrochaetus*), Harperella (*Ptilimnium nodosum*), Virginia Spiraea (*Spiraea virginiana*), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), Indiana bat (*Myotis sodalis*), Gray bat (*Myotis grisescens*), Clubshell (*Pleurobema clava*), Fanshell (*Cyprogenia stegaria*), Pink mucket (*Lampsilis abrupt*), Northern riffleshell (*Epioblasma torulosa rangiana*), Cheat Mountain salamander (*Plethodon nettingi*), flat-spired three-toothed snail (*Triodopsis platysayoides*), James spinymussel (*Pleurobema collina*), and the West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*). Federally designated endangered (or threatened) species include the bald eagle (*Haliaeetus leucocephalus*) and the Cheat Mountain salamander (*Plethodon nettingi*). Globally rare and imperiled species include an isopod (*Caecidotea sinuncus*), tall larkspur (*Delphinium exaltatum*), eastern small-footed bat (*Myotis lebii*), Allegheny woodrat (*Neotoma magister*), Timber Ridge cave beetle (*Pseudanophthlmus hadenoecus*), and the South Branch Valley cave millipede (*Pseudotremia princeps*). Two other endangered species, the gray wolf (*Canis lupus*) and the eastern cougar (*Puma concolor couguar*), are believed to be extirpated from the region during the late 1800s or early 1900s (USDA 2006). In addition to the species identified above, the West Virginia Wildlife Diversity Program lists 397 endangered, threatened, or rare plant species and 491 rare, threatened, or endangered animal species occurring in West Virginia (West Virginia Division of Natural Resources [WVDNR] 2011).

The Jenningston Training Area MRS consists of land within the Otter Creek Wilderness, the Monongahela National Forest, and private land. The MRS is not within a national park, or a state, or county park but is located within a national forest and contains a federally designated wilderness area (USFWS 2011d, National Park Service 2011a, U.S. Forest Service 2011). The MRS is also the location of a federally designated critical habitat for the Virginia Big-Eared Bat (USFWS 2011). Because there are known caves within the MRS, suitable habitat for the species of bats and cave inhabiting animals listed above could be located on the site. In addition, portions of the site are considered suitable habitat for the West Virginia northern flying squirrel (*Glaucomys sabrinus fuscus*), the Cheat Mountain salamander (*Plethodon nettingi*), the Indiana Bat (*Myotis sodalis),* and Running Buffalo Clover (*Trifolium*

stoloniferum). The Flat-spired three-toothed snail (*Triodopsis platysayoides*) is found only in the Cheat River gorge located approximately 33 miles north of the site and is not anticipated to be encountered. The remaining animal species listed are found in larger river systems and are not anticipated to inhabit the area of the Jenningston Training Area MRS.

The USFWS Wetlands Mapper, through the National Wetlands Inventory, was used to identify wetlands within the Jenningston Training Area MRS (USFWS 2011c). Wetlands are land areas that are transitional between terrestrial and deep-water habitats in which the water table usually is at or near the surface or in which the land is covered by shallow water. Several wetlands were identified within the MRS, including freshwater pond, forest/shrub, and riverine types. During the SI field activities, the SVT observed surface water in streams and rivers within the MRS.

Based on the above information and a review of the Army Checklist for Important Ecological Places (Department of the Army 2005b), the Jenningston Training Area MRS is classified as an important ecological place because it is located within a national forest, and because it contains wetlands, federally designated wilderness area, and critical habitat for an endangered species. The determinations regarding important ecological places pertain to whether ecological receptors are present at the site. If a site is determined to be an important ecological place, ecological receptors are present and a Screening Level Ecological Risk Assessment (SLERA) will be conducted if there is an observed release of potential elevated metals. The SVT observed no T&E species during the site visit. Sensitive environments were not impacted by the SI effort and all QR and SI field efforts were performed to minimize any intrusion in sensitive areas.

5.2.5 SAMPLING LOCATIONS AND ANALYTICAL METHODS

Based on suspected uses of the Jenningston Training Area MRS, direct release of metals from munitions activities at the Jenningston Training Area MRS would have been to soil, with potential migration to surface water, sediment, groundwater or air (through resuspended soil particulates). The TPP Team agreed that surface soil samples would be collected from the MRS using the CRREL "seven-point wheel" composite sampling technique. Surface water and sediment samples would also be collected from the rivers within the MRS. Groundwater sampling would be conducted if domestic wells were located within the MRS and ROEs could be obtained for the properties containing the wells. Although several groundwater wells were identified within the MRS (Figure 5.1), ROEs were not received for the properties containing the wells, so no groundwater samples were collected. No air samples were collected as part of this SI, in accordance with TPP Team decisions.

On May 12, 13, 15, and 16, 2012 the SVT conducted QR and surface soil, surface water, and sediment sampling at the Jenningston Training Area MRS. The team collected one biased surface soil sample (WVMA-MRS03-SS-02-01), along with one associated field duplicate sample (WVMA-MRS03-SS-02-03), from within the MRS. The samples were collected in the proposed location, next to the cave where mortar shipping canisters were observed historically. The samples were also collected from the proposed depth of 0 to 2 inches bgs. The team collected one set of biased surface water/sediment coupled samples (WVMA-MRS03-SW-01 and WVMA-MRS03-SD-01), along with one set of associated field duplicate coupled samples (WVMA-MRS03-SW-03 and WVMA-MRS03-SD-03), from Otter Creek, within the MRS. The TPP Team originally planned to collect the surface water/sediment samples from Glady Fork, below the cave where the shipping canisters were found. However, the shipping canisters would not likely impact Three Springs Run or Glady Fork below the cave; therefore, the TPP Team made a decision to move the samples to Otter Creek, downstream from the MRS. The sample locations were selected to represent areas with the highest likelihood of the presence of MEC or metals contamination (Eco 2011a).

However, no MEC, MD, or evidence of metals contamination was observed during the site visit. Agriculture & Priority Pollutants Laboratories, Inc. (APPL, Inc.) in Clovis, CA analyzed the surface water, sediment, and soil samples for explosives (Method SW846-8330B) and selected metals (Method SW846-6010B). The soil and sediment samples were also analyzed for pH (Method SW846-9045D). The selected metals included aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc. Table 5.1 indicates the rationale behind the sample locations.

The UXO Technician III used a Schonstedt GA-52Cx magnetometer to screen and approve each potential sample location prior to final location selection and sample collection. Per the Final PWP (Parsons 2010), the UXO Technician III checked the magnetometer against a known piece of metal and performed battery checks each day to confirm that it was working properly. The surface soil, surface water, and sediment sample collection procedures presented in the Final PWP (Parsons 2010), the Final PSAP (USACE 2005), and the Final PSAP Addendum (Parsons 2006) were followed. The CRREL seven-point wheel composite sampling technique was employed for collecting the soil samples. A 4-foot diameter template was used during sample collection. This method resulted in equidistant spacing of the six locations in a circular pattern, with all six outer locations placed at a distance of two feet from the center location (for a total 4-foot diameter of the sample "wheel"). Therefore, the configuration called for by the CRREL seven-point wheel composite sampling technique was met. The actual geographic positioning system (GPS) coordinates for the center point of each surface soil sample location were recorded and updated in the geographical information systems (GIS) database (Appendix H). Figure 5.2 shows the sample locations and identification numbers. Table 5.1 indicates the rationale behind the sample locations. Appendix D includes the field notes and field forms for the site visit.

Surface water samples were collected by submerging the sample containers at each location. The surface water field parameters were gathered prior to sample collection with a Horiba U-22 water quality meter. The following parameters were measured in each water sample:

- Conductivity
- pH
- Temperature
- Turbidity

Sediment grab samples were collected in the same locations as coupled surface water samples using disposable trowels. For each coupled surface water/sediment sample pair, the surface water sample was collected first, followed by the sediment sample, to avoid cross-contamination

TABLE 5.1
SAMPLING RATIONALE
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID	Sample Coordinates (Decimal Degree)		Medium	Analysis(1)	Potential Munitions	Rationale
	Longitude	Latitude				
WVMA-MRS03-SS-02-01	–79.615959	38.965627	Soil	Explosives, Selected metals, pH	Small arms, general: Cartridges: .22 cal, .30 cal (includes carbine), .38 cal, .45 cal, .50 cal, machine gun Shell: 60mm, high explosive (HE), M49A2; Cartridge: 81mm, HE, M43; 81mm, smoke, WP, M57; 81mm, target practice (TP); 105mm, HE, M1; 105mm, smoke, hexachloroethane (HC), M84 Projectile, 155mm, HE, M102, WP, M110 Rocket, 3.25-inch, target, Mk1 through Mk4 Grenade: hand, fragmentation, MkII (1917 – present); hand, practice, MkII Demolition Block: charge, 1/4 lb., 1/2 lb., 1 lb. Firing Device: demolition, pull, M1 Cap: blasting, non-electric, M7, electric, M6 Fuse: blasting, time, M700	Sample was collected from proposed location directly adjacent to the vertical cave where mortar canisters were found by the U.S. Forest Service. Will help support appropriate MRS recommendation.
WVMA-MRS03-AMB-SS-02-02	–79.668264	38.942393	Soil	Explosives, Selected metals, pH	None	Sample location moved to an area just south of the MRS boundary near Condon Run; an area that is upgradient from munitions debris or historical evidence of DoD-use. Will help support appropriate MRS recommendation.

TABLE 5.1
SAMPLING RATIONALE
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID	Sample Coordinates (Decimal Degree)		Medium	Analysis(1)	Potential Munitions	Rationale
	Longitude	Latitude				
WVMA-MRS03-SW-01	–79.609383	39.04214	Surface Water	Explosives, Selected metals	Small arms, general: Cartridges: .22 cal, .30 cal (includes carbine), .38 cal, .45 cal, .50 cal, machine gun Shell: 60mm, high explosive (HE), M49A2; Cartridge: 81mm, HE, M43; 81mm, smoke, WP, M57; 81mm, target practice (TP); 105mm, HE, M1; 105mm, smoke, hexachloroethane (HC), M84 Projectile, 155mm, HE, M102, WP, M110 Rocket, 3.25-inch, target, Mk1 through Mk4 Grenade: hand, fragmentation, MkII (1917 – present); hand, practice, MkII Demolition Block: charge, 1/4 lb., 1/2 lb., 1 lb. Firing Device: demolition, pull, M1 Cap: blasting, non-electric, M7, electric, M6 Fuse: blasting, time, M700	Sample location moved to the intersection of Otter Creek and the Dry Fork River; an area downgradient from munition areas. Will help support appropriate MRS recommendation.
WVMA-MRS03-AMB-SW-02	-79.668468	38.941999	Surface Water	Explosives, Selected metals	None	Sample location moved to Condon Run; an area just south of the MRS boundary that is upgradient from munitions debris or historical evidence of DoD-use. Will help support appropriate MRS recommendation.

TABLE 5.1
SAMPLING RATIONALE
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID	Sample Coordinates (Decimal Degree)		Medium	Analysis(1)	Potential Munitions	Rationale
	Longitude	Latitude				
WVMA-MRS03-SD-01	–79.609383	39.04214	Sediment	Explosives, Selected metals, pH	Small arms, general: Cartridges: .22 cal, .30 cal (includes carbine), .38 cal, .45 cal, .50 cal, machine gun Shell: 60mm, high explosive (HE), M49A2; Cartridge: 81mm, HE, M43; 81mm, smoke, WP, M57; 81mm, target practice (TP); 105mm, HE, M1; 105mm, smoke, hexachloroethane (HC), M84 Projectile, 155mm, HE, M102, WP, M110 Rocket, 3.25-inch, target, Mk1 through Mk4 Grenade: hand, fragmentation, MkII (1917 – present); hand, practice, MkII Demolition Block: charge, 1/4 lb., 1/2 lb., 1 lb. Firing Device: demolition, pull, M1 Cap: blasting, non-electric, M7, electric, M6 Fuse: blasting, time, M700	Sample location moved to the intersection of Otter Creek and the Dry Fork River; an area downgradient from munition areas. Will help support appropriate MRS recommendation.
WVMA-MRS03-AMB-SD-02	–79.668468	38.941999	Sediment	Explosives, Selected metals, pH	None	Sample location moved to Condon Run; an area just south of the MRS boundary that is upgradient from munitions debris or historical evidence of DoD-use. Will help support appropriate MRS recommendation.

Notes:
(1) Selected metals include: aluminum, antimony, copper, lead, manganese, and mercury
DoD Department of Defense
HE high explosive
WP white phosphorus
HC hexachloroethane
MC munitions constituents
MD munitions debris
MRS munitions response site

5.2.6 DATA QUALITY ASSESSMENT

The samples were shipped to APPL, Inc. for analysis. APPL, Inc. is certified under the DoD Environmental Laboratories Accreditation Program (ELAP) and the National Environmental Laboratory Accreditation Conference (NELAC). The laboratory submitted the soil chemical data to Eco under Sample Delivery Group 67766. The data are presented in Appendix F. Parsons validated and assessed the data in accordance with the guidelines outlined in the PSAP (consisting of the field sampling plan and the quality assurance project plan) for the MMRP SI Program (USACE 2005a) and the PSAP Addendum (Parsons 2006). The data validation indicates that the laboratory correctly performed the analyses and that no data were rejected. All laboratory analytical data are considered usable for the purposes of this project. Appendix G presents the data validation summary reports.

As stated in Section 4.7 of the SS-WP (Eco 2011b), any U-flagged value is treated as "not detected", and is assumed to not be present in the sample. In some cases, the PQL is greater than the screening value. This is common in some analyses due to sample preparation and analytical limitations. This could lead to a situation where the analyte is present at a concentration greater than the screening value, but is reported as "not detected or estimated" leading to an underestimate of risk. However, such occasions are expected to be rare and are not likely to drive the recommendation for the SI. For this SI, PQLs for five analytes are greater than the selected screening values:

- 1,3-Dinitrobenzene (surface soil): PQL = 0.40 mg/kg; screening value (ecological) = 0.073 mg/kg;
- 2,4-Dinitrotoluene (surface water): PQL = 0.30 µg/L; screening value (human health) = 0.11 µg/L;
- 2-Nitrotoluene (surface water): PQL = 0.30 µg/L; screening value (human health) = 0.27 µg/L;
- 2,4,6-Trinitrotoluene (TNT) (sediment): PQL = 0.30 mg/kg; screening value (ecological) = 0.092 mg/kg;
- 2,4-Dinitrotoluene (sediment): PQL = 0.070 mg/kg; screening value (ecological) = 0.040 mg/kg; and,
- Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) (sediment): PQL = 0.50 mg/kg; screening value (ecological) = 0.013 mg/kg.

However, no other explosive compounds were detected in the surface soil, surface water, or sediment at MRS03; therefore, it is unlikely these explosive compounds are present at the site.

5.2.7 BACKGROUND/AMBIENT CONCENTRATIONS

Due to the variability of naturally occurring metals in the area and to supplement the single ambient sample (per media) collected during the SI, the TPP Team agreed to the following evaluation criteria:

Soil: To supplement the limited ambient surface soil data collected during the SI, the background values used to compare biased samples were augmented by background concentrations obtained from the West Virginia Voluntary Remediation and Redevelopment Act Guidance Manual Version 2.1, Table 2-3: Natural Background Levels of Inorganics in Soil in West Virginia and Surrounding Areas:

http://www.dep.wv.gov/dlr/oer/voluntarymain/documents/vrra%20guidanceversion2-1.pdf.
The applicable data are based on larger sample sizes ($n \geq 10$) leading to a more robust comparison.

The background value used for comparison to the biased surface soil sample results is three times the mean background concentration obtained from West Virginia guidance, per United States Environmental Protection Agency (USEPA) guidance (USEPA, 1992).

Sediment: For sediment, two sources of information were used to determine sediment background metals values at MRS01:

- Three times the average concentrations of elements in Tucker County, West Virginia, identified by the United States Geological Survey (USGS), described in the paragraph below, (USGS, 2012); and
- Analytical results of one ambient sediment sample collected during the 2012 SI field activities in an area not expected to be affected by munitions activities, used in the absence of a Tucker County average concentration. The background value is three times the ambient sample analytical result.

The nationwide Mineral Resources Data System (MRDS) database of concentrations of elements provides county-specific background values for selected metals. The MRDS includes mineral resource occurrence data covering the world, most thoroughly within the United States. This database contains the records previously provided in the MRDS of USGS and the Mineral Availability System/Mineral Industry Locator System originated by the United States Bureau of Mines, which is now part of the USGS. According to the USGS, the MRDS is a large and complex relational database developed over several decades by hundreds of researchers and reporters (USGS, 2012). This dataset is considered to likely be more representative of conditions within Randolph County; however, the available data are limited to a select group of metals. Concentrations of the antimony, barium, and chromium are not available in this dataset.

Surface Water: For surface water, additional metals background data were not available. Therefore, per USEPA guidance (USEPA, 1992) the surface water background value is established as three times the concentration detected in the ambient surface water sample.

5.2.7.1 Ambient Surface Soil Samples

One ambient surface soil sample (WVMA-MRS03-AMB-SS-02-02) and one set of ambient surface water/sediment coupled samples (WVMA-MRS03-AMB-SW-02 and WVMA-MRS03-AMB-SD-02) were collected from an area southwest of the MRS that is not anticipated to be impacted by DoD activities. The ambient surface water and sediment samples were collected from Condon Run, which empties into Otter Creek downstream from the sample location. Otter Creek then flows northward through the MRS. The SVT also collected the ambient surface soil sample in the same area. The SVT observed no MD or evidence of DoD use near the ambient sample locations. The ambient surface soil, surface water, and sediment samples were analyzed for explosives and selected metals (aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc). The surface soil and sediment samples were also analyzed for pH.

The ambient sample analytical results were used to represent naturally occurring metals concentrations at the Jenningston Training Area MRS. Tables 5.3, 5.4, and 5.5 summarize the metals concentrations detected in the collected ambient samples. These concentrations were then compared to the maximum detected metals concentrations found in the biased-location samples obtained within the Jenningston Training Area MRS. Since explosives are not naturally occurring, any detected explosives concentrations would be retained for consideration in the SLRA in Chapter 6. However, explosives were not detected in any samples collected at the Jenningston Training Area MRS.

TABLE 5.2
SUMMARY OF BACKGROUND CONCENTRATIONS IN SURFACE WATER
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

ANALYTES	WVMA-MRS03-AMB-SW-02(1)	SELECTED BACKGROUND CONCENTRATION(2)
Metals:	**µg/L**	
Aluminum	**280**	840
Antimony	**0.72J**	2.2
Chromium	**5.0U**	< 5.0*
Copper	**2.1U**	< 2.0*
Lead	**0.53J**	1.6
Manganese	**13**	42
Mercury	**0.084J**	0.25
Zinc	**7.9J**	24

Notes:

(1) Ambient sample
(2) 3x site-specific ambient sample
J Analyte detected; estimated concentration
U Analyte was analyzed for, but not detected above the sample specific practical quantitation limit (PQL, sa).
* Ambient sample result was not detected above the sample specific PQL. Comparison to detection limit made for SLRA determination.

TABLE 5.3
SUMMARY OF BACKGROUND CONCENTRATIONS IN SEDIMENT
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

ANALYTES	WVMA-MRS03-AMB-SD-02[1]	SELECTED BACKGROUND CONCENTRATION[2]
Metals:	**mg/kg**	
Aluminum	**3,400**	85,000
Antimony	**0.36**	NA
Chromium	**11**	NA
Copper	**5.5**	37
Lead	**5.8**	43
Manganese	**330J**	1,300
Mercury	**0.027J**	0.11
Zinc	**20**	170

Notes:
(1) Ambient sample
(2) 3x site-specific ambient sample
J Analyte detected; estimated concentration

TABLE 5.4
SUMMARY OF BACKGROUND CONCENTRATIONS IN SURFACE SOIL
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

ANALYTES	WVMA-MRS03-AMB-SS-02-02[1]	SELECTED BACKGROUND CONCENTRATION[2]
Metals:	**mg/kg**	
Aluminum	**4,100**	190,000
Antimony	**0.44J**	2.3
Chromium	**7.1**	140
Copper	**12**	66
Lead	**74**	50
Manganese	**730J**	2.310
Mercury	**0.27**	0.42
Zinc	**23**	180

Notes:
(1) Ambient sample.
(2) 3x site-specific ambient sample
J Analyte detected; estimated concentration.

5.2.8 ESTABLISHING AN OBSERVED RELEASE

As explained in Subchapter 5.1.1, an exposure pathway for a chemical release is not considered complete unless metals concentrations that are consistent with the identified MC contaminants of concern have been released to environmental media. To make this determination, analytical results for metals in the soil, surface water, and sediment samples were compared against several criteria. For an analyte to be considered to have been released due to munitions-related activities at the Jenningston Training Area MRS, it is necessary for the following conditions to be true:

- The analyte is detected in the sample medium.
- The analyte is present above the selected background concentration.
- The analyte is a potential constituent of the munitions formerly used at the site (see Table 4.1).

The metals analyzed were evaluated against these criteria to determine whether metals have been released. Only analytes that meet the conditions above are evaluated further in the SLRA in Chapter 6. Any detection of explosives at the site is evidence of a potential release of metals and is evaluated in the SLRA.

The above method is consistent with the process described in Chapter 5, Observed Release, of the HRS Guidance Manual (USEPA 1992). The HRS Guidance Manual process for establishing an observed release "requires documenting that the concentration of at least one hazardous substance in a release sample is significantly increased above its background level, and that the substance in the release can be attributed to the site" (USEPA 1992). The method described above both confirms whether an analyte is present above background concentrations and whether that analyte is a potential constituent of the munitions formerly used at the site, meeting both criteria defined in the guidance.

5.3 JENNINGSTON TRAINING AREA MUNITIONS RESPONSE SITE

This subchapter of the SI Report evaluates pathways for the Jenningston Training Area MRS. The analysis of each pathway is described in detail. The related CSEM for the MRS is provided in Appendix J.

5.3.1 HISTORICAL MUNITIONS CONSTITUENTS INFORMATION

The Jenningston Training Area MRS consists of 40,000 acres. No historical metals-related groundwater, surface water, sediment, soil, or air sampling has been documented at this MRS.

5.3.2 GROUNDWATER EXPOSURE PATHWAY

Groundwater can serve as a contaminant transport mechanism that may affect surface water bodies, drinking water supplies, vegetation, and sensitive environments such as wetlands. The likelihood of exposure is influenced by such factors as the mass and concentration of metals in soil at the ground surface that can be transported to the groundwater, site-specific geology, climate, and the expected future land use.

5.3.2.1 Geologic and Hydrogeologic Setting

The geologic and hydrogeologic settings at the Jenningston Training Area MRS are described in Subchapter 5.1.1.

5.3.2.2 Releases and Potential Releases to Groundwater

There are no known releases or potential releases of metals to groundwater at the Jenningston Training Area MRS. Groundwater would not have been directly affected by activities associated with the MRS. If there were releases of metals to soil, surface water, or sediment, as a result of the munitions-related activities, it is possible that the constituents could leach to groundwater, which ranges from 7.65 feet bgs to 241.18 feet bgs within the 4-mile buffer for the MRS (EDR 2012).

5.3.2.3 Groundwater Exposure Pathway and Receptors

A water well data report included in Appendix L lists 90 groundwater wells within 4 miles of the Jenningston Training Area MRS (EDR 2012). The report lists 4 wells within the Jenningston Training Area MRS (Table 5.5 and Figure 5.1).

TABLE 5.5
GROUNDWATER WELLS WITHIN 4-MILE BUFFER OF THE JENNINGSTON TRAINING AREA MRS
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

DISTANCE FROM SITE	TOTAL
On site	4
0 to ¼ mile	1
¼ to ½ mile	2
½ to 1 mile	0
1 to 2 miles	11
2 to 3 miles	37
3 to 4 miles	35
Site to 4 miles	90

Detailed well information is included in Appendix L.

As shown in Table 2.1, the 2010 census data indicate that 6,884 people live within a 4-mile radius of the Jenningston Training Area MRS. The census data also indicate that 510 people potentially live within the Jenningston Training Area MRS, as shown in Table 2.1 and on Figure 2.2 (U.S. Census Bureau 2010). A large portion of the Jenningston Training Area MRS is managed as the Monongahela National Forest, which is used for outdoor recreation and agriculture. The remainder of the MRS is owned by private individuals and consists of residential, commercial, and agricultural properties, including the unincorporated communities of Jenningston, Dryfork, Elk, and Gladwin. The SVT observed a variety of inhabited structures within the MRS. Based on the SVT's observations and the census data, residents are considered potential receptors at the Jenningston Training Area MRS.

Based on information in the PA, groundwater is the primary water source for residences within the Jenningston Training Area MRS. However, because the region is sparsely populated, groundwater use will be limited to domestic use from private wells producing from fractured bedrock aquifers (USACE 2009). Groundwater would not have been directly affected by munitions activities; however, metals in soil could leach to groundwater given the shallow depth to groundwater in some areas of the Jenningston Training Area MRS. Based on the current and future land uses of this MRS, potential receptors include current and future residents, commercial/industrial workers (e.g., U.S. Forest Service personnel),

recreational users (e.g., hikers and spelunkers), and site visitors. Human receptors in the area could be exposed to groundwater via incidental ingestion, dermal contact, and ingestion of groundwater as drinking water. Typically, ecological receptors are not exposed to groundwater. However, due to the confirmed presence of caves onsite, cave dwelling ecological receptors could be exposed to groundwater via incidental ingestion, dermal contact, and ingestion of groundwater as drinking water.

5.3.2.4 Groundwater Sampling Locations and Methods

As discussed in Subchapter 5.2.5, four groundwater wells were identified within the MRS; however, ROEs were not received for the properties containing the wells, so no groundwater samples were collected.

5.3.2.5 Groundwater Sampling Analytical Results

Not applicable; no groundwater samples were collected during the SI at the Jenningston Training Area MRS.

5.3.2.6 Groundwater Exposure Pathway Conclusions

There are 90 groundwater wells within 4 miles of the Jenningston Training Area MRS, and 4 wells are within the MRS. Groundwater beneath the site would not have been directly affected by activities at the MRS. As described in Subchapter 5.3.4.6, metals were not detected in surface soil at this MRS at concentrations above background. In addition, private residences use groundwater as drinking water and there are caves onsite. Based on this information, the groundwater exposure pathway is potentially incomplete but not quantitatively assessed for human and ecological (cave dwelling) receptors at the MRS.

5.3.3 SURFACE WATER AND SEDIMENT EXPOSURE PATHWAYS

Surface water can serve as a contaminant transport mechanism that may affect surface water bodies, sediment, drinking water supplies, vegetation, and sensitive environmental areas such as wetlands. The likelihood of exposure is influenced by such factors as the mass and concentration of metals in soil at the ground surface that can be transported to the surface water and sediment through runoff and erosion.

5.3.3.1 Hydrologic Setting

Surface water in the Jenningston Training Area MRS drains from the high slopes of McGowan and Shavers Mountains and eventually into the Cheat River system. The MRS encompasses portions of Otter Creek and the Dry Fork, Glady Fork, and Laurel Fork Rivers. Otter Creek traverses the western half of the MRS and flows from south to north through the Otter Creek Wilderness. There are numerous caverns, sink holes, and springs located along the slope of Shavers Mountain at the center of the MRS, and Glady Fork is located at the base of the mountain slope. The Glady Fork and Laurel Fork Rivers flow northeastward through the eastern half of the MRS. In the northeast portion of the MRS, both rivers empty into the Dry Fork River, which flows northwestward through the northern MRS boundary. During the site visit, the SVT observed surface water within the Otter Creek drainage, the Glady Fork River, and the Dry Fork River, as well as in other smaller streams and drainages. Several wetlands are mapped within the MRS, including freshwater pond, forest/shrub, and riverine types; however, these were not observed by the SVT during the field activities. As described in Subchapters 5.2.2 and 5.2.3, eleven surface water intakes are within 15 miles of the MRS and no tribal drinking water sources are located within 4 miles of the MRS (USEPA 2012).

5.3.3.2 Releases and Potential Releases to Surface Water and Sediment

Based on historical documents for the Jenningston Training Area MRS, the area was used as an infantry division troop maneuver area. Activities conducted in the area consisted of rock climbing exercises and troop maneuver training. No MEC has been found within the MRS during previous investigations or during the 2012 SI. There are no reports of MEC being found historically by members of the public. In 2006, 60mm and 81mm mortar shipping canisters were found within the MRS in a trash pit at the bottom of a small cave on the eastern slope of Shaver's Mountain. However, this is the only physical evidence of military use that has been found within the MRS to date. Therefore, there are no known direct releases of metals to surface water and sediment at the Jenningston Training Area MRS (USACE 1995).

5.3.3.3 Surface Water and Sediment Exposure Pathway and Receptors

There are perennial surface water bodies present at the Jenningston Training Area MRS, and surface water was observed in these water bodies by the SVT. Direct release of metals to surface water and sediment is not known to have occurred at this MRS. However, if potential metals contamination was present in the soil at the MRS, it could migrate to surface water or sediment via runoff and erosion. The surface water and sediment exposure pathways include ingestion as drinking water, incidental ingestion and dermal exposure. Ecological receptors may also be exposed to metals by the ingestion of biota that may have been exposed to metals in surface water or sediment. Residents, commercial/industrial workers (e.g., U.S. Forest Service personnel), recreational users (e.g., hikers and spelunkers), site visitors, and ecological receptors at this MRS could be exposed to metals via these pathways.

5.3.3.4 Surface Water and Sediment Sampling Locations and Methods

One set of biased surface water/sediment coupled samples (WVMA-MRS03-SW-01 and WVMA-MRS03-SD-01), along with one set of associated field duplicate samples (WVMA-MRS03-SW-03 and WVMA-MRS03-SD-03) were collected from Otter Creek, within the northern portion of the Jenningston Training Area MRS. The samples were collected from a location downstream of the Otter Creek Wilderness and the majority of the MRS. These sample locations were selected to represent areas with the highest likelihood of the presence of MEC or metals contamination. Although no MEC and no MD has been found in the Otter Creek Wilderness, it is possible that troops conducted training in the area. One set of ambient surface water/ sediment coupled samples (WVMA-MRS03-AMB-SW-02 and WVMA-MRS03-AMB-SD-02) were collected from an area southwest of the MRS that is not anticipated to be impacted by DoD activities. The ambient surface water and sediment samples were collected from Condon Run, which empties into Otter Creek on the south side of the Jenningston Training Area MRS. No MD or evidence of metals contamination was observed at or near the sample locations. Figure 5.2 shows the sample locations and identification numbers. Table 5.1 indicates the rationale behind the sample locations. Appendix D includes the field notes and field forms for the site visit.

APPL, Inc. in Clovis, CA analyzed all of the samples for explosives and selected metals (aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc). The sediment samples were also analyzed for pH. The ambient samples were analyzed for explosives to verify that the sample location represents background surface water and sediment conditions at the MRS. The analytical results from the ambient samples are also used to estimate background concentrations of naturally occurring metals in the surface water and sediment at the MRS (Subchapter 5.2.7).

5.3.3.5 Surface Water and Sediment Sampling Analytical Results

The analytical results for the surface water and sediment samples collected from the Jenningston Training Area MRS are presented in Tables 5.6 (surface water) and 5.7 (sediment) and are included in Appendix F.

These results were evaluated using the criteria described in Subchapter 5.2.8 to determine whether metals contamination is present.

The source evaluations are summarized in Table 5.8 for surface water and Table 5.9 for sediment. Explosive compounds are not naturally occurring; therefore, any detection of explosive compounds is assumed to result from munitions-related activities and would be retained for further consideration in the SLRA in Chapter 6. However, no explosive compounds were detected in any of the surface water or sediment samples collected from this MRS and the maximum detected concentrations of the metals at MRS03 did not exceed the selected background concentrations.

As shown in Table 5.7, all seven metals (aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc) were detected in the sediment samples collected from the MRS, none of them however, exceeded background concentrations.

5.3.3.6 Surface Water and Sediment Exposure Pathway Conclusions

Based on the current and future land use of the Jenningston Training Area MRS, potential receptors include current and future residents, commercial/industrial workers (e.g., U.S. Forest Service personnel), recreational users (e.g., hikers and spelunkers), site visitors, and ecological receptors. Human receptors may be exposed to metals in surface water or sediment via ingestion as drinking water, incidental ingestion or dermal exposure. Ecological receptors could be exposed to metals in surface water or sediment through incidental ingestion, dermal exposure, and ingestion as a drinking water source. Surface water and sediment samples were collected from the Jenningston Training Area MRS. As discussed in Subchapter 5.2.3.5, none of the metals were detected at concentrations exceeding background values. Based on this information, the surface water and sediment exposure pathways are incomplete for human and ecological receptors.

5.3.4 SOIL EXPOSURE PATHWAY

Potential soil exposure pathways may include incidental ingestion, dermal contact, and inhalation of re-suspended soil particulates by human and ecological receptors. Contamination in soil can also leach to groundwater and migrate to surface water and sediment via runoff and erosion. Subchapters 5.3.2 and 5.3.3 discuss the groundwater and surface water/sediment exposure pathways, respectively. Ecological receptors may also come into contact with metals in soil by ingesting biota that has been exposed to metals in soil. The likelihood of exposure is influenced by such factors as the mass and concentration of metals in soil exposed at the ground surface; site-specific geology, hydrogeology, climate; and the expected future land use.

5.3.4.1 Physical Source Access Conditions

The SVT encountered no barriers (fences and locked gates) to control access to the Jenningston Training Area MRS. There are several roads and highways that can be used to access the communities within the MRS and areas outside of the Otter Creek Wilderness Area. The interior of the Otter Creek Wilderness Area, while remote, can be accessed by hiking trails.

5.3.4.2 Actual or Potential Contamination Areas

The location of the Jenningston Training Area MRS is based on reviews of historical documents identified in the INPR and the PA. Prior to the SI, the only area identified within the MRS with the potential for metal contamination was the cave where mortar shipping containers were found. During the 2012 site visit, the SVT observed that the floor of the cave was clear of trash and munitions-related debris. The SVT found no MD, MEC, firing points, target areas, or other evidence of DoD use within the MRS.

TABLE 5.6: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID: / Date Sampled: / Analytes	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SW-02* 05/13/12	WVMA-MRS03-SW-01 05/13/12	WVMA-MRS03-SW-03** 05/13/12
	µg/L	µg/L	µg/L		
Explosives - SW8330B					
1,3,5-Trinitrobenzene	460 (2)	60000 (5)	0.30 U	0.30 U	0.30 U
1,3-Dinitrobenzene	1.5 (2)	26 (5)	0.30 U	0.30 U	0.30 U
2,4,6-Trinitrotoluene (TNT)	2.2 (2)	100 (6)	0.30 U	0.30 U	0.30 U
2,4-Dinitrotoluene	0.11 (3)	44 (6)	0.30 U	0.30 U	0.30 U
2,6-Dinitrotoluene	15 (2)	81 (6)	0.30 U	0.30 U	0.30 U
2-Amino-4,6-dinitrotoluene	30 (2)	1500 (6)	0.30 U	0.30 U	0.30 U
2-Nitrotoluene	0.27 (2)	39000 (5)	0.30 U	0.30 U	0.30 U
3-Nitrotoluene	1.3 (2)	750 (6)	0.30 U	0.30 U	0.30 U
4-Amino-2,6-dinitrotoluene	30 (2)	43000 (5)	0.30 U	0.30 U	0.30 U
4-Nitrotoluene	3.7 (2)	1900 (6)	0.30 U	0.30 U	0.30 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.61 (2)	360 (6)	0.30 U	0.30 U	0.30 U
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	63 (2)	5800 (5)	0.30 U	0.30 U	0.30 U
Nitrobenzene	0.12 (2)	2700 (7)	0.30 U	0.30 U	0.30 U
Nitroglycerin	1.5 (2)	140 (6)	0.30 U	0.30 U	0.30 U
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	780 (2)	150 (6)	0.30 U	0.30 U	0.30 U
Pentaerythritol Tetranitrate (PETN)	16 (2)	85000 (6)	1.5 U	1.5 U	1.5 U
Total Metals - SW6010B					
Aluminum	16000 (2)	87 (6)	**280**	**170**	**180**
Antimony	14 (3)	30 (6)	**0.72 J**	**0.97 J**	**0.88 J**
Chromium	16000 (2)	74 (6)	5.0 U	5 U	5 U

TABLE 5.6: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID: / Date Sampled: / Analytes	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SW-02* 05/13/12	WVMA-MRS03-SW-01 05/13/12	WVMA-MRS03-SW-03** 05/13/12
	µg/L	µg/L	µg/L		
Copper	1000 (3)	9 (6)	2.1 U	2 U	2 U
Lead	50 (3)	2.5 (6)	**0.53 J**	**0.42 J**	2 U
Manganese	1000 (3)	120 (6)	**42**	**13**	**13**
Mercury	0.14 (3)	2.4 (4)	**0.084 J**	0.2 U	0.2 U
Zinc	4700 (2)	120 (6)	**7.9 J**	**5.7 J**	**5 J**
pH			s.u.		
			4.44	**5.04**	**5.04**
Turbidity			NTU		
			27.1	**4.4**	**4.4**

QA Notes and Data Qualifiers:
(NO CODE) Confirmed identification
U Analyte was analyzed for but not detected above the sample specific practical quantitation limit (PQL_sa)
UJ - Analyte not detected, reported PQL_sa may be inaccurate or imprecise
J - Analyte detected, estimated concentration
s.u. - Standard units
NTU - Nephelometric Turbidity Units
* Ambient sample
** Field duplicate of sample on left
Detections are bolded

TABLE 5.6: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR WATER SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

(1) Human health screening levels for surface water used from WV Requirements Governing Water Quality Standards (47CSR2) June 27, 2011 (http://www.dep.wv.gov/WWE/Programs/wqs/Documents/Rules/WVDEP_47CSR2_WQS_FinalRule%206_27_2011.pdf), supplemented with USEPA National Recommended Water Quality Criteria August 2010 (http://water.epa.gov/scitech/swguidance/standards/current/index.cfm), and USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Tap Water, May 2012 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf). (2) WV Requirements Governing Water Quality Standard not available. Used USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Tap Water, May 2012 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf).
(3) Human health screening levels for surface water from WV Requirements Governing Water Quality Standards (47CSR2) June 27, 2011 (http://www.dep.wv.gov/WWE/Programs/wqs/Documents/Rules/WVDEP_47CSR2_WQS_FinalRule%206_27_2011.pdf). (4) Ecological screening values for surface water used from WV Requirements Governing Water Quality Standards (47CSR2) June 27, 2011 (http://www.dep.wv.gov/WWE/Programs/wqs/Documents/Rules/WVDEP_47CSR2_WQS_FinalRule%206_27_2011.pdf) supplemented with USEPA National Recommended Water Quality Criteria August 2010 (http://water.epa.gov/scitech/swguidance/standards/current/index.cfm), and USEPA Region 3 Freshwater Screening Benchmark June 13, 2011 (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/screenbench.htm), and Los Alamos National Laboratory's EcoRisk Database v3.0 October 2011 (http://www.lanl.gov/environment/cleanup/ecorisk.shtml), and USEPA Region 4 Ecological Screening Values for Fresh Surface Water November 30, 2001 (http://www.epa.gov/region04/waste/ots/ecolbul.html#tbl1), and USEPA Region 5 Ecological Screening Levels August 22, 2003 (http://www.epa.gov/Region5/waste/cars/pdfs/ecological-screening-levels-200308.pdf). (5) Ecological screening values for surface water used from WV Requirements Governing Water Quality Standards (47CSR2) June 27, 2011 (http://www.dep.wv.gov/WWE/Programs/wqs/Documents/Rules/WVDEP_47CSR2_WQS_FinalRule%206_27_2011.pdf) supplemented with USEPA National Recommended Water Quality Criteria August 2010 (http://water.epa.gov/scitech/swguidance/standards/current/index.cfm), and USEPA Region 3 Freshwater Screening Benchmark June 13, 2011 (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/screenbench.htm), and Los Alamos National Laboratory's EcoRisk Database v3.0 October 2011 (http://www.lanl.gov/environment/cleanup/ecorisk.shtml), and USEPA Region 4 Ecological Screening Values for Fresh Surface Water November 30, 2001 (http://www.epa.gov/region04/waste/ots/ecolbul.html#tbl1), and USEPA Region 5 Ecological Screening Levels August 22, 2003 (http://www.epa.gov/Region5/waste/cars/pdfs/ecological-screening-levels-200308.pdf). (6) WV Water Quality Standard not available. Used USEPA Region 3 Freshwater Screening Benchmark June 13, 2011 (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/screenbench.htm).
(7) WV Requirements Governing Water Quality Standards (47CSR2) no t available. Used USEPA Region 4 Ecological Screening Values for Fresh Surface Water November 30, 2001 (http://www.epa.gov/region04/waste/ots/ecolbul.html#tbl1),

TABLE 5.7: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Analytes / Sample ID: / Date Sampled:	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SD-02*	WVMA-MRS03-SD-01	WVMA-MRS03-SD-03**
			05/13/12	05/13/12	05/13/12
Explosives - SW8330B	mg/kg	mg/kg		mg/kg	
1,3,5-Trinitrobenzene	2200 (2)	1300 (5)	0.090 U	0.090 U	0.090 U
1,3-Dinitrobenzene	6.1 (2)	1.2 (5)	0.40 U	0.40 U	0.40 U
2,4,6-Trinitrotoluene (TNT)	19 (2)	0.092 (6)	0.30 U	0.30 U	0.30 U
2,4-Dinitrotoluene	1.6 (2)	0.04 (6)	0.070 U	0.070 U	0.070 U
2,6-Dinitrotoluene	61 (2)	9.7 (5)	0.040 U	0.040 U	0.040 U
2-Amino-4,6-dinitrotoluene	150 (3)	34 (5)	0.50 U	0.50 U	0.50 U
2-Nitrotoluene	2.9 (2)	28 (5)	0.50 U	0.50 U	0.50 U
3-Nitrotoluene	6.1 (2)	24 (5)	0.50 U	0.50 U	0.50 U
4-Amino-2,6-dinitrotoluene	150 (2)	9.5 (5)	0.50 U	0.50 U	0.50 U
4-Nitrotoluene	30 (2)	4.1 (6)	0.50 U	0.50 U	0.50 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.5 (2)	0.013 (6)	0.50 U	0.50 U	0.50 U
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	240 (2)	100 (5)	0.50 U	0.50 U	0.50 U
Nitrobenzene	4.9 (2)	27 (5)	0.50 U	0.50 U	0.50 U
Nitroglycerin	6.1 (2)	1700 (5)	0.50 U	0.50 U	0.50 U
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3800 (2)	27000 (5)	0.50 U	0.50 U	0.50 U
Pentaerythritol Tetranitrate (PETN)	120 (3)	1400 (5)	2.5 U	2.5 U	2.5 U
Metals - SW6010B				mg/kg	
Aluminum	77000 (2)	280 (5)	**3400**	**4900 J**	**5,400**
Antimony	31 (2)	2 (6)	**0.36**	**0.16 J**	**0.24 J**
Chromium	120000 (2)	43 (6)	**11.0**	**8.1 J**	**8**

TABLE 5.7: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Analytes / Sample ID: / Date Sampled:	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SD-02*	WVMA-MRS03-SD-01	WVMA-MRS03-SD-03**
			05/13/12	05/13/12	05/13/12
Copper	3100 (2)	32 (6)	**5.5**	**3.9 J**	**4.4**
Lead	400 (2)	36 (6)	**5.8**	**7.8 J**	**9.2**
Manganese	3330 (2)	460 (5)	**86.0**	**330 J**	**320**
Mercury	23 (2)	0.18 (5)	**0.027 J**	**0.034 J**	**0.029 J**
Zinc	23000 (2)	120 (5)	**20.0**	**71 J**	**74**
pH - SW9045D				**s.u.**	
			4.4	**6.4**	**6.1**
Percent Moisture				**%**	
Moisture, percent			**19**	**21**	**33**

QA Notes and Data Qualifiers:
(NO CODE) - Confirmed identification
U - Analyte was analyzed for but not detected above the sample specific practical quantitation limit (PQL_sa)
J - Analyte detected, estimated concentration
s.u. - Standard units
* - Ambient sample
** Field duplicate of sample on left
Detections are bolded

(1) Human health screening levels for soil and sediment used from WVDEP Risk-Based Concentrations (RBCs), Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) May 1, 2012 (http://www.dep.wv.gov/dlr/oer/voluntarymain/Documents/60CSR3%20VRRA%20filed%204-11-12.pdf) supplemented with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Soil, May 2012 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf).
(2) WVDEP Risk-Based Concentrations (RBCs), Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) May 1, 2012 (http://www.dep.wv.gov/dlr/oer/voluntarymain/Documents/60CSR3%20VRRA%20filed%204-11-12.pdf)
(3) WVDEP RBC not available. Used USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Soil ,May 2012 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf).

TABLE 5.7: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SEDIMENT SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Analytes / Sample ID: / Date Sampled:	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SD-02*	WVMA-MRS03-SD-01	WVMA-MRS03-SD-03**
Date Sampled:			05/13/12	05/13/12	05/13/12

(4) Ecological screening values for sediment used from USEPA Region 3 Ecological Screening Benchmark June 13, 2011 (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm), and National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRTs) (http://archive.orr.noaa.gov/book_shelf/122_NEW-SQuiRTs.pdf), and Los Alamos National Laboratory's EcoRisk Database v3.0 October 2011 (http://www.lanl.gov/environment/cleanup/ecorisk.shtml), and USEPA Region 4 Ecological Screening Values for Sediment November 30, 2001 (http://www.epa.gov/region04/superfund/programs/riskasses/ecolbul.html#tbl3), and USEPA Region 5 Ecological Screening Levels August 22, 2003 (http://www.epa.gov/Region5/waste/cars/pdfs/ecological-screening-levels-200308.pdf).

(5) USEPA Region 3 Ecological Screening Benchmark screening value not available. Used Los Alamos National Laboratory's EcoRisk Database v3.0 October 2011 (http://www.lanl.gov/environment/cleanup/ecorisk.shtml).

(6) USEPA Region 3 Ecological Screening Benchmark June 13, 2011 (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/screenbench.htm).

TABLE 5.8
SURFACE WATER SOURCE EVALUATION
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

ANALYTE	MAXIMUM DETECTED SITE CONCENTRATION	3X SITE-SPECIFIC AMBIENT SAMPLE	EXCEEDS BACKGROUND CONCENTRATION?	POTENTIAL METAL CONTAMINATION(1)?	SLRA REQUIRED?	PRIMARY REASON FOR EXCLUSION FROM SLRA
Metals:	µg/L					
Aluminum	180	840	No	**Yes**	No	Not detected above background
Antimony	0.97J	2.2	No	**Yes**	No	Not detected above background
Chromium	5.0U	<5.0*	No	**Yes**	No	Not detected at MRS
Copper	2.0U	<2.0*	No	**Yes**	No	Not detected at MRS
Lead	0.42J	1.6	No	**Yes**	No	Not detected above background
Manganese	13	42	No	**Yes**	No	Not detected above background
Mercury	0.20U	0.25	No	**Yes**	No	Not detected at MRS
Zinc	5.7J	24	No	**Yes**	No	Not detected above background

Notes:
(1) Potential MC as listed in Table 4.1 of the SI Report
J Analyte detected, estimated concentration
U Analyte was analyzed for but not detected above the sample specific practical quantitation limit (PQL_sa).
* - Ambient sample result was not detected above the sample specific PQL. Comparison to detection limit made for SLRA determination

TABLE 5.9
SEDIMENT SOURCE EVALUATION
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

ANALYTE	MAXIMUM DETECTED SITE CONCENTRATION	3X USGS BACKGROUND VALUE(1)	3X SITE-SPECIFIC AMBIENT SAMPLE	EXCEEDS BACKGROUND CONCENTRATION?	POTENTIAL METAL CONTAMINATION(2)?	SLRA REQUIRED?	PRIMARY REASON FOR EXCLUSION FROM SLRA
Metals:		**mg/kg**					
Aluminum	5,400	85,000	10,000	No	**Yes**	No	Not detected above background
Antimony	0.24J	NA	1.1	No	**Yes**	No	Not detected above background
Chromium	8.1J	NA	33	No	**Yes**	No	Not detected above background
Copper	4.4	37	17	No	**Yes**	No	Not detected above background
Lead	9.2	43	17	No	**Yes**	No	Not detected above background
Manganese	330J	1,300	260	No	**Yes**	No	Not detected above background
Mercury	0.034J	0.11	0.081	No	**Yes**	No	Not detected above background
Zinc	74	170	60	No	**Yes**	No	Not detected above background

Notes:
(1) USGS derived background concentration for Tucker County (http://mrdata.usgs.gov/geochem/county.php?place=f54093&el=Al&rf=east-central). The background values are selected from those available in the column order shown (i.e., the USGS value is used if there is one; if there is no USGS value, then the site-specific value is used). The selected value is shown in **Bold**.
(2) Potential metals contamination as listed in Table 4.1
J Analyte detected, estimated concentration

5.3.4.3 Soil Exposure Pathways and Receptors

The soil exposure pathway accounts for the potential risk to human and ecological receptors at or near the Jenningston Training Area MRS that may come into contact with potentially contaminated soil. Human and ecological receptors may come into contact with metals in surface soil via dermal contact, incidental ingestion, or inhalation of re-suspended soil particulates. Ecological receptors are considered to be present at this MRS (Subchapter 5.2.4) and may also come into contact with metals in surface soil by ingesting biota that have been exposed to metals in soil. Based on the site use, census data, and the SVT observations listed in Subchapter 5.3.2.3, the potential receptors likely present at the Jenningston Training Area MRS are current and future residents, commercial/industrial workers (e.g., U.S. Forest Service personnel), recreational users (e.g., hikers and spelunkers), site visitors, and ecological receptors.

5.3.4.4 Soil Sampling Locations and Methods

The TPP Team agreed to collect one biased surface soil sample, one ambient surface soil sample, and associated QC samples within the Jenningston Training Area MRS during the SI. The biased sample (WVMA-MRS03-SS-02-01), along with one duplicate (WVMA-MRS03-SS-02-03) and the ambient sample (WVMA-MRS03-AMB-SS-02-02), were collected during the May 2012 site visit using the proposed CRREL "seven-point wheel" composite sampling technique. The samples were collected from the proposed sample depth of 0 to 2 inches bgs.

No MD and no MEC items were found during the site visit. Samples WVMA-MRS03-SS-02-01 and WVMA-MRS03-SS-02-03 were collected adjacent to the opening of the cave where mortar shipping canisters were found. The ambient surface soil sample was collected near Condon Run, southwest of the MRS. As described in Subchapter 5.2.5 of this report, the UXO technician used a Schonstedt GA-52Cx magnetometer to screen all soil sample locations before sample collection. Soil sampling was employed, as specified in the final SS-WP. The coordinates for each sample location were recorded and uploaded to the GIS database. Figure 5.2 shows the sample locations and identification numbers. Table 5.1 indicates the rationale behind the sample locations. Appendix D includes the field notes and field forms for the site visit.

All of the surface soil samples were analyzed for explosives, metals (aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc), and pH. The ambient surface soil sample was analyzed for explosives to verify that the sample location represents background soil conditions at the MRS. The analytical results from the ambient sample are used to estimate background concentrations of naturally occurring metals in the surface soil at the site (Subchapter 5.2.7).

5.3.4.5 Soil Sampling Analytical Results

Results for the soil sample analysis are listed in Table 5.10 and are included in Appendix F. These results were evaluated using the criteria described in Subchapter 5.2.8. Explosives were not detected in any of the surface soil samples, and therefore, the source evaluation for the MRS presented in Table 5.11 is for metals only. Seven metals (aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc) were detected in the surface soil samples. None of these metals were detected at concentrations greater than their respective selected background concentrations.

5.3.4.6 Soil Exposure Pathway Conclusions

Potential receptors for soil at the Jenningston Training Area MRS include current and future residents, commercial/industrial workers (e.g., U.S. Forest Service personnel), recreational users (e.g., hikers and spelunkers), site visitors, and ecological receptors. These receptors may be exposed to surface soil through dermal contact, incidental ingestion, and inhalation of resuspended particulate matter. Ecological

receptors also may be exposed to metals in the soil by ingestion of biota that may have been exposed to metals in the soil. The maximum detected concentrations of each metal did not exceed its respective background concentrations, and therefore, the surface soil exposure pathways are incomplete for all potential receptors at the MRS.

5.3.5 AIR EXPOSURE PATHWAY

The air exposure pathway accounts for hazardous substance exposure in gaseous or particulate form through the air. Airborne transport of contaminants can be an exposure pathway for human and ecological receptors. No air sampling has been performed at this site, and none was performed for this SI.

5.3.5.1 Climate

Subchapter 2.2.3 discusses climate.

5.3.5.2 Releases and Potential Releases to Air

There are no known direct releases of metals to air at the Jenningston Training Area MRS. The occurrence of windblown soil particulates may be expected at the site. Releases of metals contamination via this pathway are possible through resuspension of surface soil particulates.

TABLE 5.10: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID: / Analytes / Date Sampled:	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SS-02-02* 05/13/12	WVMA-MRS03-SS-02-01 05/13/12	WVMA-MRS03-SS-02-03** 05/13/12
Explosives – SW8330B	***mg/kg***	***mg/kg***	**mg/kg**		
1,3,5-Trinitrobenzene	2200 (2)	6.6 (5)	0.090 U	0.090 U	0.090 U
1,3-Dinitrobenzene	6.1 (2)	0.073 (5)	0.40 U	0.40 U	0.40 U
2,4,6-Trinitrotoluene (TNT)	19 (2)	6.4 (5)	0.30 U	0.30 U	0.30 U
2,4-Dinitrotoluene	1.6 (2)	2.5 (5)	0.070 U	0.070 U	0.070 U
2,6-Dinitrotoluene	61 (2)	1.8 (5)	0.040 U	0.040 U	0.040 U
2-Amino-4,6-dinitrotoluene	150 (3)	10 (5)	0.50 U	0.50 U	0.50 U
2-Nitrotoluene	2.9 (2)	9.9 (5)	0.50 U	0.50 U	0.50 U
3-Nitrotoluene	6.1 (2)	12 (5)	0.50 U	0.50 U	0.50 U
4-Amino-2,6-dinitrotoluene	150 (2)	3.6 (5)	0.50 U	0.50 U	0.50 U
4-Nitrotoluene	30 (2)	22 (5)	0.50 U	0.50 U	0.50 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	5.5 (2)	7.5 (5)	0.50 U	0.50 U	0.50 U
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	240 (2)	0.99 (5)	0.50 U	0.50 U	0.50 U
Nitrobenzene	4.9 (2)	40 (6)	0.50 U	0.50 U	0.50 U
Nitroglycerin	6.1 (2)	71 (5)	0.50 U	0.50 U	0.50 U

TABLE 5.10: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

Sample ID: / Analytes / Date Sampled:	Human Health Screening Values (1)	Ecological Screening Values (4)	WVMA-MRS03-AMB-SS-02-02* 05/13/12	WVMA-MRS03-SS-02-01 05/13/12	WVMA-MRS03-SS-02-03** 05/13/12
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3800 (2)	27 (5)	0.50 U	0.50 U	0.50 U
Pentaerythritol Tetranitrate (PETN)	120 (3)	100 (5)	2.5 U	2.5 U	2.5 U
Metals – SW6010B			**mg/kg**		
Aluminum	77000 (2)	50 (6)	**4100**	**24000 J**	**12,000**
Antimony	31 (2)	0.27 (7)	**0.44 J**	**0.25 J**	**0.26 J**
Chromium	120000 (2)	26 (5)	**7.1**	**30 J**	**15**
Copper	3100 (2)	28 (7)	**12**	**10 J**	**6.3**
Lead	400 (2)	11 (7)	**74**	**19 J**	**14**
Manganese	3330 (2)	220 (7)	**52**	**730 J**	**590**
Mercury	23 (2)	0.013 (5)	**0.27**	**0.21**	**0.06 J**
Zinc	23000 (2)	46 (7)	**23**	**81 J**	**50**
pH – SW9045D			**s.u.**		
pH			3.9	5.4	5.6
Percent Moisture			**%**		
Moisture, percent			63	32	34

TABLE 5.10: SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED IN MAY 2012
West Virginia Maneuver Area/Dolly Sods FUDS
Jenningston Training Area MRS

QA Notes and Data Qualifiers:

(NO CODE) - Confirmed identification

U - Analyte was analyzed for but not detected above the sample specific practical quantitation limit (PQL_sa)

J - Analyte detected, estimated concentration

s.u. - Standard units

* - Ambient sample

** Field duplicate of sample on left

Detections are bolded

(1) Human health screening levels for soil and sediment used from WVDEP Risk-Based Concentrations (RBCs), Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) May 1, 2012 (http://www.dep.wv.gov/dlr/oer/voluntarymain/Documents/60CSR3%20VRRA%20filed%204-11-12.pdf) supplemented with USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Soil, May 2012 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf).

(2) WVDEP Risk-Based Concentrations (RBCs), Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) May 1, 2012 (http://www.dep.wv.gov/dlr/oer/voluntarymain/Documents/60CSR3%20VRRA%20filed%204-11-12.pdf)

(3) WVDEP RBC not available. Used USEPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Soil ,May 2012 (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2012.pdf).

(4) Ecological screening values for soil used from USEPA EcoSSLs May 2008 (http://www.epa.gov/ecotox/ecossl/), and Los Alamos National Laboratory's EcoRisk Database v3.0 October 2011 (http://www.lanl.gov/environment/cleanup/ecorisk.shtml), and USEPA Region 4 Ecological Screening Values for Soil November 30, 2001 (http://www.epa.gov/region4/superfund/images/allprogrammedia/pdfs/tsstablesoilvalues.pdf), and USEPA Region 5 Ecological Screening Levels August 22, 2003 (http://www.epa.gov/Region5/waste/cars/pdfs/ecological-screening-levels-200308.pdf).

(5) USEPA EcoSSLs not available. Used Los Alamos National Laboratory's EcoRisk Database v3.0 October 2011 (http://www.lanl.gov/environment/cleanup/ecorisk.shtml).

(6) USEPA EcoSSLs not available. Used USEPA Region 4 Ecological Screening Values for Soil November 30, 2001 (http://www.epa.gov/region4/superfund/images/allprogrammedia/pdfs/tsstablesoilvalues.pdf). If pH is less than 5.5, the USEPA Region 4 screening value of 50 mg/kg will be used.

(7) USEPA EcoSSLs May 2008 (http://www.epa.gov/ecotox/ecossl/).

TABLE 5.11
SOIL SOURCE EVALUATION
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

ANALYTE	MAXIMUM DETECTED SITE CONCENTRATION	3X WV VRRP BACKGROUND VALUE(1)	EXCEEDS BACKGROUND CONCENTRATION?	POTENTIAL MC(2)?	SLRA REQUIRED?	PRIMARY REASON FOR EXCLUSION FROM SLRA
Metals:	mg/kg					
Aluminum	24,000J	190,000	No	**Yes**	No	Not detected above background
Antimony	0.26J	2.3	No	**Yes**	No	Not detected above background
Chromium	30J	140	No	**Yes**	No	Not detected above background
Copper	10J	66	No	**Yes**	No	Not detected above background
Lead	19J	50	No	**Yes**	No	Not detected above background
Manganese	730J	2310	No	**Yes**	No	Not detected above background
Mercury	0.21	0.42	No	**Yes**	No	Not detected above background
Zinc	81J	180	No	**Yes**	No	Not detected above background

Notes:

(1) From West Virginia Voluntary Remediation and Redevelopment Act Guidance Manual Version 2.1. Table 2-3: Natural Background Levels of Inorganics in Soil in West Virginia and Surrounding Areas. http://www.dep.wv.gov/dlr/oer/voluntarymain/documents/vrra%20guidanceversion2-1.pdf

(2) Potential MC as listed in Table 4.1

J Analyte detected, estimated concentration

5.3.5.3 Air Exposure Pathways and Receptors

Because there are no known volatile contaminants associated with the munitions used at the WVMA/Dolly Sods FUDS, the only remaining air exposure pathway would be via the inhalation of resuspended soil particulates. Based on the known current and future land use, census data, and the SVT observations listed in Subchapter 5.3.2.3, the potential receptors that are likely present at the Jenningston Training Area MRS are current and future residents, commercial/industrial workers (e.g., U.S. Forest Service personnel), recreational users (e.g., hikers and spelunkers), site visitors, and ecological receptors.

5.3.5.4 Air Sampling and Monitoring Locations and Methods

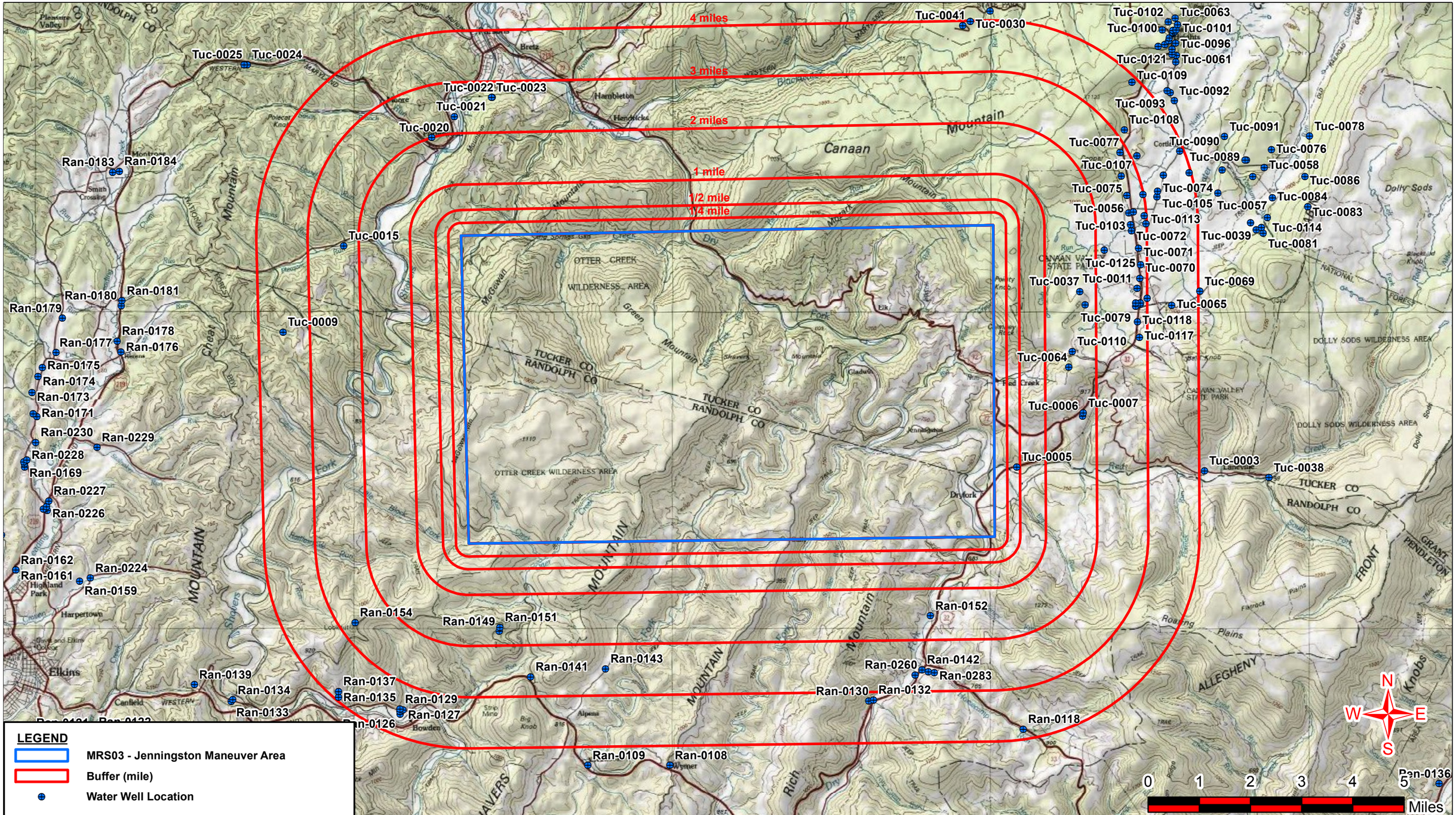
There is no historical record of air sampling at the WVMA/Dolly Sods FUDS. Air sampling was not conducted as part of the SI within the Jenningston Training Area MRS.

5.3.5.5 Air Sampling Analytical Results

Not applicable; no air sampling was conducted as part of the SI at the Jenningston Training Area MRS.

5.3.5.6 Air Exposure Pathway Conclusions

As discussed in Subchapter 5.3.4.5, all metals were detected in surface soil at concentrations below the selected background concentrations. Based on these results, the air exposure pathway is incomplete for all receptors present at the Jenningston Training Area MRS. The air exposure pathway for human receptors is assessed through the soil exposure pathway, as the screening values for human receptors include inhalation. While the inhalation exposure pathway is indirectly evaluated through the human health screening values for soil, the ecological screening values for soil do not evaluate this pathway, and the air exposure pathway is considered potentially complete but not quantitatively assessed for ecological receptors at this MRS.



Prepared by:

Eco & Associates, Inc.
and
PARSONS

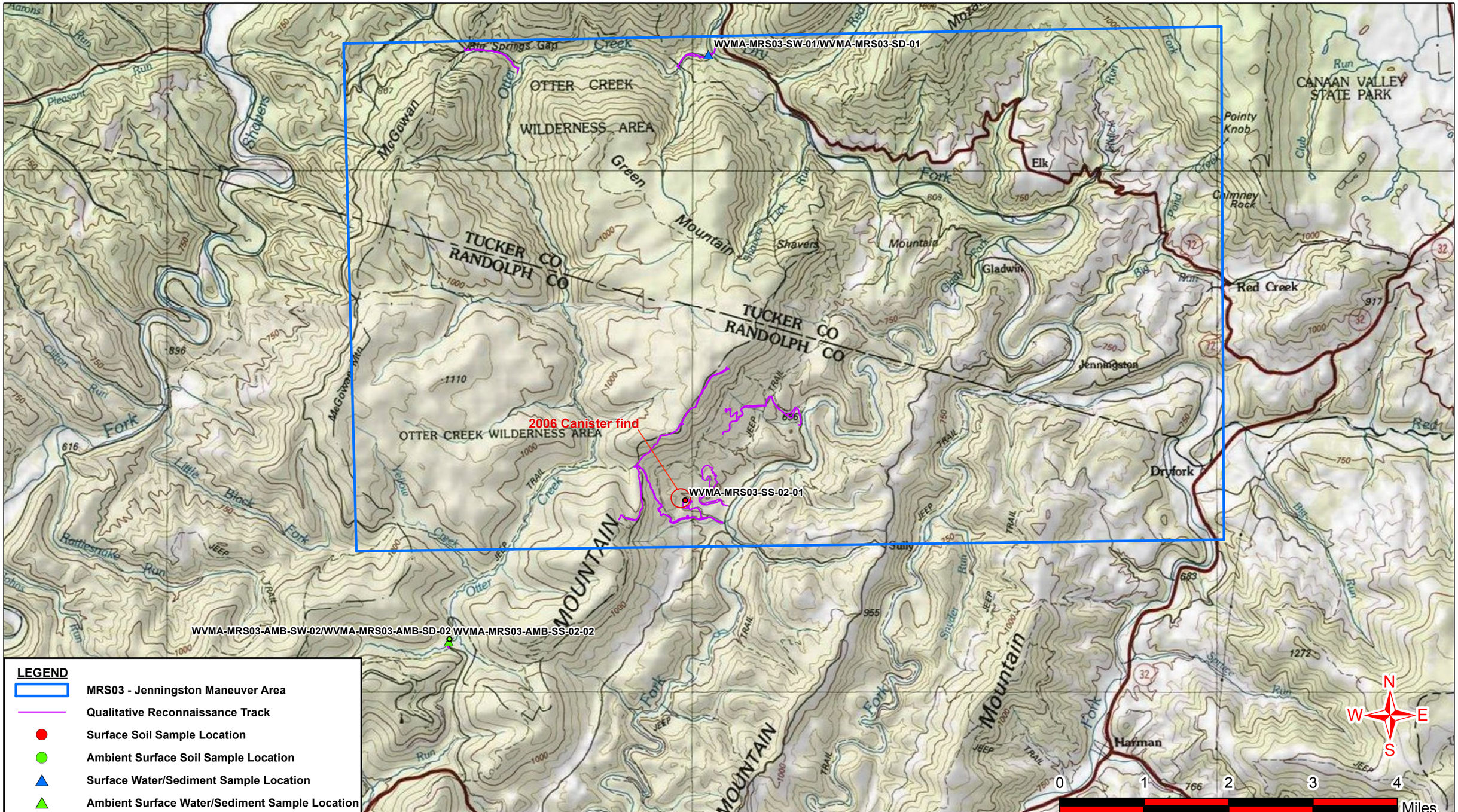
WATER WELLS WITHIN 4-MILE BUFFER

MRS03 - Jennington Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE
5.1



Prepared by:
Eco & Associates, Inc.
and
PARSONS

QUALITATIVE RECONNAISSANCE AND SAMPLE LOCATIONS

MRS03 - Jennington Maneuver Area
MMRP West Virginia

PROJECT NO. Eco-11-452

DATED August 2013

FIGURE 5.2

CHAPTER 6
SCREENING-LEVEL RISK ASSESSMENT

6.1 MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING-LEVEL RISK ASSESSMENT

6.1.1 INTRODUCTION

A qualitative risk assessment evaluates the potential explosive safety risk to the public at MRS03. This risk assessment qualitatively communicates whether a potential risk exists at the MRS and the primary causes of that potential risk. The risk assessment is based on historical information presented in prior studies (e.g., the INPR and the PA) and on observations made during the SI QR.

An explosive safety risk exists if a person can come near or into contact with MEC and interact with the MEC in a manner that results in a detonation. The potential for an explosive safety risk depends on the presence of three critical elements:

- A source (i.e., presence of MEC), and
- A human receptor (i.e., a person), and
- The potential for interaction between the source and receptor (i.e., the possibility that the person might pick up or disturb the MEC).

All three of these elements must be present for an explosive safety risk to exist. There is no risk if any one element is missing. Each of these three elements provides a basis for implementing effective risk management response actions.

6.1.2 CONCEPTUAL SITE MODEL

The CSM for the Jenningston Training Area MRS, included in Appendix J, summarizes conditions at the FUDS that could result in human exposure to MEC. They describe the types of MEC potentially present at the Jenningston Training Area MRS, past MEC and MD findings, and current and projected future land use and receptors.

6.1.3 QUALITATIVE RISK EVALUATION

6.1.3.1 Primary Risk Factors

For the Jenningston Training Area MRS, the potential risk posed by MEC was characterized qualitatively by evaluating the following three primary risk factors, which are related to the three critical elements listed above:

1. *MEC presence:* whether there is potential for MEC at each MRS
2. *MEC type:* the types of MEC that might be at each MRS and the related potential explosive hazards
3. *Site accessibility:* how potential receptors at each MRS might interact with the MEC

6.1.3.2 Risk Factors Description

The known or suspected presence of an explosive hazard at a given MRS and any potential human receptors at that MRS will typically be considered sufficient justification for RI/FS implementation at that MRS. The following paragraphs describe each of the primary risk factors.

MEC Presence

MEC presence describes whether MEC have been confirmed or are suspected at the MRS, either at the surface or in the subsurface, based on historical information in prior studies (e.g., the INPR, and the PA) and observations made during the QR. If there is historical evidence of potential MEC presence at a site, lack of confirmation of MEC presence during the QR will not be considered as evidence of MEC absence for this qualitative risk evaluation. Table 6.1 describes the three possible categories of MEC presence for this evaluation.

TABLE 6.1
CATEGORIES OF MEC PRESENCE
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

MEC PRESENCE	DESCRIPTION
Confirmed or suspected	There is physical or confirmed historical evidence of MEC presence at the MRS, or there is physical or historical evidence indicating that MEC may be present at the MRS.
Small arms only(1)	The presence of small arms ammunition is confirmed or suspected, and there is evidence that no other types of munitions were used or are present at the MRS.
Evidence of no munitions	Following investigation of the MRS, there is no physical or historical evidence that there are UXO or discarded military munitions present.

Note:
(1) Small arms ammunition is "ammunition, without projectiles that contain explosives (other than tracers), that is .50caliber or smaller or for shotguns" (Department of the Army 2005a).

MEC Type

MEC type describes whether the MEC potentially present at the MRS might be detonated, resulting in a minor injury or worse to one or more human receptors. If multiple MEC types are potentially present at the MRS, the type that poses the greatest risk to public health is selected for this qualitative risk evaluation. This determination is based on historical information in prior studies (e.g., the INPR, and the PA) and observations made during the QR. Table 6.2 describes the three possible categories of MEC type for this evaluation.

TABLE 6.2
CATEGORIES OF MEC TYPE
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

MEC TYPE	DESCRIPTION
Potentially hazardous	Fuzed or unfuzed MEC that may result in physical injury to an individual if detonated by an individual's activities.
Small arms only(1)	Small arms ammunition is confirmed or suspected, and there is evidence that no other types of munitions were used or are present at the MRS.
Inert	MD or other items that will cause no injury (e.g., training ordnance containing no explosives, fuzes, spotting charges, etc.).

Note:
(1) Small arms ammunition is defined as "ammunition, without projectiles that contain explosives (other than tracers), that is .50-caliber or smaller or for shotguns" (Department of the Army 2005a).

Site Accessibility

Site accessibility describes whether human receptors have access to the MRS and, therefore, may interact with any MEC at the surface or in the subsurface. For this qualitative risk evaluation, if MEC are confirmed or suspected at the MRS, it is assumed that human receptors might come into contact with the MEC unless there is complete restriction to access. This assessment will also describe the potential receptors. Table 6.3 describes the two possible categories of site accessibility for this evaluation.

TABLE 6.3
CATEGORIES OF SITE ACCESSIBILITY
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

SITE ACCESSIBILITY	DESCRIPTION
Accessible	Access control is not complete: residents, site workers, or visitors can gain access to all or part of the MRS.
Complete restriction to access	Human receptors are completely prevented from gaining access to the MRS.

Conditions for Qualitative Risk Assessment

For this qualitative risk assessment, further evaluation (i.e., RI/FS) for the MRS will typically be justified if the following conditions are all met:

- MEC are confirmed or suspected to be present.
- MEC are confirmed present, or if suspected to be present, are potentially hazardous.
- The MRS is accessible.

The primary risk factors identified above were evaluated for the Jenningston Training Area MRS at the West Virginia Maneuver Area/Dolly Sods FUDS using the data collected during the 2012 site visit and the historical data available from other studies. The following subchapters discuss the qualitative risk evaluation by each primary risk factor to determine whether further evaluation is justified at this MRS.

6.1.4 MUNITIONS AND EXPLOSIVES OF CONCERN RISK ASSESSMENT: JENNINGSTON TRAINING AREA MUNITIONS RESPONSE SITE

Based on historical documents for the Jennington Training Area MRS, the area was used as an infantry division troop maneuver area. The 2009 PA indicates that activities conducted in the area consisted of rock climbing exercises and troop maneuver training. In 2006, 60mm and 81mm mortar shipping canisters were found within the MRS in a trash pit at the bottom of a small cave on the eastern slope of Shaver's Mountain. It was determined that the identification of shipping containers alone does not indicate the potential for mortars within the MRS. Based on the use of the area as a Maneuver Area, documented training activities consisted of mountain marching and rock scaling. No known training activities within the MRS required actual munitions. Without the presence of munitions debris relating to the ordnance item within the shipping containers (mortars), it is an indication that the shipping containers were merely used for training purposes, not transport or use of munitions. In addition, an area close to the location of the recovered shipping containers was used for pack mule training. The training activities associated with pack mule training used items simulating munitions size and weight, rather than actual munitions. Live ordnance was at a premium and was needed in the European and Pacific theaters. As a result, ordnance containers (such as shipping containers) were used. They were filled with either sand or other materials equaling the weight of the container if it had contained munitions. No MEC or MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03.

The Jenningston Training Area MRS consists of 40,000 acres approximately 9 miles northeast of the City of Elkins, West Virginia. A large portion of the Jenningston Training Area is managed by the U.S. Forest Service as the Monongahela National Forest. The forest is used for outdoor recreation and agriculture. The remainder of the MRS is owned by private individuals and consists of residential, commercial, and agricultural properties, including the unincorporated communities of Jenningston, Dryfork, Elk, and Gladwin. The SVT encountered no barriers (fences and locked gates) to control access to the Jenningston Training Area MRS. Therefore, the site accessibility at the Jenningston Training Area MRS is considered "Accessible".

6.1.5 RISK SUMMARY

Table 6.4 summarizes the qualitative MEC risk evaluation for the Jenningston Training Area MRS. Based on this qualitative evaluation, no known explosive hazards remain at the Jenningston Training Area MRS. Therefore, there is no explosive safety risk at this MRS.

TABLE 6.4
MEC RISK EVALUATION
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WV

MRS	MEC Presence	MEC Type		Site Accessibility	Further Evaluation ?
Jenningston Training Area	Evidence of no munitions	None	Not applicable	Accessible	No

6.2 MUNITIONS CONSTITUENTS HUMAN HEALTH SCREENING – LEVEL RISK ASSESSMENT

6.2.1 CONCEPTUAL SITE MODEL

Based on the current and future land use of the Jenningston Training Area MRS, potential human receptors at the MRS are current and future residents, commercial/industrial workers (e.g., U.S. Forest Service personnel), recreational users (e.g., hikers and spelunkers), and site visitors. Based on the evaluation of exposure pathways in Chapter 5, these receptors may be exposed to metals through direct contact with soil, surface water, or sediment. Human receptors may be exposed to metals in surface soil through incidental ingestion, dermal contact, and inhalation of resuspended soil particulates. They may be exposed to metals in surface water or sediment via ingestion as drinking water, incidental ingestion or dermal exposure. There are four groundwater wells located within the MRS boundary, therefore human receptors may be exposed to metals in groundwater via ingestion as drinking water, incidental ingestion, and dermal contact. The CSEM identifies source media, transport mechanisms, exposure routes, and potential receptors (Appendix J) for this MRS.

6.2.2 AFFECTED MEDIA

Direct release of metals from munitions activities within the MRS would have been to soil. Metals in the surface soil can become airborne as resuspended particulate matter, can migrate to shallow groundwater through leaching, and can migrate to surface water and sediment through runoff and erosion. Based on decisions made at the TPP Meeting, biased soil, surface water, and sediment samples and field duplicate samples were collected from this MRS. No other media (groundwater or air) were sampled at this site.

6.2.3 HUMAN HEALTH SCREENING VALUES

Soil and Sediment: The WVDEP RBCs, and Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) supplemented with USEPA Regional Screening Levels (RSLs);

Surface Water: WV Requirements Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria and USEPA RSLs for tap water.

6.2.4 RISK CHARACTERIZATION

As discussed in Subchapter 5.2.8, the metals source evaluation is used to determine which analytes are retained for consideration in a SLRA. Only those analytes retained for consideration in the SLRA following the source evaluation are evaluated in this chapter.

To complete the human health risk characterization for the Jenningston Training Area MRS, the maximum detected concentrations of each selected metal that exceeded the selected background concentration for surface soil, surface water, and sediment were retained for consideration in the SLRA. These maximum detected concentrations were compared to the screening levels agreed to by the TPP Team and described in Subchapter 6.2.3. For an analyte to be considered a potential human health risk related to a release from munitions activities at the Jenningston Training Area MRS, it is necessary for the metals concentrations to exceed their screening values. The following subchapters evaluate the Jenningston Training Area MRS at the WVMA/Dolly Sods FUDS and any potential effects on human health.

6.2.4.1 Jenningston Training Area Munitions Response Site

Surface Water: One biased surface water sample and one field duplicate sample were collected from the Jenningston Training Area MRS. As shown in Table 5.8, none of the metals detected exceeded their respective background concentrations. Therefore, based on the analytical results presented in this report, no unacceptable human health risk is expected from exposure to metal in surface water due to former munitions-related activities at this MRS.

Sediment: One biased sediment sample and one field duplicate sample were collected from the Jenningston Training Area MRS. As shown in Table 5.9, none of the metals detected exceeded their respective background concentrations. Therefore, based on the analytical results presented in this report, no unacceptable human health risk is expected from exposure to metals in sediment due to former munitions-related activities at this MRS.

Soil: One biased surface soil sample and one field duplicate sample were collected from the Jenningston Training Area MRS. As shown in Table 5.11, none of the metals detected exceeded their respective background concentrations. Therefore, based on the analytical results presented in this report, no unacceptable human health risk is expected from exposure to metals in surface soil due to former munitions-related activities at this MRS.

6.2.5 DISCUSSION

In surface water, sediment, and surface soil, the maximum detected concentrations of the evaluated metals did not exceed the background values at this MRS. Therefore, based on the analytical results presented in this report, no unacceptable human health risk is expected from exposure to metals in surface water, sediment, or surface soil due to former munitions-related activities at the Jenningston Training Area MRS.

As discussed in Subchapter 5.2.5, although several groundwater wells were identified within the MRS (Figure 5.1), ROEs were not received for the properties containing the wells, so no groundwater samples were collected. Therefore, since groundwater was not sampled, the groundwater exposure pathways for human receptors are potentially complete, but not quantitatively assessed.

6.3 MUNITIONS CONSTITUENTS SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

6.3.1 CONCEPTUAL SITE MODEL

As discussed in Subchapter 5.2.4, the Jenningston Training Area is considered an important ecological place because it is located within a national forest, and because it contains wetlands, federally designated wilderness area, and critical habitat for an endangered species. Therefore, ecological receptors are considered to be present at the Jenningston Training Area MRS. Based on the evaluation of exposure pathways conducted in Chapter 5, ecological receptors may be exposed to metals through incidental ingestion, dermal contact, inhalation of resuspended soil particulates, and ingestion as a drinking water source. They may also be exposed to metals indirectly through ingesting biota that may have been exposed to metals in soil, surface water, or sediment. Due to the confirmed presence of caves onsite, cave dwelling ecological receptors could be exposed to groundwater via incidental ingestion, dermal contact, and ingestion of groundwater as drinking water. Appendix J presents the CSEM developed for this MRS.

6.3.2 AFFECTED MEDIA

Direct release of metals from munitions activities within the MRS would have been to soil. Metals in the surface soil can become airborne as resuspended particulate matter, can migrate to shallow groundwater through leaching, and can migrate to surface water and sediment through runoff and erosion. Based on decisions made at the TPP Meeting, biased soil, surface water, and sediment samples and field duplicate samples were collected from this MRS. No other media (groundwater or air) were sampled at this site.

6.3.3 ECOLOGICAL SCREENING VALUES

The ecological screening values (ESVs) listed below were used for the screening-level comparison for soil, surface water, and sediment. These ESVs are based on conservative assumptions, including the types of receptors present at a site (e.g., insectivores, terrestrial mammals, etc.) and exposure parameters (such as soil ingestion rate and receptor range). Site-specific information was not used to develop these ESVs. The use of site-specific information typically results in less conservative, and higher, ESVs.

Soil: The USEPA EcoSSL. In absence of EcoSSLs, values obtained from the LANL EcoRisk Database, and USEPA Region 3 Ecological Screening Levels;

Sediment: USEPA Region 3 Ecological Benchmarks, Freshwater Sediment Screening Benchmark, National Oceanic and Atmospheric Administration Screening Quick Reference Tables, LANL EcoRisk Database, and USEPA Region 3 ESLs.

Surface Water: WV Requirements Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria, USEPA Region 3 Freshwater Screening Benchmark, and LANL EcoRisk Database.

6.3.4 ECOLOGICAL RISK CHARACTERIZATION

As discussed in Subchapter 5.2.8, the source evaluation is used to determine which analytes are retained for consideration in the SLERA. Only those analytes retained for consideration in the SLERA following the source evaluation are evaluated in this chapter. None of the metals analyzed were detected at concentrations above their respective background concentrations; therefore, a SLERA was not performed.

CHAPTER 7
SUMMARY AND CONCLUSIONS

7.1 SUMMARY

The SI performed at the Jenningston Training Area MRS in Randolph and Tucker Counties, West Virginia, evaluated site-specific conditions that could affect the potential for complete exposure pathways to human and ecological receptors at the MRS. The project was planned and performed to satisfy the DQOs set for the project: 1) evaluate potential presence of MEC; 2) evaluate potential presence of elevated metals concentrations that are consistent with the identified MC contaminants of concern; 3) collect data needed to complete MRSPP scoring sheets; and 4) collect information for HRS scoring. Successful completion of the DQOs allowed determination of whether further response action under CERCLA is appropriate.

The SI included 23.59 miles of QR and the collection of surface soil samples at two locations and surface water and sediment coupled samples at two locations (with associated QC samples) at the Jenningston Training Area MRS.

APPL, Inc. in Clovis, California, analyzed the soil and sediment samples for explosives, selected metals, and pH. The surface water samples were analyzed for explosives and selected metals only. No explosives were detected and no metals were detected above the selected background values.

No MEC and no MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03.

7.2 CONCLUSIONS REGARDING POTENTIAL MUNITIONS AND EXPLOSIVES OF CONCERN EXPOSURE PATHWAYS

The evaluation of potential MEC exposure (Subchapter 6.1) concluded that explosive hazards do not exist within the MRS.

7.3 CONCLUSIONS REGARDING POTENTIAL MUNITIONS CONSTITUENTS EXPOSURE PATHWAYS

An exposure pathway for a chemical release is not considered complete unless all four of the following elements are present (USEPA 1989):

1. A source and mechanism for chemical release
2. An environmental transport and/or exposure medium
3. A receptor exposure point
4. A receptor and a likely route of exposure at the exposure point

Because no explosives were detected during the May, 2012 site visit and no metals exceeded their respective background concentrations, there are no unacceptable human or ecological health risks at the Jenningston Training Area MRS.

CHAPTER 8
RECOMMENDATIONS

8.1 RECOMMENDATIONS TO PROCEED TO NO FURTHER ACTION

Based on the analytical results and exposure pathways evaluated during this SI, no further action (including a removal action) is warranted (Table 8.1). The recommendation is based on the following:

- No MEC or MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03.
- No explosives were detected and no metals were detected above the selected background values.

TABLE 8.1
RECOMMENDATIONS
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WEST VIRGINIA

MRS	ACREAGE	MEC ASSESSMENT(1)	METALS ASSESSMENT(2)	RECOMMENDATION
Jenningston Training Area	40,000	**No** MEC is not expected due to no known training activities utilizing munitions conducted within the MRS.	**No** Exposure pathways for human and ecological receptors are considered incomplete. No unacceptable human health and ecological risks are expected.	No Further Action

Notes:
(1) "No" in this column indicates that MD indicative of potential MEC presence has not been confirmed, resulting in an NFA recommendation for the MRS.
(2) "No" in this column indicates the absence of metals at levels indicating a potential risk to human health or ecological receptors, resulting in a recommendation for further metals sampling for the MRS.

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APPENDIX A

PERFORMANCE WORK STATEMENT

STATEMENT OF WORK

1. PROJECT AND LOCATION. The project sites will be throughout the Range Support Center boundaries and can be found as part of the Former West Virginia Maneuver Area, Grant, Preston, Pendleton, Tucker, and Randolph Counties, West Virginia. Each site identified will require the completion of the Military Munitions Response Program (MMRP) Project Site Inspection phase of work.

2. PURPOSE. The purpose of the project is to complete all planning, field work and reporting for the Site Inspection (SI) phase at each of the projects listed below. The Contractor shall use the existing programmatic documents as developed by Parsons Infrastructure and Technology Group for the 2004 SI initiative. The final SI shall reflect that attempts were made to seek concurrence from state regulators and other potential stake holders related to the decisions made based on the findings of the SI.

3. AUTHORIZATION. This projected is in support of the U.S. Army Corps of Engineers (USACE), Los Angeles District (SPL) Formerly Used Defense Site Program (FUDS). This project will comply with Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Occupational Safety & Health Administration (OSHA), and all other applicable local, city, county, state, or federal requirements.

4. DESCRIPTION OF WORK AND SERVICES REQUIRED. The Contractor shall perform the work and services as follows.

Task 1. **Coordinate Technical Project Planning (TPP) Meetings**: The Contractor shall coordinate, attend, and take meeting minutes for the TPP meeting with the USACE Project Manager, members of the Project Delivery Team (PDT), State Regulators and other stakeholders involved with the execution of the SI phase of work. In preparation for this meeting the Contractor shall research the current property owners associated with the FUDS Project locations and provide this information to USACE to assist in inviting relevant stakeholders to the TPP meetings. The Contractor shall capture decisions made in the TPP meeting in a TPP Memorandum submittal.

Task 2. **Prepare Site Specific Work Plan:** The Contractor shall prepare a Draft Site Specific Work Plan that incorporates all decisions and inputs from the TPP. All work shall be performed in accordance with the programmatic planning documents referenced above.

Task 3. **Field Work and Sampling:** Field work will be scheduled based on the approval of a final Site Specific Work Plan (SSWP) and the execution of an Rights of Entry (ROE) by the Government for all properties to be visited during field activities. Field Work will be conducted in compliance with the SSWP and existing programmatic planning documents.

Task 4. **Reporting:** Reports shall be developed using the established format for the MMRP SI Program. A draft, draft-final and final version shall be prepared. All appendices shall be included with the final deliverable in the electronic version.

Task 5. **Digital Data:** Analytical and Digital Data will be maintained and delivered to the Government at the finalization of each report. Analytical data shall be validated according to the accepted protocols established by the MMRP SI Program. Geographic

Information Systems (GIS) deliverable shall contain a Spatial Data Standard for Facilities, Infrastructure and Environment (SDSFIE) data structure and Federal Geographic Data Committee (FGDC) metadata.

Sites

Project #	Project Name	FUDS #
05	DAILEY INFILTRATION CAMP	G03WV0013
06	WVMA AMMUNITION DEPOT	G03WV0013
07	MANEUVER AREA	G03WV0013
08	FORE KNOBS-BEAR ROCKS FIRING RANGES	G03WV0013
09	BEARDEN KNOB FIRING RANGE	G03WV0013
10	BROWN/CABIN MOUNTAIN FIRING RANGES	G03WV0013
11	BUENA SMALL ARMS FIRING RANGE	G03WV0013

5. DELIVERABLE REQUIREMENTS. The front cover of all deliverables will state the report version, project name and number, title and date. The deliverables will include a section for responses to USACE and Regulatory comments.

A Compact Disc-Recordable (CD-R) will be included in a three-ring binder (in a plastic insert) along with each three-ring paper version of final reports issued. The CD-R will include the original documents in AutoCAD, MS Office 2007, JPG, PDF formats. The Contractor shall arrange all documents into separate file folders for each chapter. One file titled “Entries” adobe (PDF) file format will be included on the CD-R or FTP site download that contains the entire document, identical to the three-ring paper version.

Distribution List for Submittals:

Submittal	Quantity
Draft TPP Memo	6
Final TPP Memo	6
Draft Site Specific Work Plan	6
Final Site Specific Work Plan	6
Draft Completion Report	6
Draft-Final Completion Report	6
Final Completion Report	6

6. GENERAL REQUIREMENTS.

a. Regulatory Requirements. All activities shall be conducted in compliance with all Federal, State, and Local regulations for the protection of human health and the environment. The Contractor shall comply with all Federal State, and Local environmental laws, statutes, and regulations.

b. Privacy Act and Confidential Information. The Contractor shall comply with the Privacy Act and keep all information private. The Contractor shall keep all data and information obtained confidential prior to the release of data by the USACE.

7. CRITERIA AND STANDARDS. The Contractor shall prepare the final materials in accordance with criteria and applicable publications and manuals listed herein. Materials shall also be prepared in accordance with guidance previously furnished to the Contractor or with supplemental detailed instructions which may be issued by the Contracting Officer or Contracting Officer Representative (COR) before and during the progress of the work. The Contractor is not to undertake action for relocation, enlargement or deletion of any features of this proposed project. The Contractor shall be responsible for notifying the Contracting Officer of any missing criteria needed for their work.

8. PERIOD OF PERFORMANCE. The period of performance shall commence on the date of receipt of the Notice to Proceed (NTP), and shall end 24 months after the NTP. The Contractor shall schedule performance of this statement of work with the COR for this contract to ensure efficiency and cost effectiveness, and shall also schedule the completion and review of interim deliverables as appropriate.

9. QUALITY CONTROL PLAN. The Contractor is responsible for ensuring that product development and independent technical review for this Statement of Work are carried out in accordance with the approved MMRP SI Programmatic Plans.

10. ITEMS AND DATA TO BE FURNISHED BY THE GOVERNMENT. The Government shall make available to the Contractor relevant information from related studies, reports, manuals, and other pertinent available data in its files, which may contribute to this work.

The Contractor shall ensure that all material has been received. This material is, by this reference, hereby incorporated into and made part of this contract, as fully and completely as thought the same were set forth in full.

11. PROJECT MANAGEMENT. The Contractor shall name and assign a responsible Project Manager who shall maintain a project file to contain correspondence and criteria pertinent to this project. The Project Manager shall be knowledgeable about all pertinent work ongoing and shall be available as the Contractor's point of contact to the Government.

During the progress of the work, the Contractor shall confer with the Project's COR, as required, to assure approval of the completed work.

The COR may visit the Contractor's office at any time during the progress of the work for the specific purpose of examining the progress of work and to resolve any questions the Contractor may have concerning the development of the work. The COR shall be supported by a technical specialist as necessary to provide guidance to assure an adequate submittal.

12. VISITS TO SITES, PRIVATE SOURCES, AND GOVERNMENTAL AGENCIES. The Contractor shall advise the COR of each proposed visit to the site, private sources and Governmental agencies prior to each visit. Contacts with Governmental representatives shall be limited to research and coordination of data pertinent to the project.

13. DEVIATION OF THIS STATEMENT OF WORK. The Contractor is advised not perform any extra services under this contract requested by any other person within or external to SPL, orally or in writing, which the Contractor considers to be a change in work or services required which necessitates an

adjustment in the contract fee, until the Contractor has been requested by the Contracting Officer to: (1) review a supplemental Statement of Work; (2) make a written proposal covering such extra services; and/or (3) has negotiated a mutually satisfactory fee and received a notice to proceed in writing from the Contracting Officer.

14. OTHER REQUIREMENTS:

a. Subcontractors: The Contractor shall not enter into any subcontracts without prior written approval of the Contracting Officer.

b. Responsibility for Field Work: The Contractor shall be responsible for all damages to persons and property that all occur as a result of the Contractor fault or negligence in connection with field work, and shall save and hold the Government free from all claims and suits arising from such damages.

15. PAYMENT FOR WORK AND SERVICES. The Government anticipates award of a Firm Fixed Price contract. The agreed upon awarded price shall constitute full compensation by the Government to the Contractor for the work and services performed under this contract. Payments shall be made in accordance with the payment clause included in this contract and period of performance of this contract. The Contractor shall invoice only after the completion of finalized milestones. The milestone structure for this requirement shall be as follows:

Final TPP Memo: 25%
Final SSWP: 25%
Field Work Complete: 25%
Final SI Report: 25%

APPENDIX B

TPP SESSION DOCUMENTATION/ MEETING MINUTES

(ELECTRONIC ONLY)

1ST TPP MEETING DOCUMENTATION

TECHNICAL PROJECT PLANNING MEMORANDUM

Subject: **Formerly Used Defense Site Military Munitions Response Program Documentation of Technical Project Planning Team Concurrence for Site Inspection Phase**

Site: **West Virginia Maneuver Area/Dolly Sods**
Grant, Preston, Pendleton, Tucker, and Randolph Counties, West Virginia
FUDS Project No. G03WV0013

Contract: **Contract No. W912PP-11-C-0007**
Task Order 0001

INTRODUCTION

This document provides a record of the Technical Project Planning (TPP) Meeting for the West Virginia Maneuver Area/Dolly Sods Formerly Used Defense Site (FUDS) located in portions of Grant, Preston, Pendleton, Tucker, and Randolph Counties in northeastern West Virginia. The TPP Team members present indicated concurrence with the Site Inspection (SI) Technical Approach as developed during the TPP Meeting held at the Canaan Valley Resort State Park, Davis, West Virginia on April 7, 2011. An initial Technical Approach was developed using the collaborative experience of Eco & Associates, Inc. (Eco), Parsons Infrastructure and Technology Group (Parsons), the U.S. Army Corps of Engineers (USACE) technical experts, and available site information including the Inventory Project Report (INPR), revised INPR, Archives Search Report (ASR), Preliminary Assessment (PA), Historical Records Review (HRR), and other pertinent documents. The TPP Team discussed and refined the initial Technical Approach during the course of the TPP Meeting yielding a final Technical Approach for implementation at the seven munitions response sites (MRS) associated with this FUDS.

The Final Technical Approach agreed upon by the TPP Team is documented herein and will be further detailed in the forthcoming Draft Site-Specific Work Plan (SS-WP) Addendum (an addendum to the Programmatic Work Plan [PWP]). The Draft SSWP Addendum will be submitted to the TPP Team members for review to ensure that the key aspects of the TPP Meeting resolutions are fully captured.

The former West Virginia Maneuver Area/Dolly Sods site (FUDS Project No. G03WV0013) is located in portions of Grant, Preston, Pendleton, Tucker, and Randolph Counties in northeastern West Virginia. This property covers an area of approximately 2,180,367 acres: generally bounded by the city of Elkins to the west, U.S. Route 50 in Preston County to the north, Petersburg to the east, and U.S. Route 33 to the south, with a sliver of land extending farther south to Franklin. The FUDS incorporates the Dolly Sods Wilderness Area, which is located within the Monongahela National Forest. The property is centered at approximately N 39° 07' 08", W 79° 27' 09" (latitude, longitude).

According to the 2009 Preliminary Assessment (PA), maneuver rights obtained by the Rents and Claims Board, Fifth Service Command, secured 350,416 acres of public lands (part of the Monongahela National Forest), 48,557 acres of leased property (for inclusion in the impact area), and 1,781,394 acres of so-called "lesser interests" covered by "trespass agreements." Apparently, the landowners had given use of these lands to the Army on verbal commitment. "Trespass agreement" descriptions are not available in written documents for the properties.

The former West Virginia Maneuver Area/Dolly Sods property was used for special low altitude, mountain training activities during World War II. Regiments and battalions of larger infantry divisions went to the area from installations in other parts of the country to introduce the troops to various aspects of mountain warfare. Preliminary reconnaissance of the area by the Army found it to be similar to that of the Apennines and lower ranges of the Italian Alps, allowing troops to simulate conditions that could be encountered during the invasion of Italy and other mountainous regions during the war in Europe. Regiment exercises emphasized physical conditioning, navigation through mountainous terrain, map interpretation, bivouac establishment, stream crossing, and military problems unique to mountainous areas.

Based on information found on historical maps and historical site documents, munitions used during the 1943 to 1944 military training included the following:

- 40-millimeter (mm) and 57mm armor-piercing projectiles
- 105mm and 155mm high explosive (HE) howitzer rounds
- 105mm smoke rounds (SRs)
- 60mm HE mortars, 81mm HE and SR mortars, and 4.2-inch inert (sand-loaded) HE and SR mortars
- .30 caliber and .50 caliber machine gun rounds
- 75mm artillery (documented as being fired, but no physical evidence has been found)
- 3.25-inch rockets
- Practice antitank mines and fuses (no evidence of use or physical evidence has been found)

Before returning the land to the public and United States Forest Service (USFS) in 1950, Engineer Bomb and Shell Disposal Team Number 6 conducted an ordnance clearance of the West Virginia Maneuver Area during May 1946. Records indicate that the team found and destroyed 189 4.2-inch SR mortars, one 155mm HE projectile, three 105mm HE projectiles, two 40mm projectiles, and 12 or 14 inert (sand-loaded) rounds in the Dolly Sods region. The search did not include certain areas to the north and northeast of the Dolly Sods North (DSN) and Dolly Sods Scenic Area (DSSA) that were too rough and overgrown to be searched. During May 1953, the 549th Explosive Ordnance Disposal (EOD) from Baltimore, Maryland, conducted a follow-up reconnaissance and disposal mission of suspected impact areas, locating and destroying six live rounds. During a site visit in May 1991, in preparation of the work plan for the 1991 Feasibility Study, personnel from Metcalf & Eddy, Inc. (M&E) and UXB International, Inc. (UXB) found gun emplacements near Bell Knob Tower. Between June and October 1997 Human Factors Applications, Inc. (HFA) conducted a clearance in the Dolly Sods Wilderness (DSW). Fourteen (14) live mortars were found and destroyed by detonation, including 60mm HE and 81mm HE rounds. Ordnance and explosives (OE)-related scrap was recovered, inspected, and certified, then turned over to ENVIRCO, Inc. of Baker, WV. Between October 1997 and August 1998 HFA conducted a clearance in the DSN and DSSA. Eight (8) live mortars were found and destroyed by detonation, including 60mm HE and 4.2-inch SR and HE rounds. Unexploded ordnance (UXO) found from July 2004 through June 2007 includes one 105mm howitzer round, one 60mm mortar round, one 81mm mortar round, and five 3.25-inch rockets.

Currently, the Monongahela National Forest, the Nature Conservancy, Canaan Valley Institute, the U.S. Fish and Wildlife Service, hunting clubs, private individuals, large private entities, and other businesses own most of the former West Virginia Maneuver Area/Dolly Sods. There are two popular state parks in Tucker County: Canaan Valley State Park and Blackwater Falls State Park. Hiking, skiing, rock climbing, rafting, hunting, and fishing are extremely popular activities, and attract thousands of visitors annually to the area.

The 1990 INPR concluded that the West Virginia Maneuver Area had been formerly owned or used by the Army and was an eligible FUDS property. The USACE Huntington District conducted a field visit in the DSW and the DSSA on December 3, 1984. The report does not indicate whether munitions debris was observed onsite during the field visit. The report recommended a Remedial Investigation and Feasibility Study (RI/FS) to determine the types and extent of ordnance contamination at the site.

As part of the USACE DERP FUDS program, a Preliminary Assessment (PA) of the entire WVMA was prepared by the CELRH in 2009. The purpose of the PA was to collect sufficient information concerning conditions at the site to assess the immediate or potential threats posed to human health and the environment. The information was also used to support a decision regarding the need for further action. The PA included a review of available file information, collection and interpretation of historic aerial photographs, interviews, and site reconnaissance. This PA included only an assessment of possible environmental concerns associated with former DoD activities at the former WVMA. Information used to prepare the PA included military records, historical documents, historical newspaper reports, interviews with local residents, and historic aerial photographs. Based upon a review of the information above, the CELRH identified a total of 7 Munitions Response Sites (MRSs) warranting further investigation. For each of the MRSs, the PA recommended a SI to be conducted to determine the presence of munitions and explosives of concern (MEC). In the revised INPR, dated 1 December 2010, each of the MRS was assigned a priority, with 1 being the highest relative priority and 8 being the lowest. The seven MRSs associated with the West Virginia Maneuver

Area/Dolly Sods FUDS, and their corresponding Munitions Response Site Prioritization Protocol (MRSPP) are described in the table below.

MUNITIONS RESPONSE SITE DETAILS
WEST VIRGINIA MANEUVER AREA / DOLLY SODS
(GRANT, PRESTON, PENDLETON, TUCKER, AND RANDOLPH COUNTIES)

MRS NAME	SIZE (ACRES)	MRSPP	MUNITIONS USED *
MRS01 Dailey Infiltration Camp	200	5	Small arms, general: Cartridge, .22 caliber Cartridge, .30 caliber (includes carbine) Cartridge, .38 caliber Cartridge, .45 caliber Grenade, hand, fragmentation, MkII (1917 – present) Grenade, hand, practice, MkII
MRS02 Ammunition Depot**	4	7	Small arms, general: Cartridge, .30 caliber (includes carbine) Cartridge, .50 caliber, machine gun Cartridge, 40mm, armor piercing – tracer (AP-T), M81 Cartridge, 57mm, AP-T, M70 Shell, 60mm, high explosive (HE), M49A2 Shell, 60mm, smoke, white phosphorus (WP), M302 Shell, 75mm, HE, MkI Shell, 75mm, smoke, WP, MkII Cartridge, 81mm, HE, M43 Cartridge, 81mm, smoke, WP, M57 Cartridge, 105mm, HE, M1 Cartridge, 105mm, smoke, HC, M84 Shell, 4.2-inch, HE, Mm3, M3A1 Shell, 4.2-inch, smoke, M2 (1918 – 1944) Projectile, 155mm, HE, M102 Mine, antitank, practice, M1 Rocket, 3.25-inch, target, Mk1 through Mk4

MRS NAME	SIZE (ACRES)	MRSPP	MUNITIONS USED *
MRS03 Jenningston Training Area**	40,000	7	Small arms, general: Cartridge, .30 caliber (includes carbine) Cartridge, .50 caliber, machine gun Cartridge, 40mm, armor piercing – tracer (AP-T), M81 Cartridge, 57mm, AP-T, M70 Shell, 60mm, high explosive (HE), M49A2 Shell, 60mm, smoke, white phosphorus (WP), M302 Shell, 75mm, HE, MkI Shell, 75mm, smoke, WP, MkII Cartridge, 81mm, HE, M43 Cartridge, 81mm, smoke, WP, M57 Cartridge, 105mm, HE, M1 Cartridge, 105mm, smoke, HC, M84 Shell, 4.2-inch, HE, Mm3, M3A1 Shell, 4.2-inch, smoke, M2 (1918 – 1944) Projectile, 155mm, HE, M102 Mine, antitank, practice, M1 Rocket, 3.25-inch, target, Mk1 through Mk4
MRS04 Fore Knobs / Bear Rocks Firing Ranges	42,000	3	Shell, 60mm, HE, M49A2 Shell, 60mm, smoke, WP, M302 Cartridge, 81mm, HE, M43 Cartridge, 81mm, smoke, WP, M57 Cartridge, 105mm, HE, M1 Cartridge, 105mm, smoke, HC, M84 Projectile, 155mm, HE, M102
MRS05 Bearden Knob Firing Range	8,000	3	Cartridge, .30 caliber (includes carbine) Cartridge, .50 caliber, machine gun Cartridge, 3-inch, armor piercing capped (APC), M62, M62A1 Cartridge, 3-inch, AP, M79 Cartridge, 105mm, HE, M1 Cartridge, 105mm, high explosive antitank (HEAT), M67 Projectile, 155mm, HE, M102 Projectile, 155mm, AP, M112
MRS06 Brown / Cabin Mountain Firing Ranges	16,000	3	Cartridge, 105mm, HE, M1 Cartridge, 105mm, smoke, HC, M84 Projectile, 155mm, HE, M102 Projectile, 155mm, WP, M110 Rocket, 3.25-inch, target, Mk1 through Mk4
MRS07 Buena Small Arms Firing Range	50	4	Small arms, general: Cartridge, .22 caliber Cartridge, .30 caliber (includes carbine) Cartridge, .38 caliber Cartridge, .45 caliber Grenade, hand, fragmentation, MkII (1917 – present) Grenade, hand, practice, MkII

* Munitions list from the Preliminary Assessment (USACE 2009).
** Includes all potential munitions listed for the FUDS

MRS03 – JENNINGSTON TRAINING AREA

The 2009 PA included the 40,000-acre Jenningston Training Area MRS, which was used as a maneuver area by infantry division troops. Activities conducted in the area consisted of rock climbing exercises, troop maneuver problems, and potential mortar firing. This site is generally bounded by the Otter Creek Wilderness Area to the west, Mozark Mountain to the north, Chimney Rock/community of Dryfork to the east, and the community of Sully to the south. The Jenningston Training Area MRS consists of private and public land, which is predominantly owned by the U.S. Department of Agriculture and managed by the USFS. The area is currently partly within the Monongahela National Forest and partly farmland with residences. The revised INPR reports an MRSPP score of 7 for the MRS. Table 1, in the introductory section of this document, summarizes the details of the Jenningston Training Area MRS at the former West Virginia Maneuver Area.

The existing body of information for the Jenningston Training Area MRS is insufficient to make a preliminary recommendation of NDAI or of further response (RI/FS study). Munitions debris has not been confirmed within the MRS, although mortar transportation canisters have been found near the Otter Creek Wilderness Area (vicinity of western MRS boundary). There is potential for MEC within the MRS. Exposure pathways may be complete based on the possibility of MEC and MC. In accordance with ER 200-3-1, sufficient data need to be collected during the SI to evaluate the potential presence of MEC and MC contamination for effective RI/FS initiation or to support an NDAI recommendation for the MRS. In addition, the data necessary for USEPA to complete the HRS scoring and for completion of the MRSPP will be collected and developed. The TPP team has proposed the following activities in support of the SI for the former Jenningston Training Area MRS in portions of Tucker and Randolph County, West Virginia:

- **Site Visit –** A site visit in accordance with the PWP and the SSWP Addendum will be conducted. The site visit will cover those areas of the MRS which are outside of the Otter Creek National Wilderness Area (NWA) in the eastern and central portions of the MRS. The TPP Team agreed that the Otter Creek NWA will be avoided due to its remoteness and likely access difficulties. Data will be gathered to evaluate vegetation and topography as they pertain to site characterization and to identify potential limitations to subsequent recommended actions.
- **Qualitative Reconnaissance –** QR in accordance with the PWP will be conducted. The QR will focus on the areas where debris has previously been found to help support an anticipated NDAI or RI/FS recommendation.
- **Munitions Constituent Sampling –** If munitions debris is observed, MC sampling will be conducted in accordance with the PWP and the PSAP. The MRS will be screened for the presence of MC contamination in the surface soil, surface water, sediment, and groundwater, if available and warranted. Surface soil sampling will be conducted using the FUDS Military Munitions Response Program for Site Inspections at Multiple Sites (CONUS and OCONUS) CRREL 7-point wheel sampling approach. Background samples will also be collected from areas suspected to be unaffected by military activity to serve as ambient

data for comparison. Sampling locations and specific analytes were discussed as part of the TPP process. Surface soil, surface water and sediment, and groundwater samples are planned as follows:

- Surface soil samples will be collected and analyzed for explosives, selected metals (aluminum, antimony, copper, lead, manganese, mercury, and zinc), and pH;
- Surface water and sediment samples will be collected and analyzed for explosives and selected metals as listed above;
- Groundwater samples will be collected if sources are identified, samples will be analyzed for explosives and the selected metals listed above.

In addition to the determinations stated above, the following issues and resolutions were noted from TPP Meeting minutes:

- It was noted that canisters were found in the vicinity of Dry Fork, by contractors for USFS.
- Portions of the MRS are within the Monongahela National Forest, therefore, this MRS is considered to be ecologically sensitive. The proposed screening levels to be used for the ecological risk assessment are described as follows, and are listed in Table 3-1.
  - **Soil**: USEPA EcoSSLs. In absence of EcoSSLs, values obtained from the Los Alamos National Laboratory (LANL), EcoRisk Database, and USEPA Region 3 Ecological Screening Levels
  - **Sediment**: USEPA Region 3 Ecological Screening Benchmarks, Freshwater Sediment Screening Benchmark, National Oceanic and Atmospheric Administration Screening Quick Reference Tables, LANL Ecorisk Database, and USEPA Region 3 ESLs
  - **Surface water**: Requirements governing Water Quality Standards supplemented with USEPA National Recommended Water Quality Criteria, USEPA Region 3 Freshwater Screening Benchmark, LANL Ecorisk Database
- The proposed screening levels to be used for the human health risk assessment are described as follows, and are listed in Table 1-1.
  - **Soil and Sediment**: Risk-Based Concentrations supplemented with USEPA Regional Screening Levels
  - **Surface water**: Requirements governing Water Quality Standards supplemented with USEPA National Recommended Water Quality Criteria and USEPA Regional Screening Levels for tap water
  - **Groundwater**: Requirements governing Water Quality Standards then Risk-Based Concentrations supplemented with USEPA Maximum Contaminant Levels, National Primary Drinking Water Standards and USEPA Regional Screening Levels for tap water

- California Conservation Corps (CCC) camps may have been located within portions of the MRS. USFS may have information regarding locations.
- Samples should only be taken in areas with trash pits, unless areas of concern are identified during the QR.
- If samples indicate contamination, then water downstream of the location should be sampled.
- The Otter Creek NWA on the western portion of the MRS should be avoided.
- Nearby drums and refuse should be photographed but not sampled.
- The TPP Team concurred that no known cultural resources exist within MRS.
- The TPP agreed that the MRS boundaries would be revised to closely match the acreage listed in the PA (40,000 acres).
- Glady Fork as shown on presentation Slide 74 is mislabeled. The correct location is shown on Slide 77.

WV
MMRP File

TECHNICAL PROJECT PLANNING
ATTENDANCE SIGN-IN SHEET

Date: April 7, 2011
Place: Canaan Valley Resort State Park, Davis, West Virginia
Projects:

West Virginia Maneuver Area

PRINTED NAME	ORGANIZATION / ADDRESS	PHONE NUMBER	EMAIL ADDRESS
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TECHNICAL PROJECT PLANNING
ATTENDANCE SIGN-IN SHEET

Date: April 7, 2011
Place: Canaan Valley Resort State Park, Davis, West Virginia
Projects:

West Virginia Maneuver Area

PRINTED NAME	ORGANIZATION / ADDRESS	PHONE NUMBER	EMAIL ADDRESS
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Lauren Johnson	Parsons 1700 Broadway, Suite 900 Denver, CO 80290	(303) 764-8830	Lauren.Johnson@Parsons.com
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US Army Corps of Engineers®
Huntington District

SIGN-IN SHEET

West Virginia Maneuver Area
Technical Project Planning Meeting

PLEASE PRINT

LOCATION: Canaan Valley Resort State Park **DATE:** 7 April 2011 **TIME:** 9:00 a.m. – 5:30 p.m.

Name	Address/City/State/Zip	Phone	Email
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PROJECT OBJECTIVES WORKSHEET

SITE: **Jenningston Training Area**
PROJECT: **MMRP Site Inspection / FUDS Project No. G03WV0013**

Site Objective[a]					Data Needs	Data Collection Methods	Project Objective Classification[d]
No.	Executable Stage[b]		Description	Source[c]			
	Current	Future					
1	Yes		Determine presence/lack thereof of MEC	PA, Recon	Are there any MEC? If so what type, where and hazard posed? Future LU.	Qualitative Reconnaissance	Basic
2	Yes		Determine presence/lack thereof of MC, both explosive and non-explosive concentrations.	Soil, surface water, sediment, groundwater sampling	Are there any explosives present in samples? If present, what is it, to what degree is it present, is it above the the designated screening level? And if so, is action required?	Sample collection IAW SAP	Basic

a Refer to EM 200-1-2, Paragraph 1.2.2
b Refer to EM 200-1-2, Paragraph 1.2.5
c For example, Meeting with Customer/stakeholder/Regulator, State Regulation____,
d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

PA - Preliminary Assessment
IAW - In accordance with
MEC - Munitions and Explosives of Concern
LU - Land Use
MC - Munitions Constituents
SAP - Sampling and Analysis Plan

Former West Virginia Maneuver Area

TPP Team	EM 200-1-2, Paragraph 1.1.1	
Decision Makers		
Customer	USACE Huntington District (CELRH)	
Project Manager	Richard Meadows, CELRH	
Regulators	West Virginia Department of Environmental Protection; EPA Region 3	
Primary Stakeholders	Private Landowners, U.S. Department of Agriculture	
Data Types	**Data User(s)**	**Data Gatherer**
Demographics/Land Use	Risk, Responsibility, and Compliance Perspectives	Parsons (Senior Scientist, Risk Specialist)
Site Conditions	Remedy Perspective	Parsons (Geologist, Senior Scientist)
Munitions and Explosives of Concern (MEC)	Risk and Remedy Perspectives	Parsons (UXO Technician III or higher, Risk Specialist, Senior Scientist)
Munitions Constituents (MC)	Risk and Remedy Perspectives	Parsons (Chemist, Risk Specialist, Senior Scientist)
Archaeology	Compliance and Remedy Perspectives	Parsons (Staff Scientist, Senior Scientist)
Endangered Species	Risk and Compliance Perspectives	Parsons (Staff Scientist, Senior Scientist)

CUSTOMER'S GOALS		EM 200-1-2, Paragraph 1.1.2	
Potential Area of Interest (PAOI)	**Contaminant Issues**	**Future Land Use**	**Site-specific Closeout Goal (if applicable)**
Jenningston Training Area	TBD	National Forest, private	See below
Site Closeout Statement			
To manage the munitions and explosives of concern (MEC) and munitions constituents (MC) risk through a combination of removal, administrative controls, and public education; thereby rendering the site as safe as reasonably possible to humans and the environment and conducive to the anticipated future land use.			
Customer's Schedule Requirements			
Site Inspection and Reporting Complete by January 14, 2013			
Customer's Site Budget			
Site Inspection and Reporting: Fully Funded through SI Phase			

IDENTIFY SITE APPROACH		
EXISTING SITE INFORMATION & DATA EM 200-1-2, Paragraph 1.1.3 and 1.2.1		
Attachment(s) to Phase I TPP Memorandum	**Located at Repository**	**Preliminary Conceptual Site Model**
Preliminary Assessment (Archives Search Report)	N/A for SI Phase; Implemented in post-SI Phase as warranted	No
Site-Specific SI Work Plan	N/A for SI Phase; Implemented in post-SI Phase as warranted	Yes
POTENTIAL POINTS OF COMPLIANCE EM 200-1-2, Paragraph 1.2.1.3		
Determination of absence or presence of MEC/MC and applicability of RI/FS		
If MC are detected, comparison against Screening Levels (SSLs) as identified in "Site Constraints and Dependencies" below to determine if further MC evaluation during RI/FS is warranted.		
Avoidance of sensitive conditions: endangered species, archaeological sites		
MEDIA OF POTENTIAL CONCERN EM 200-1-2, Paragraph 1.2.1.4		
Qualitative review of MEC presence		
Quantitative screening of MC in soil		
Comparison criteria		
SITE OBJECTIVES EM 200-1-2, Paragraph 1.2.2		
Eliminate from further consideration those releases that pose no significant threat to public health or the environment.		
Collection of sufficient data to perform MRSPP scoring and USEPA to conduct MC-related HRS		
See Programmatic and Site-Specific Work Plan		
See Attached Worksheets Developed by the Project Team		
REGULATOR AND STAKEHOLDER PERSPECTIVES EM 200-1-2, Paragraph 1.2.3		
Regulators	**Community Interests**	**Others**
West Virginia Department of Environmental Protection; EPA Region 3	Partly farmland with residences	
	Partly within Monongahela National Forest	
	Managed by USFS	
PROBABLE REMEDIES EM 200-1-2, Paragraph 1.2.4		
RI/FS		
Institutional Controls / Public Education		
EXECUTABLE STAGES TO SITE CLOSEOUT EM 200-1-2, Paragraph 1.2.5		
Site Inspection (SI)		
Remedial Investigation/Feasibility Study (RI/FS)		
Proposed Plan		
Decision Document		
Remedial Design (RD)		
Remedial Action (as necessary)		
Recurring Review		
Time Critical Removal Action (as required)		

IDENTIFY CURRENT PROJECT	
SITE CONSTRAINTS AND DEPENDENCIES	**EM 200-1-2, Paragraph 1.3.1**
Administrative Constraints and Dependencies	
Right of Entry (ROE)	
Cultural Resources	
Funding beyond the SI	
Schedule	
Concurrent Planning Programs	
Technical Constraints and Dependencies	
Property owner/leaseholder site activities (Site access)	
Cultural Resources	
Topography/vegetation	
MEC avoidance screening of MC sample locations for safety	
Environmentally sensitive areas	
Legal and Regulatory Milestones and Requirements	
Consistent with CERCLA and NCP, and in compliance with all legally applicable federal and state requirements.	
Public, stakeholder and regulatory involvement and review of key documents	
Funding beyond the SI	
Comparison criteria as agreed upon by the TPP Team. Human Health: RBCs supplemented with USEPA RSLs (soil and sediment); Requirements governing Water Quality Standards supplemented with USEPA National Recommended Water Quality Criteria and USEPA RSLs for tap water (surface water); Requirements governing Water Quality Standards then RBCs supplemented with USEPA MCLs, National Primary Drinking Water Standards and USEPA RSLs for tap water (groundwater). Ecological: USEPA EcoSSLs, or in absence of EcoSSLs - values obtained from LANL, EcoRisk Database, and USEPA Region 4 and Region 5 ESLs (soil); USEPA Region 3 Ecological Screening Benchmarks, Freshwater Sediment Screening Benchmark and NOAA Screening Quick Reference Tables, LANL Ecorisk Database and USEPA Region 4 and Region 5 ESLs (sediment); Requirements governing Water Quality Standards supplemented with USEPA National Recommended Water Quality Criteria, USEPA Region 3 Freshwater Screening Benchmark, LANL Ecorisk Database, USEPA Region 4 ESVs for Fresh Surface Water, and UsEPA Region 5 ESVs (surface water). Background: Natural Background Levels of Inorganics in Soils in West Virginia and Surrounding Areas, three times USGS ambient concentrations, or mean concentration if multiple ambient samples (soil and sediment); three times ambient concentration, or mean concentration if multiple ambient samples (surface water); three times ambient concentration, or mean concentration if multiple ambient samples (groundwater).	
CURRENT EXECUTABLE STAGE	**EM 200-1-2, Paragraph 1.3.3**
Site Inspection	

Basic (For Current Projects)	**Optimum** (For Future Projects)	**Excessive** (Objectives that do not lead to site closeout)
Site Reconnaissance	RI/FS	

Acronyms

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CELRH - U.S. Corps of Engineers, Huntington District
DoD - Department of Defense
ESL - Ecological Screening Level
ESV - Ecological Screening Value

USEPA - U.S. Environmental Protection Agency
FUDS - Formerly Used Defense Sites
HRS - Hazard Ranking System
LANL - Los Alamos National Laboratory
MC - munitions constituents
MCL - Maximum Contaminant Level
MEC - munitions and explosives of concern
MRSPP - Munitions Response Site Prioritization Protocol
NCP - National Contingency Plan
NDAI - No Department of Defense Action Indicated
PSAP - Programmatic Sampling and Analysis Plan
RBC - Risk-Based Concentration
RI/FS - Remedial Investigation and Feasibility Study
RSL - Regional Screening Level
SI - Site Inspection
SSL - Soil Screening Level
TBD - To be determined

MEC DATA QUALITY OBJECTIVE WORKSHEET

SITE: **West Virginia Maneuver Area; FUDS Project No. G03WV0013**
PROJECT: **MMRP Site Inspection / MRS03 Jenningston Training Area**

DQO STATEMENT NUMBER: **1 of 4**

DQO Element Number*	**DQO Element Description***	**Site-Specific DQO Statement**
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate potential presence of munitions or explosives of concern (MEC)
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, remedy
3	Contaminant or Characteristic of Interest	MEC, munitions debris
4	Media of Interest	N/A
5	Required Locations or Areas	Jenningston Training Area MRS
6	Number of Samples Required	N/A
7	Reference Concentration of Interest or Other Performance Criteria	Visual identification of MEC or munitions debris during qualitative reconnaissance (QR)
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	QR with magnetometer (Schonstedt) for avoidance
9	Analytical Method	N/A

* Refer to EM 200-1-2, Paragraph 4.2.1

MC DATA QUALITY OBJECTIVE WORKSHEET

SITE: **West Virginia Maneuver Area; FUDS Project No. G03WV0013**
PROJECT: **MMRP Site Inspection / MRS03 Jenningston Training Area**

DQO STATEMENT NUMBER: **2 of 4**

DQO Element Number*	**DQO Element Description***	**Site-Specific DQO Statement**
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate potential release of munitions constituents (MC)
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, remedy
3	Contaminant or Characteristic of Interest	See CSM
4	Media of Interest	Surface soil, and surface water and sediments
5	Required Sampling Locations or Areas and Depths	Samples will be collected as determined by the TPP Team, see Figures 3 and 4. Sample depth is 0-3 inches for surface soil.
6	Number of Samples Required	1 discretionary biased surface soil sample and 1 ambient surface soil sample. 1 biased sample set of surface water & sediment, and 1 ambient sample set. Plus associated QA/QC samples.
7	Reference Concentration of Interest or Other Performance Criteria	Human health selected values for soil and sediment are from the USEPA 'protection for groundwater' risk-based screening levels, supplemented with USEPA Region 3 Screening Levels. Human health selected values for surface and ground water are from *Requirements Governing Water Quality Standards Rule*, supplemented by USEPA Region 3 levels for tap water (or MCLs if no value for tap water was found). Ecological selected values are from USEPA EcoSSLs, supplemented by Los Alamos National Laboratory's EcoRisk Database values and the relevant USEPA Ecological Screening Benchmarks.

Appropriate Sampling and Analysis Methods:		
8	Sampling Method	Seven-point wheel sampling method in accordance with the SS-WP, PSAP and PSAP Addendum
9	Analytical Method	Explosives: SW846-8321A Selected metals: SW846-6010B pH: EPA Method 150.1

Refer to EM 200-1-2, Paragraph 4.2.1

MRSPP Data Quality Objective Worksheet

Site: West Virginia Maneuver Area; FUDS No. G03WV0013
Project: MMRP Site Inspection / MRS03 Jenningston Training Area
DQO Statement Number: 3 of 4

Module	Table #	Table Description	Known Data	Current Data Gap	Data Source
Explosive Hazard Evaluation (EHE)	1	Munitions Type	X		Historical records or field findings
	2	Source of Hazard	X		Historical maps
	3	Location of Munitions		X	Historical records or field findings
	4	Ease of Access		X	Field findings
	5	Status of Property	X		Historical records
	6	Population Density		X	U.S. Census Bureau
	7	Population Near Hazard		X	Field findings
	8	Types of Activities/Structures		X	Regional zoning
	9	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	10	Determining the EHE		X	Scores from Tables 1 through 9
Chemical Warfare Material (CWM) Hazard Evaluation (CHE)	11	CWM Configuration	X		Historical records or field findings
	12	Sources of CWM	X		Historical records or field findings
	13	Location of CWM	X		Historical records or field findings
	14	Ease of Access		X	Historical records or field findings
	15	Status of Property	X		Historical records
	16	Population Density		X	U.S. Census Bureau
	17	Population Near Hazard		X	Field findings
	18	Types of Activities/Structures		X	Regional zoning
	19	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	20	Determining the CHE		X	Scores from Tables 11 through 19
Health Hazard Evaluation (HHE)	21	Groundwater Data		X	N/A
	22	Surface Water - Human Endpoint		X	Field findings
	23	Sediment - Human Endpoint		X	Field findings
	24	Surface Water - Ecological Endpoint		X	Field findings
	25	Sediment - Ecological Endpoint		X	Field findings
	26	Surface Soil		X	Surface soil sampling results
	27	Supplemental Contaminant Hazard Factor		X	All MC sampling results
	28	Determining the HHE		X	Scores from Tables 21 through 27
	29	MRS Priority		X	Scores from Tables 10, 20, and 28
	A	MRS Background Information	X		DoD databases

HRS Data Quality Objective Worksheet

Site: West Virginia Maneuver Area; FUDS No. G03WV0013
Project: MMRP Site Inspection / MRS03 Jenningston Training Area
DQO Statement Number: 4 of 4

Data Description	Known Data	Current Data Gap	Data Source
Source Type	X		Historical records or field findings
Estimated Volume or Area	X		Field findings
Hazardous Substance	X		Constituents of suspected munitions
Groundwater Sample Concentration		X	N/A
Groundwater Use		X	Well records and municipal data
Surface Water Sample Concentration		X	N/A
Surface Water Pathways		X	Field findings
Soil Sample Concentration		X	Sample results
Soil Pathways		X	Field findings
Sensitive Environments	X		State Historic Preservation Office, U.S. Fish and Wildlife Service, various government agencies
Attractiveness/Accessibility		X	Field findings and land use records

2nd TPP MEETING DOCUMENTATION

Technical Project Planning Memorandum

Subject: Formerly Used Defense Site Military Munitions Response Program
Documentation of Technical Project Planning Meeting for Draft Final Site Inspection Report Recommendation concurrence

Site: ***West Virginia Maneuver Area/Dolly Sods FUDS***
FUDS Property No. G03WV0013

MRS03 – Jenningston Training Area
Randolph and Tucker Counties, West Virginia
FUDS Project No. G03WV001307

Contract: Contract Number W912PP-11-C-0007
Task Order 0001

This document serves as a record of the events and discussion during the final Technical Project Planning (TPP) meeting for the Jenningston Training Area Munitions Response Site (MRS03) at the West Virginia Maneuver Area (WVMA) / Dolly Sods Formerly Used Defense Site (FUDS). The Jenningston Training Area MRS, is one of 7 MRSs within the FUDS, and is located in Randolph and Tucker Counties in northeastern West Virginia. The TPP Meeting was held on 30 July 2013 at the West Virginia Forest Service Headquarters (200 Sycamore St., Elkins, WV).

The TPP Team members listed below met for a presentation and discussion on the Draft Final Site Inspection (SI) Report for the Jenningston Training Area MRS.

Parsons provided a presentation that summarized the technical approach, field effort, the SI Report recommendations and the Munitions Response Site Prioritization Protocol (MRSPP) evaluation for the MRS.

The following issues and resolutions were noted during the TPP Meeting:

- Stakeholders concur with a No Further Action recommendation for the MRS based on an incomplete MEC exposure pathway and no unacceptable risk to human or ecological receptors as a result of exposure to metals in surface soil, sediment and surface water.

- Brian Jordan (USACE, Albuquerque District) requested the following changes for the Final SI Report:

    - MRSPP – revise Table 1 to state “evidence of no munitions” with a score of 0. As a result, Tables 2-9 will be omitted.

TPP Meeting Attendance

Name	Organization / Address	Phone Number	E-mail Address
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Name	Organization / Address	Phone Number	E-mail Address
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TECHNICAL PROJECT PLANNING MEETINIG 2
ATTENDANCE SIGN-IN SHEET

Date: July 30, 2013
Place: U.S. Forest Service Headquarters, Elkins, WV
Project: West Virginia Maneuver Area

PRINTED NAME SIGNATURE	ORGANIZATION/ ADDRESS	PHONE NUMBER	E-MAIL ADDRESS
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Mohammad Estiri via phone	Eco & Assoc.		

Huntington District

West Virginia Maneuver Area / Dolly Sods FUDS

FUDS Project No. G03WV0013

Jenningston Training Area (MRS03)

Randolph and Tucker Counties, West Virginia

Technical Project Planning Meeting
For
Site Inspection

July 30, 2013

Why Are We Here?

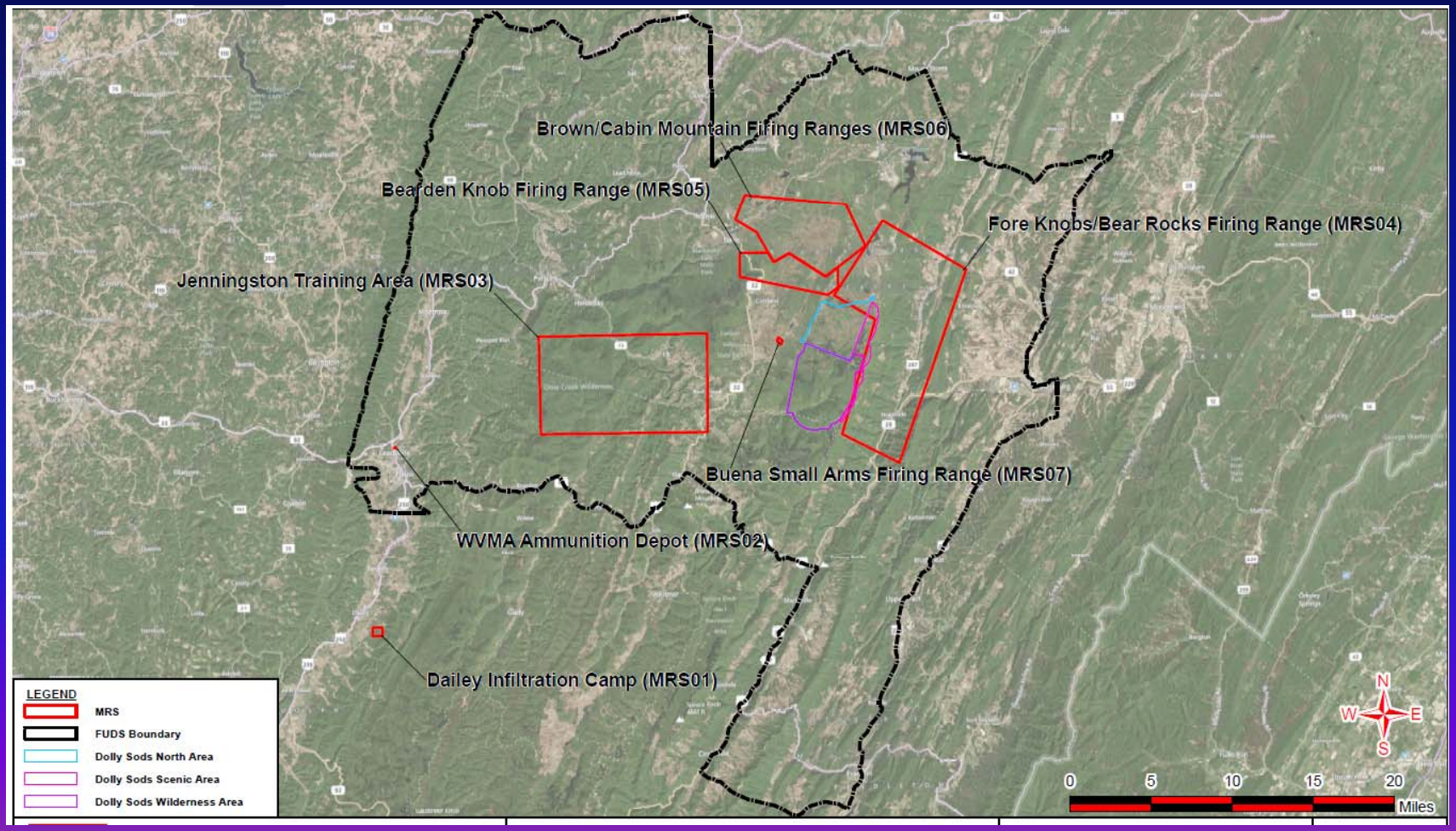
- To discuss and agree to the recommendations presented in the Draft Final Site Inspection (SI) Report and subsequent Revision Summary.

- To complete the SI phase for the Jenningston Training Area Munitions Response Site (MRS) at the West Virginia Maneuver Area Formerly Used Defense Site (FUDS).

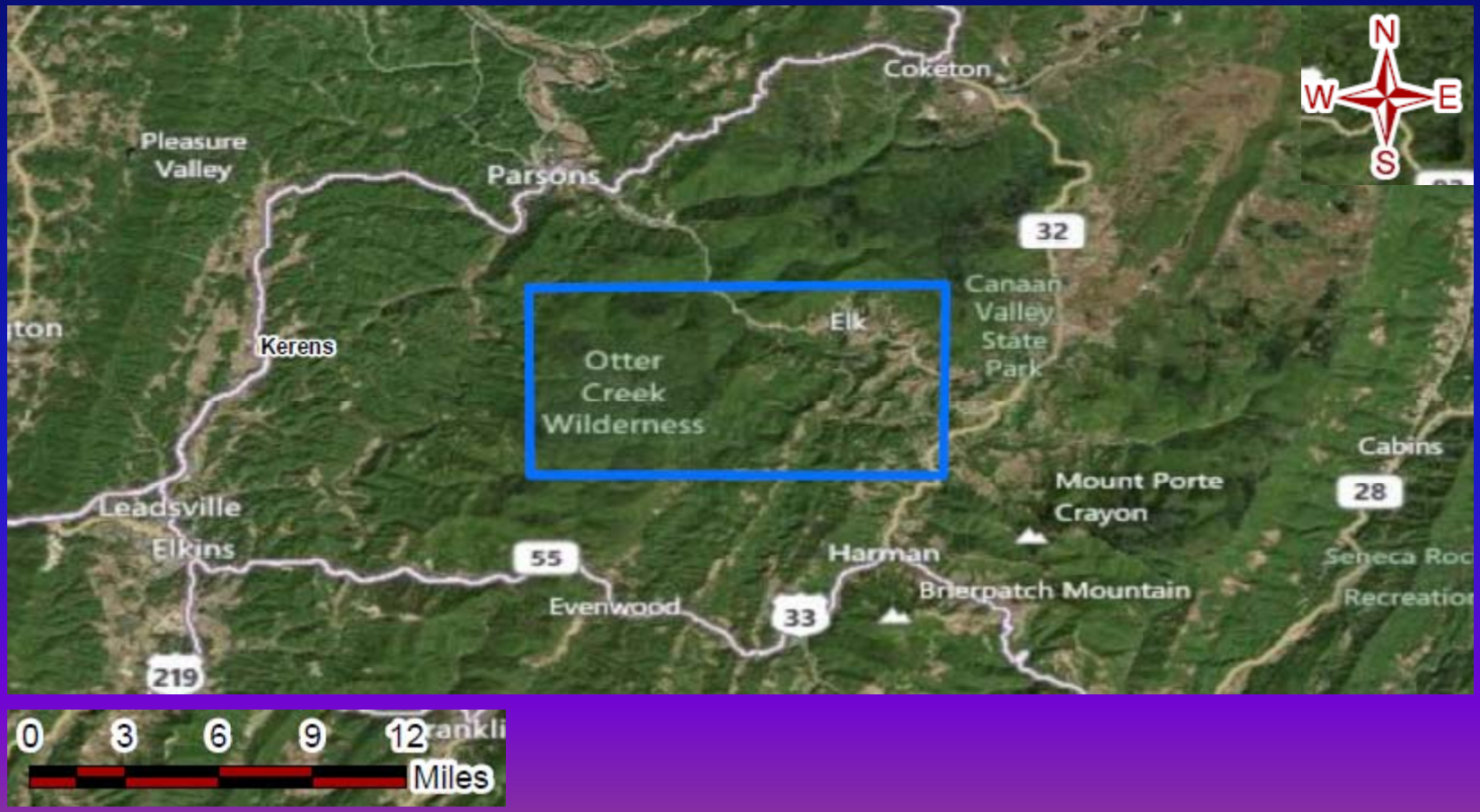
How Did We Get Here?

- Technical Project Planning (TPP) Meeting No. 1 – April 2011
  - Established TPP Team consensus on appropriate SI technical approach
- TPP Memorandum submitted and approved – September 2011
- Site-Specific Work Plan (SS-WP) approved – February 2012
- Field Work (qualitative reconnaissance [QR] and metals sampling) – May 12, 13, 15 and 16, 2012
  - Field Team Leader = Lauren Ranker (Parsons); UXO Tech = Rick White (Parsons); Sampling Tech = Steve Saunders (Eco & Associates)
- TPP Meeting No. 2 (this meeting) – July 30, 2013
- Final SI Report – Anticipated to be sent out August 2013

WVMA / Dolly Sods FUDS Location



Jenningston Training Area MRS Location



Site History - Revisited

- West Virginia Maneuver Area (WVMA) / Dolly Sods FUDS has a total property area of 2,180,367 acres (FUDS Property ID No. G03WV0013).
- The FUDS was acquired by the Army in the early 1940s and was returned to the Department of Agriculture and private landowners in 1950.
- Jenningston Training Area MRS (MRS03) consists of 40,000 acres (FUDS Project No. G03WV001307). One of 7 MRSs associated with the FUDS, which was used by the U.S. Army between 1943 and 1944 for training activities during WWII.
- The MRS was used as an infantry division troop maneuver area. Activities conducted in the area consisted of rock climbing exercises, troop maneuver problems, and mountain marching. No known training activities within the MRS required actual munitions. The training was conducted in a 40,000-acre area centered on the town of Elk.
- A pack mule training school was operated in the vicinity of the town of Gladwin. The school provided instruction on the use of pack mules for transportation of equipment and supplies. Troop training and encampment areas were also constructed near the communities of Sully and Kerens.

Site History - Revisited

- 1950 – FUDS Property was returned to the Department of Agriculture and private landowners.
- There is no historical documentation of a clearance being conducted at this MRS.
- Currently
  - A large portion of the MRS is owned by the U.S. Department of Agriculture and managed by the U.S. Forest Service as the Monongahela National Forest (MNF). The remainder of the MRS is owned by private individuals and consists of residential, commercial, and agricultural properties, including the unincorporated communities of Jenningston, Dryfork, Elk, and Gladwin.
  - The forest is used for outdoor recreation (hiking and spelunking), and agriculture.
  - Small communities within the MRS consist of private residences and agricultural land, and commercial structures such as small stores and gas stations.

Site History - Revisited

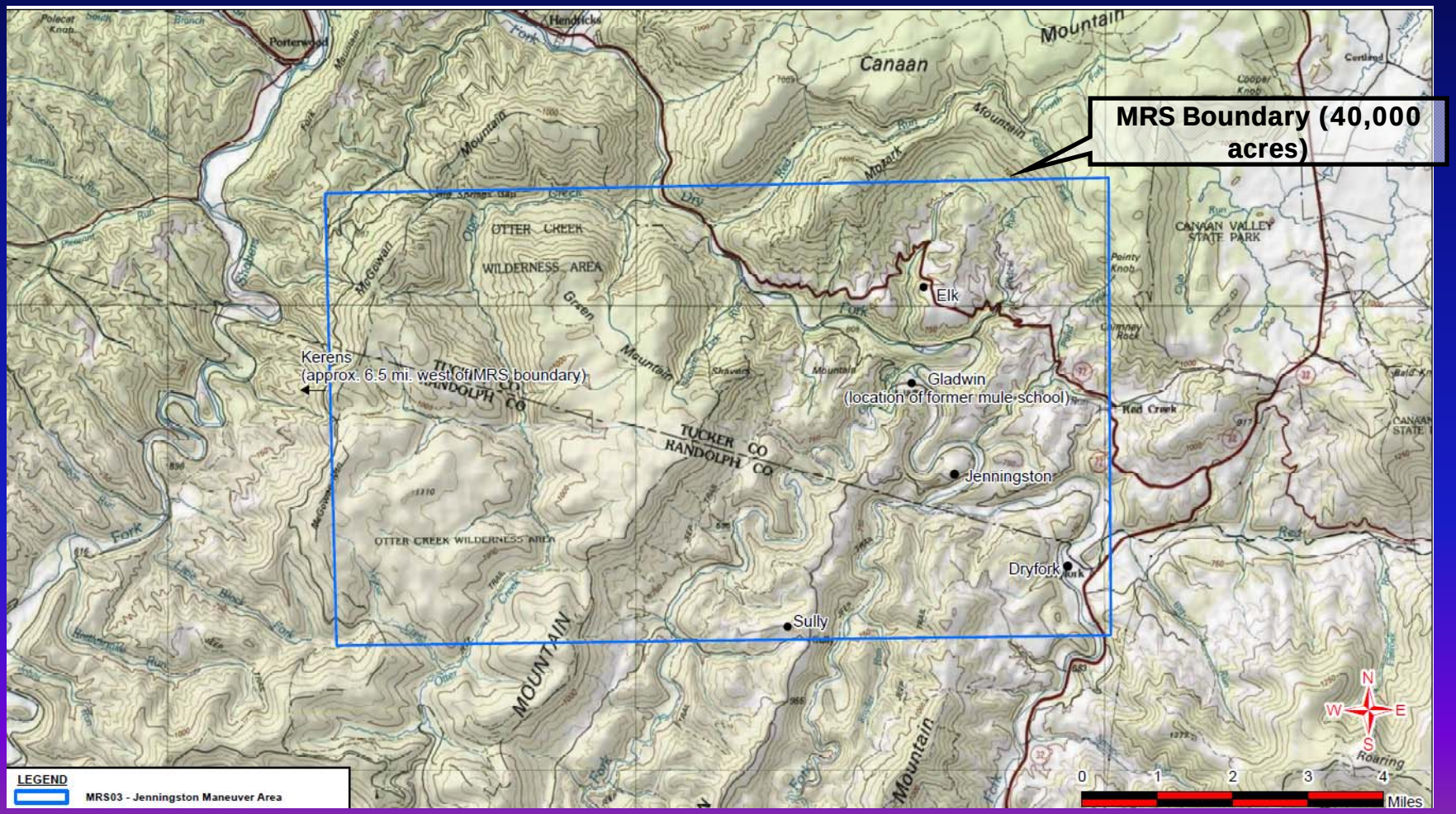
- In 2006, a cave containing 60-mm and 81-mm shipping canisters was located by MNF personnel conducting a karst survey project. Explosives Ordnance Disposal (EOD) personnel that responded to the incident believed that the shipping canisters were a random act of disposal located in a troop maneuver area.
- No munitions debris (MD) or munitions and explosives of concern (MEC) items have been documented at the Jenningston Training Area MRS.
- The majority of the historical information for the MRS comes from the 2009 Preliminary Assessment (PA).
- The PA included a September 2007 field visit. The field team observed the area of the former pack mule training facility as well as the troop training and encampment areas near the communities of Sully and Kerens. No evidence of military use was observed in those areas during the site visit.
- The PA assigned Munitions Response Site Prioritization Protocol (MRSPP) score of 7 to the MRS.

Site History - Revisited

- The PA did not provide a list of the known or suspected munitions for Jenningston Maneuver Area; therefore, as a conservative measure, the potential munitions list considered for the SI activities on this MRS included all potential munitions for the WVMA / Dolly Sods FUDS:
  - 155 mm HE and WP projectiles
  - 105mm HE and SR cartridges
  - 81mm HE and SR cartridges
  - 81mm target practice cartridges
  - 75mm HE and SR shells
  - 60mm HE and SR shells
  - 4.2-inch HE and SR shells
  - 3.25-inch target rockets
  - 57mm AP-T cartridges
  - 40 mm AP-T cartridges
  - Antitank practice mines
  - Demolition firing devices, pull
  - Electric and non-electric blasting caps
  - Blasting time fuses
  - General small arms ammunition [.22 caliber, .30 caliber (including carbine), .38 caliber, .45 caliber, .50 caliber (machine gun)]
  - Fragmentation hand grenades
  - Practice hand grenades
  - Demolition charges, ¼ lb, ½ lb, and 1 lb blocks

Note: The SI results did not provide evidence that any of these munitions are present at the MRS.

Site Setting: Jenningston Training Area MRS



Technical Approach

On April 7, 2011, the TPP Team discussed the technical approach:

- QR to evaluate potential presence of MEC / MD
- Sampling methods and media to evaluate for the potential presence of metals contamination:
  - Cold Regions Research and Engineering Laboratory (CRREL) 7-point wheel composite soil sampling (0 to 2 in. bgs)
  - Grab surface water (SW) and sediment (SD) samples
  - Groundwater would be sampled if domestic wells were identified and right-of-entries obtained.

Technical Approach (Continued)

Agreed on sample locations:

- Biased samples at locations where munitions debris or range features are observed. (One sample was collected next to the cave where mortar canisters were found.)
- Limited ambient samples in areas up-gradient or upstream from areas of DoD use
- Archaeological/cultural resources are possible within the MRS, but not recorded. Sampling was not anticipated to affect resources.

- Laboratory analyses for metals:

  Surface soil, SW, and SD:

  - Explosives
  - Selected metals (aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc)

  Surface soil and sediment:

  - pH (MRS is ecologically important, and Al was analyzed)

Technical Approach (Continued)

- Background Evaluation:
  - Due to the variations in naturally occurring metals across the region, it was determined that the ambient sample comparisons planned during TPP should be modified for a more representative evaluation.

  Soil:
  - Limited ambient surface soil data collected during the SI were supplemented by background concentrations obtained from the West Virginia Voluntary Remediation and Redevelopment Act Guidance Manual Version 2.1, Table 2-3: Natural Background Levels of Inorganics in Soil in West Virginia and Surrounding Areas.
  - The background value used for comparison to the biased surface soil sample results is three times the mean background concentration.

Technical Approach (Continued)

Sediment:

- The background value used for comparison to the biased sediment sample results is three times the mean background concentration of elements in Tucker County, West Virginia, identified by the United States Geological Survey (USGS); or
- In the absence of a Tucker County average concentration, the background value is three times the ambient analytical result of one ambient sediment sample collected during the SI. (Concentrations of antimony and chromium are not available in this dataset.)

Surface Water:

- Additional metals background data were not available. Therefore, per USEPA guidance the surface water background value is established as three times the concentration detected in the ambient surface water sample collected during the SI.

Technical Approach (Continued)

- Risk Assessment
  - Jenningston Training Area MRS is ecologically important because it contains the Monongahela National Forest, a federally designated wilderness area (Otter Creek Wilderness Area), and a federally designated critical habitat (Virginia Big-Eared Bat). Therefore, a screening level ecological risk assessment (SLERA) would be conducted, in addition to a human health screening level risk assessment (SLRA).

<u>Human Health SLRA:</u>

Soil and Sediment:

The WVDEP RBCs, and Table 60-3B in the Voluntary Remediation and Redevelopment Rule (60CSR3) supplemented with USEPA Regional Screening Levels (RSLs).

Technical Approach (Continued)

Human Health SLRA Continued:

Surface Water:

WV Requirements Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria and USEPA RSLs for tap water.

Technical Approach (Continued)

Ecological SLRA:

Soil:

USEPA EcoSSLs were used. In absence of EcoSSLs, values obtained from the LANL EcoRisk Database, and USEPA Region 3 Ecological Screening Levels (ESLs);

Sediment:

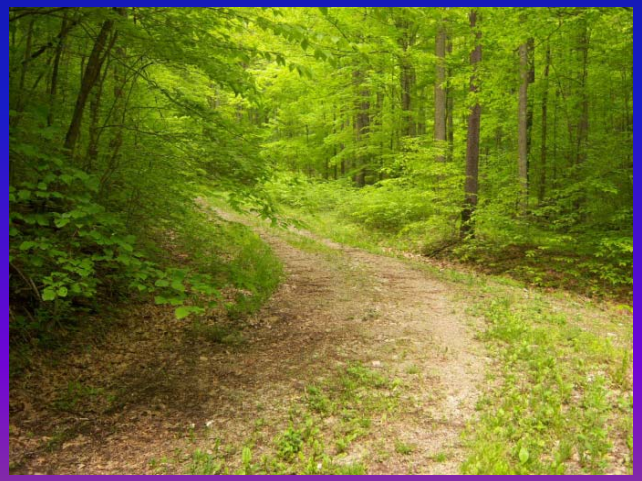
USEPA Region 3 Ecological Benchmarks, Freshwater Sediment Screening Benchmark, National Oceanic and Atmospheric Administration Screening Quick Reference Tables, LANL EcoRisk Database, and USEPA Region 3 ESLs.

Surface Water:

WV Requirements Governing Water Quality Standards (47CSR2) supplemented with USEPA National Recommended Water Quality Criteria, USEPA Region 3 Freshwater Screening Benchmark, and LANL EcoRisk Database.

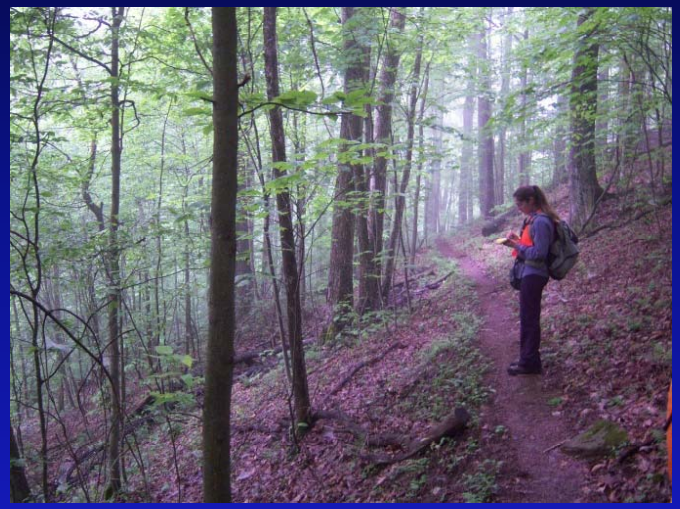
SI Field Elements

- 23.59 miles of QR walked.
- 30 observations recorded.
- No MEC or MD was observed.
- Other observations:
  - One small vertical cave
  - Two wilderness campsites
  - Stone foundation remains
  - Minor trash and debris (not DoD-related)
  - Clearings and roads left over from logging



SI Field Elements (Continued)

- Samples collected:
  - 2 CRREL 7-point wheel “composite” soil samples, 0- to 2-inch sample depth (including one ambient)
  - 2 SW/ SD coupled sample sets (including one ambient sample set)
  - 3 Field Dup samples (1/medium)
  - 3 Matrix Spike (MS) /MS Duplicate sample sets (1/medium)



- One biased soil sample was collected next to the cave where mortar shipping canisters were historically found.
- Biased SW/SD samples were collected from Otter Creek, downstream from the MRS.
- Ambient SW/SD and soil samples were collected from Condon Run, just before it empties into Otter Creek, up-stream from the MRS.

SI Field Elements (Continued)

- Rights-of-entry (ROE) were not received for the properties containing groundwater wells, so no groundwater samples were collected.
- Departures from work plan:
  - The TPP Team decided that the Otter Creek Wilderness Area should be avoided due to difficulty accessing the Wilderness Area. After reviewing the SS-WP, however, CELRH suggested that QR be conducted on Shavers Mountain and portions of the Otter Creek drainage rather than along Glady Fork as proposed in the SS-WP. This CELRH determined that this change was warranted based on the potential for additional MEC that may have been transported by the pack mule teams during training operations.
  - QR was limited to Shaver's Mountain and the northern portion of the Otter Creek Wilderness due to safety concerns associated with crossing the Otter Creek during high water levels and the potential for flash flooding.

SI Field Elements (Continued)

Mortar canister cave

Soil sampling next to cave

Clearing near cave

Jeep Trail

Non munitions-related debris

Dry fork River

SI Field Elements (Continued)

Mylius Trail

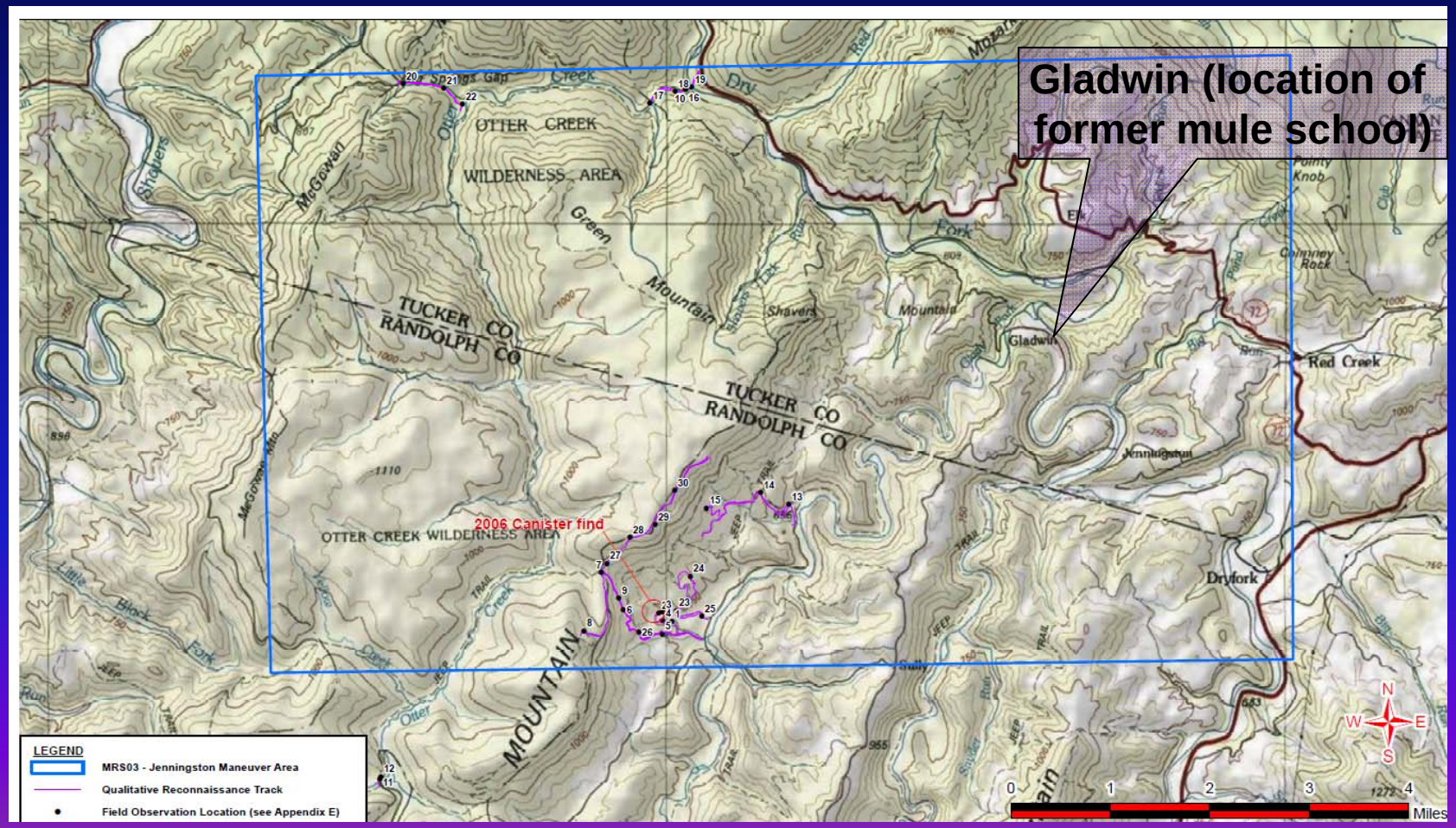
Campsite, intersection of Mylius and Shavers Mnt. Trails

Campsite on Shavers Mnt.

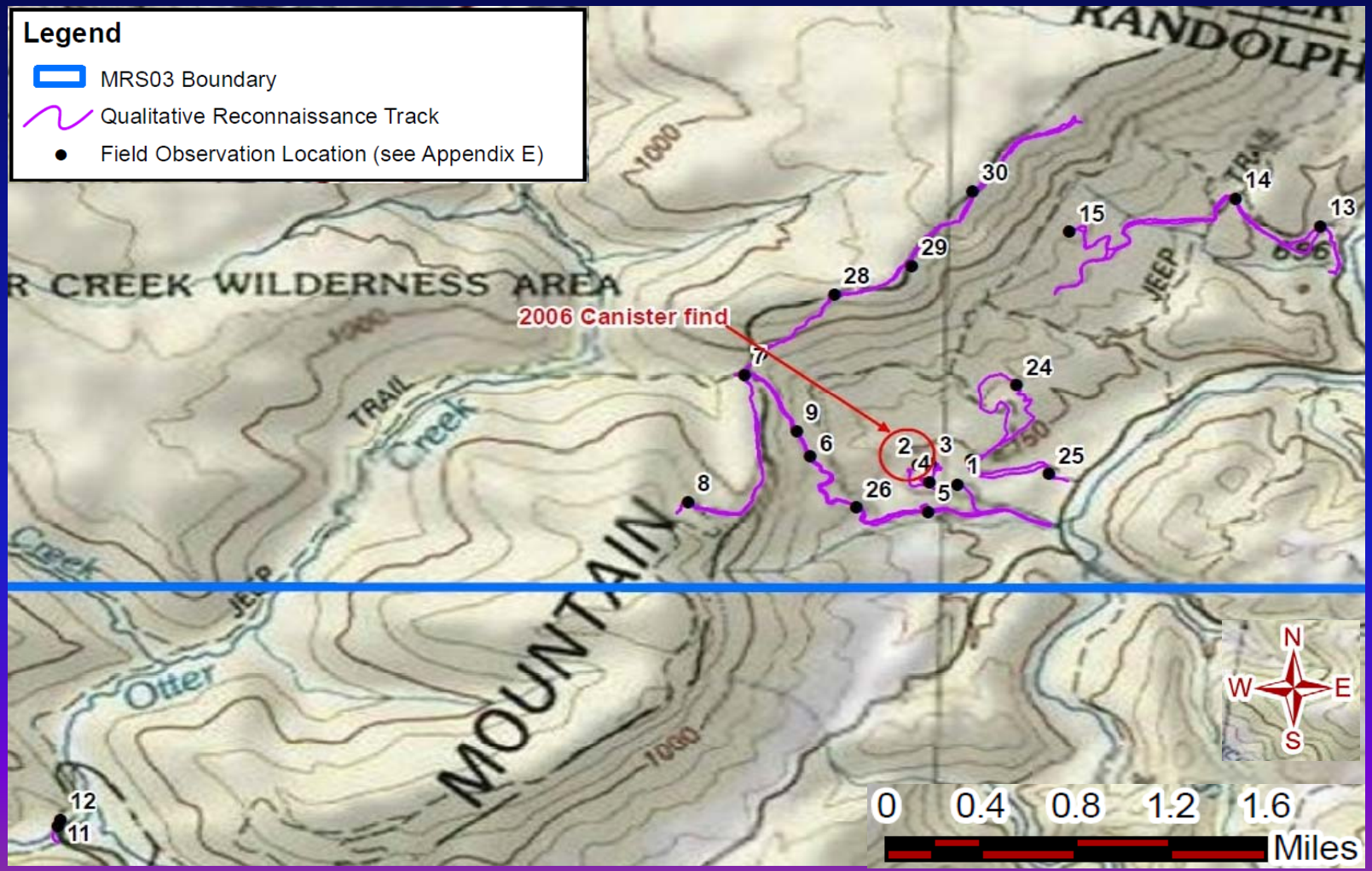
UXO Tech sweeping for metal debris

Surface water / sediment sampling in Otter Creek

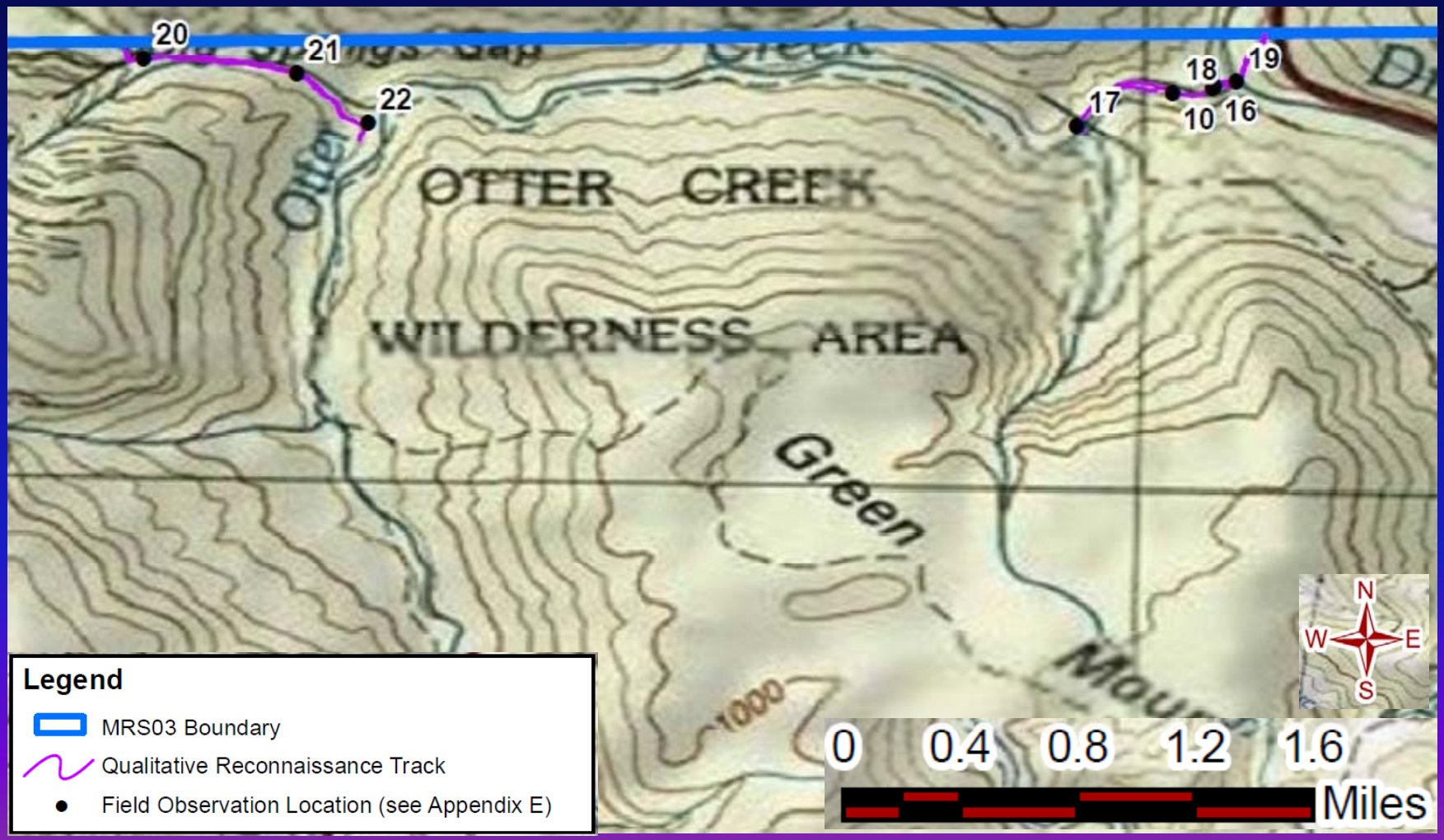
SI Field Elements (Continued)



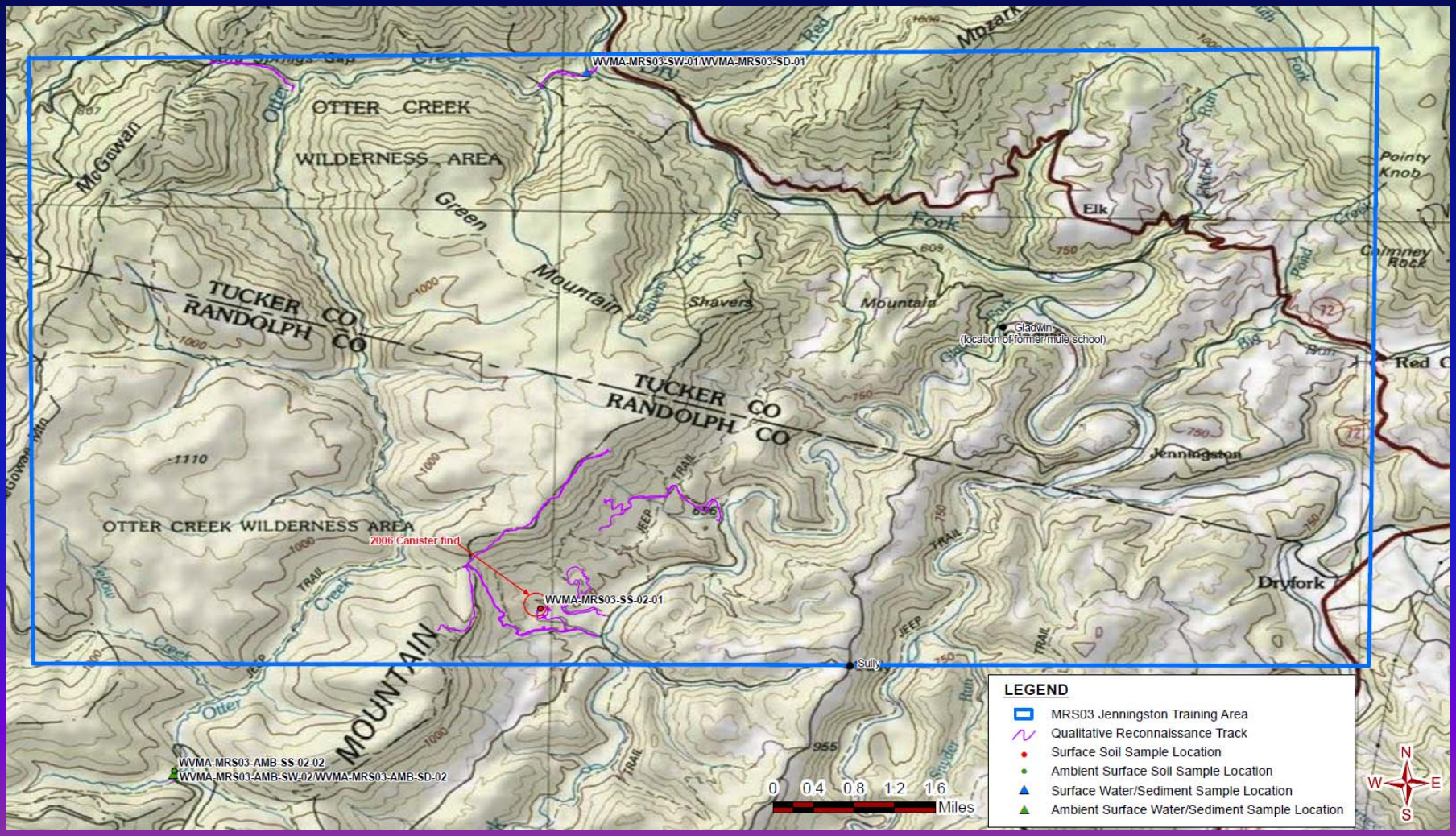
SI Field Elements (Continued)



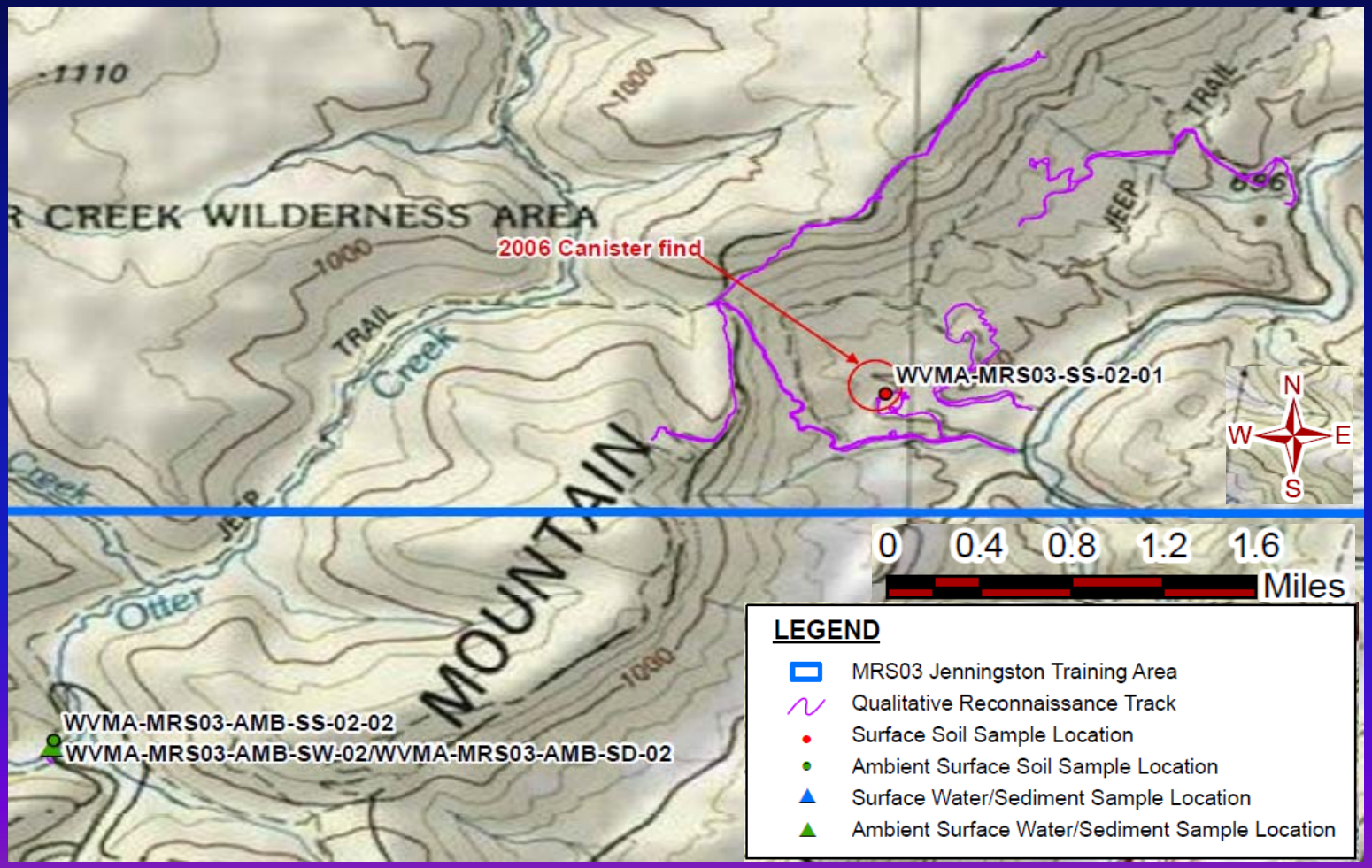
SI Field Elements (Continued)



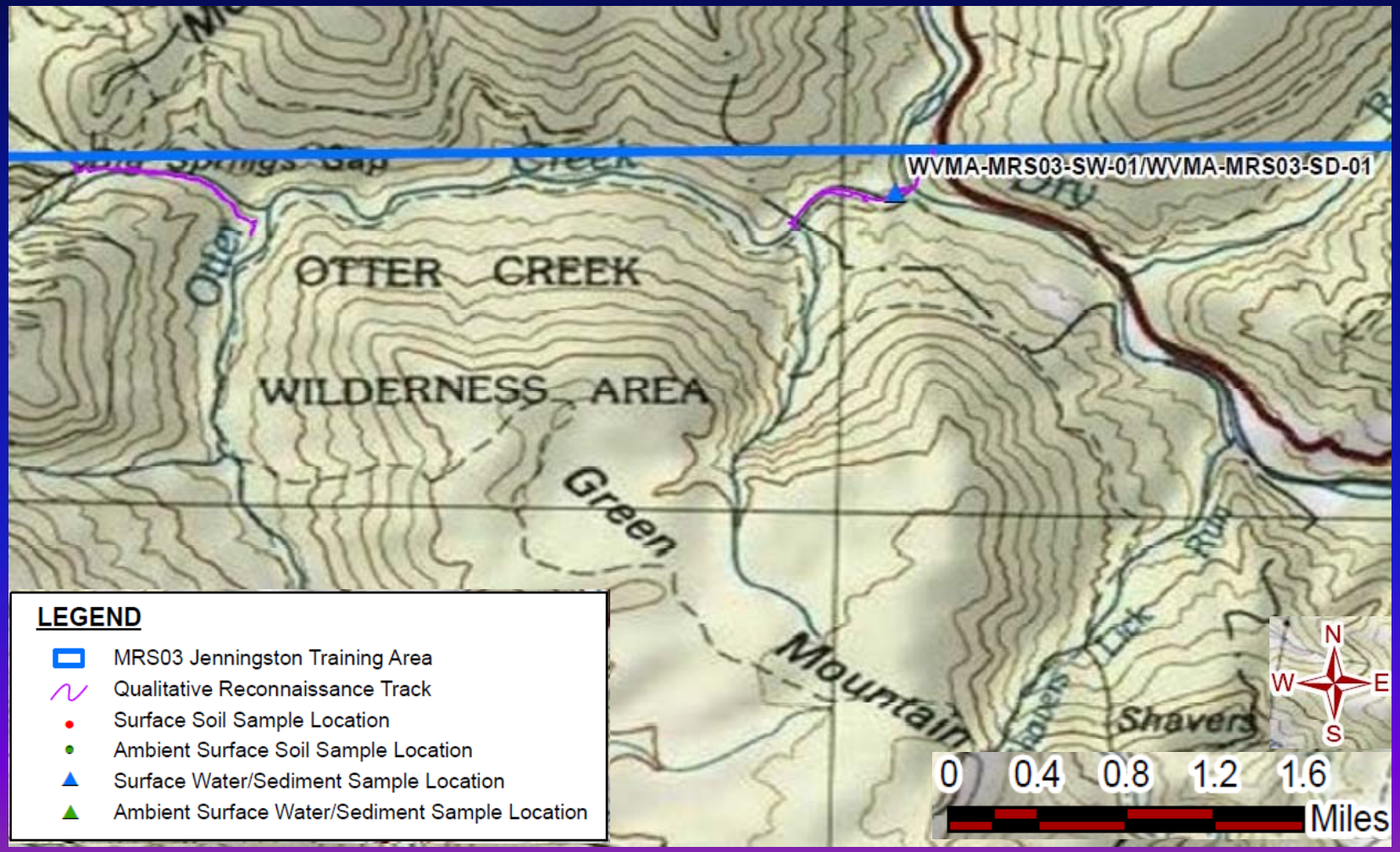
SI Field Elements (Continued)



SI Field Elements (Continued)



SI Field Elements (Continued)



Metals Results (Soil)

- Explosives were not detected in any of the surface soil samples.
- The maximum detected concentrations of aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc did not exceed the calculated background concentrations.
- Therefore, surface soil exposure pathways are incomplete for all receptors.
- Neither a human health SLRA nor a SLERA was required for metals in surface soil.

Metals Results (Surface Water)

- Explosives were not detected in any of the surface water samples.
- The maximum detected concentrations of aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc did not exceed the calculated background concentrations for surface water.
- Therefore, surface water exposure pathways are incomplete for all receptors.
- Neither a human health SLRA nor a SLERA was required for metals in surface water.

Metals Results (Sediment)

- Explosives were not detected in any of the sediment samples.
- The maximum detected concentrations of aluminum, antimony, chromium, copper, lead, manganese, mercury, and zinc did not exceed the calculated background concentrations for sediment.
- Therefore, sediment exposure pathways are incomplete for all receptors.
- Neither a human health SLRA nor a SLERA was required for metals in sediment.

Metals Conclusions/Recommendations

- Conclusion:
  - Unacceptable human health risk is not expected from exposure to metals in the surface soil, surface water, or sediment.
  - Unacceptable risk to ecological receptors is not expected from exposure to metals in the surface soil, surface water, or sediment.
- Recommendation: No further metals sampling is necessary. The MRS is recommended for No Further Action.

MEC Results

- MEC and MD have not been found during previous investigations, nor were any found during the 2012 site visit.
- The shipping canisters are the only physical evidence of military use that has been found within the MRS to date. The identification of shipping containers alone does not indicate the potential for mortars within the MRS.
- No known training activities within the MRS (mountain marching, rock scaling, pack mule training) required actual munitions.
- No known explosive hazards remain at the Jennington Training Area MRS. Therefore, there is no explosive safety risk at this MRS.

MEC Conclusions/Recommendations

- Conclusion: No MEC and no MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS. Training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03.
- A removal action for MEC is not necessary.
- Recommendation: The Jenningston Training Area MRS is recommended for No Further Action.

Recommendations for Jenningston Training Area MRS

MRS	MRS Acreage	MEC Assessment(1)	Metals Assessment(2)	Recommendation
Jenningston Training Area	40,000	No MEC is not expected due to no known training activities utilizing munitions conducted within the MRS.	No Exposure pathways for human and ecological receptors are considered incomplete. No unacceptable human health and ecological risks are expected	No Further Action

(1) "No" in this column indicates that MD indicative of potential MEC presence has not been confirmed, resulting in an NFA recommendation for the MRS.

(2) "No" in this column indicates the absence of metals at levels indicating a potential risk to human health or ecological receptors, resulting in a recommendation for no further metals sampling for this MRS.

MRSPP Scoring Protocol Background

- Potential MEC and MC remaining at a site may present explosive, chemical agent, human health, and environmental hazards.
- DoD's comprehensive plan to address these hazards includes –
  - Preparing an inventory of sites across the country
    - Over 2,800 sites are listed in the inventory
    - The inventory, updated annually, is available in the Defense Environmental Restoration Program (DERP) Annual Report to Congress
  - Developing a tool for assigning relative priority to each site
- The DoD developed the Munitions Response Site Prioritization Protocol (MRSPP) Scoring Protocol, which is designed to ensure that the priority assigned to a site sufficiently reflects actual site conditions and potential hazards.

MRSPP Scoring Protocol Background

- The MRSPP score uses three modules to evaluate the hazards at each MRS:
  - o The Explosive Hazard Evaluation (EHE) Module addresses explosive hazards posed by MEC;
  - o The Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE) Module addresses chemical hazards associated with the effects of CWM ; and
  - o The Health Hazard Evaluation (HHE) Module addresses health and environmental hazards posed by MC and incidental non munitions-related contaminants.

- Each module is made up of individual data elements (i.e. type of munitions present, site use, access conditions)

MRSPP Scoring Protocol Background (Continued)

- Scores for the individual data elements are added up to give a total score for each module.
- Total score corresponds to a rating of A through G for each module
- Alternative module ratings:
  - Evaluation Pending
  - No longer required
  - No known or suspected hazard
- EHE + CHE + HHE = MRS Priority (1 through 8)
- Priority 1 = the highest priority (reserved for CWM sites).
- Priority 8 = the lowest priority

MRSPP Scoring Summary
Jennington Training Area MRS

EHE Module

Table 1: Munitions Type 0 (Evidence of no munitions)

No MEC and no MD was observed during the SI or during previous field visits to the MRS. No known training activities within the MRS required actual munitions. Therefore, tables 2 through 9 have been omitted, and an alternative rating of No Known or Suspected Explosive Hazard was assigned for the EHE Module rating.

MRSPP Scoring Summary
Jennington Training Area MRS

- EHE Module Rating:
  No Known or Suspected Explosive Hazard

- CHE Module Rating:
  No Known or Suspected CWM Hazard

- HHE Module Rating:
  No Known or Suspected MC Hazard

MRSPP Scoring Summary
Jenningston Training Area MRS

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		*No Known or Suspected MC Hazard*	
MRS or ALTERNATIVE PRIORITY				*No Known or Suspected Hazard*	

Questions?

PUBLIC NOTICE DOCUMENTATION

D&E students inducted into Leadership Honorary

Twelve Davis & Elkins College students were inducted recently into the National Society of Leadership and Success (NSLS), a leadership honor society with more than 200 college chapters. Its mission is to build leaders who make a better world.

Among those inducted during the spring semester ceremony were: Corey Kaechele, sophomore, Bethel, Conn.; Joshua Vile, freshman, Richmond, Va.; Justin Redmon, Moorefield; Katelynn Hanek, freshman, McHenry, Md.; Kaylee Harris, freshman, Drewryville, Va.; Kelcie Mullins, freshman, St. Albans; Lucy Parson, freshman, Parsons; Mia Gresak, freshman, Mount Clare; Rebecca Canterbury, freshman, Logan; Rosie Perkins, freshman, Marlington; Ryan Finnegan, senior, Elkins; and Trisha Higgins, sophomore, Mannington.

Local chapters of the NSLS, such as the one at D&E, offer in-person leadership development and peer-to-peer networking for students around the world.

"The intangibles that students gain from membership helps establish them as leaders among their peers," said Lisa Reed, NSLS advisor and director of career services and studentemployment at D&E. "NSLS members focus on improved self-esteem, peer leadership skills, sustainable motivation and drive."

In addition to the student induction ceremony, several members of D&E faculty and staff were recognized during the evening's presentations. Dr. Bill King, professor of English, and Steve Mattingly, assistant professor of computer science, were both cited for "Excellence in Teaching."

Staff recognized for "Outstanding Service to Students" were: D&E President Buck Smith and wife, Joni; Alyssa Hannah, AmeriCorps VISTA; Kathleen Doig, assistant director of the Booth Library; and the Information Services Department led by Information Services Director Amy Mattingly, Coordinator of Administrative Computing Craig Merriam and Assistant Director of Information Services Tim Gibson.

National Engaged Leaders awards were presented to Lauren Elmer, senior, Elkins; Jason Mallow, senior, Durbin; John Trevey, sophomore, Richmond, Va.; and Sydney Mucha, junior, Mt. Clare.

D&E executive board NSLS members were also recognized, including: president – Kristin Turschmann, senior, Beaver; vice president – Brandon Arbogast, junior, Mill Creek; secretary – Trisha Higgins; treasurer – Kevin Gratias, junior, Mill Creek; and treasurer-elect – Mia Gresak.

For more information about Davis & Elkins College, visit www.dewv.edu or call 304-637-1243.

Submitted photo

Newly inducted members and current officers of the Davis & Elkins College Chapter of the NSLS include, from left: Brandon Arbogast, Ryan Finnegan, Kristin Turschmann, Katelynn Hanek, Trisha Higgins, Rosie Perkins, Mia Gresak, Kevin Gratias, Rebecca Canterbury, Lucy Parsons, Kelcie Mullins, Kaylee Harris, Josh Viles and Career Services and Student Employment Director Lisa Reed.

US Army Corps of Engineers

PUBLIC NOTICE

Request for information about the former Jenningston Training Area

Recently, the U.S. Army Corps of Engineers completed a Site Inspection at the former ***Jenningston Training Area. This site was used to provide division training consisting of rock climbing exercises, troop maneuver problems, pack mule training, and potential mortar firing from 1943 to 1944.***

The former ***Jenningston Training Area*** is one of many former military installations throughout the United States that will be reviewed under the Department of Defense' s Munitions Response Site Prioritization Protocol. This protocol is used to assess sites that may have unexploded ordnance, discarded military munitions or munitions constituents, and to assign priorities for any additional investigation or munitions removal that may be required.

The evaluation criteria, including types of munitions that may be present, ease of access to the site and number of people living near the site, are available for public review in the Site Inspection Report. A copy of the document is in the Public Information Repository located at the **U.S. Forest Service, Potomac Ranger District Office, 2499 N. Fork Highway, Petersburg, WV 26847.**

For more information or if you have additional information about past activities related to the former ***Jenningston Training Area***, please contact us at PA2@usace.army.mil or write to:

USACE, Huntington District
ATTN: WVMA Project Manager
(CELRH-PM-PP-P)
502 8th Street
Huntington, WV 25701

USACE, Huntington District
ATTN: Public Affairs Officer
(CELRH-PA)
502 8th Street
Huntington, WV 25701

US Army Corps of Engineers

PUBLIC NOTICE

Request for information about the former Ammunition Depot

Recently, the U.S. Army Corps of Engineers completed a Site Inspection at the former ***Ammunition Depot. This site was used as an ammunition storage area from 1943 to 1944.***

The former ***Ammunition Depot*** is one of many former military installations throughout the United States that will be reviewed under the Department of Defense' s Munitions Response Site Prioritization Protocol. This protocol is used to assess sites that may have unexploded ordnance, discarded military munitions or munitions constituents, and to assign priorities for any additional investigation or munitions removal that may be required.

The evaluation criteria, including types of munitions that may be present, ease of access to the site and number of people living near the site, are available for public review in the Site Inspection Report. A copy of the document is in the Public Information Repository located at the **U.S. Forest Service, Potomac Ranger District Office, 2499 N. Fork Highway, Petersburg, WV 26847.**

For more information or if you have additional information about past activities related to the former ***Ammunition Depot***, please contact us at PA2@usace.army.mil or write to:

USACE, Huntington District
ATTN: WVMA Project Manager
(CELRH-PM-PP-P)
502 8th Street
Huntington, WV 25701

USACE, Huntington District
ATTN: Public Affairs Officer
(CELRH-PA)
502 8th Street
Huntington, WV 25701

US Army Corps of Engineers

PUBLIC NOTICE

Request for information about the former Dailey Infiltration Camp

Recently, the U.S. Army Corps of Engineers completed a Site Inspection at the former ***Dailey Infiltration Camp. This site was used to provide small arms and obstacle course training from 1943 to 1944.***

The former ***Dailey Infiltration Camp*** is one of many former military installations throughout the United States that will be reviewed under the Department of Defense' s Munitions Response Site Prioritization Protocol. This protocol is used to assess sites that may have unexploded ordnance, discarded military munitions or munitions constituents, and to assign priorities for any additional investigation or munitions removal that may be required.

The evaluation criteria, including types of munitions that may be present, ease of access to the site and number of people living near the site, are available for public review in the Site Inspection Report. A copy of the document is in the Public Information Repository located at the **U.S. Forest Service, Potomac Ranger District Office, 2499 N. Fork Highway, Petersburg, WV 26847.**

For more information or if you have additional information about past activities related to the former ***Dailey Infiltration Camp***, please contact us at PA2@usace.army.mil or write to:

USACE, Huntington District
ATTN: WVMA Project Manager
(CELRH-PM-PP-P)
502 8th Street
Huntington, WV 25701

USACE, Huntington District
ATTN: Public Affairs Officer
(CELRH-PA)
502 8th Street
Huntington, WV 25701

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Major League Baseball

NATIONAL LEAGUE

East Division

	W	L	Pct	GB	WCGB	L10	Str	Home	Away
Atlanta	37	23	.617	–	–	7-3	L-1	21-7	16-16
Philadelphia	31	30	.508	6½	5	7-3	W-5	16-15	15-15
Washington	29	30	.492	7½	6	4-6	L-1	16-12	13-18
New York	23	33	.411	12	10½	6-4	W-1	12-17	11-16
Miami	16	44	.267	21	19½	3-7	L-3	10-20	6-24

Central Division

	W	L	Pct	GB	WCGB	L10	Str	Home	Away
St. Louis	39	21	.650	–	–	6-4	W-1	19-12	20-9
Cincinnati	36	24	.600	3	–	5-5	L-2	21-9	15-15
Pittsburgh	36	25	.590	3½	–	5-5	W-1	21-11	15-14
Chicago	24	34	.414	14	10½	6-4	L-1	13-17	11-17
Milwaukee	22	37	.373	16½	13	3-7	L-2	13-20	9-17

West Division

	W	L	Pct	GB	WCGB	L10	Str	Home	Away
Arizona	34	26	.567	–	–	6-4	L-1	16-12	18-14
San Francisco	31	28	.525	2½	4	4-6	L-1	21-11	10-17
Colorado	32	29	.525	2½	4	5-5	L-1	18-13	14-16
San Diego	28	32	.467	6	7½	6-4	W-2	16-14	12-18
Los Angeles	26	33	.441	7½	9	5-5	W-1	17-16	9-17

AMERICAN LEAGUE

East Division

	W	L	Pct	GB	WCGB	L10	Str	Home	Away
Boston	37	24	.607	–	–	6-4	W-1	19-13	18-11
New York	35	25	.583	1½	–	5-5	W-4	19-13	16-12
Baltimore	34	26	.567	2½	1	7-3	W-1	15-13	19-13
Tampa Bay	32	27	.542	4	2½	7-3	L-1	17-10	15-17
Toronto	25	34	.424	11	9½	5-5	W-1	14-16	11-18

Central Division

	W	L	Pct	GB	WCGB	L10	Str	Home	Away
Detroit	32	26	.552	–	–	4-6	W-1	19-10	13-16
Cleveland	30	29	.508	2½	4½	3-7	L-4	18-12	12-17
Minnesota	26	31	.456	5½	7½	7-3	L-2	13-14	13-17
Kansas City	25	32	.439	6½	8½	4-6	W-2	12-15	13-17
Chicago	25	33	.431	7	9	1-9	L-1	13-12	12-21

West Division

	W	L	Pct	GB	WCGB	L10	Str	Home	Away
Texas	36	23	.610	–	–	4-6	L-1	18-8	18-15
Oakland	37	25	.597	½	–	8-2	W-2	18-10	19-15
Los Angeles	26	34	.433	10½	9	3-7	L-1	15-18	11-16
Seattle	26	35	.426	11	9½	4-6	L-2	15-14	11-21
Houston	22	39	.361	15	13½	7-3	L-1	10-23	12-16

NATIONAL LEAGUE

Thursday's Games

N.Y. Mets at Washington, ppd., rain
St. Louis 12, Arizona 8
Philadelphia 5, Milwaukee 1
San Diego 6, Colorado 5, 12 innings
L.A. Dodgers 5, Atlanta 0

Friday's Games

Pittsburgh 2, Chicago Cubs 0
Minnesota at Washington, ppd., rain
Miami at New York, ppd., rain
St. Louis at Cincinnati, (n)
Philadelphia at Milwaukee, (n)
San Diego at Colorado, (n)
San Francisco at Arizona, (n)
Atlanta at L.A. Dodgers, (n)

Today's Games

Miami (Fernandez 3-3) at N.Y. Mets (Harvey 5-0), 1:10 p.m.
Minnesota (Correia 5-4) at Washington (G.Gonzalez 3-3), 4:05 p.m.
Pittsburgh (A.J.Burnett 3-6) at Chicago Cubs (Samardzija 3-6), 4:05 p.m.
Philadelphia (K.Kendrick 6-3) at Milwaukee (Gorzelanny 1-0), 7:15 p.m.
San Diego (Stults 4-5) at Colorado (Francis 2-3), 7:15 p.m.
St. Louis (Lyons 2-1) at Cincinnati (Latos 5-0), 7:15 p.m.
Atlanta (Medlen 2-6) at L.A. Dodgers (Fife 1-0), 10:10 p.m.
San Francisco (Bumgarner 4-4) at Arizona (Cahill 3-6), 10:10 p.m.

Sunday's Games

Miami at N.Y. Mets, 1:10 p.m.
Minnesota at Washington, 1:35 p.m., 1st game
Philadelphia at Milwaukee, 2:10 p.m.
Pittsburgh at Chicago Cubs, 2:20 p.m.
Atlanta at L.A. Dodgers, 4:10 p.m.
San Diego at Colorado, 4:10 p.m.
San Francisco at Arizona, 4:10 p.m.
Minnesota at Washington, 7:05 p.m., 2nd game
St. Louis at Cincinnati, 8:10 p.m.

AMERICAN LEAGUE

Thursday's Games

Detroit 5, Tampa Bay 2
Baltimore 3, Houston 1
Boston 6, Texas 3
Kansas City 7, Minnesota 3
Oakland 5, Chicago White Sox 4, 10 innings
N.Y. Yankees 6, Seattle 1

Friday's Games

Minnesota at Washington, ppd., rain
Texas at Toronto, (n)
Cleveland at Detroit, (n)
Baltimore at Tampa Bay, (n)
L.A. Angels at Boston, ppd., rain
Houston at Kansas City, (n)
Oakland at Chicago White Sox, (n)
N.Y. Yankees at Seattle, (n)

Today's Games

L.A. Angels (Hanson 2-2) at Boston (Doubront 4-2), 1:05 p.m., 1st game
Texas (Darvish 7-2) at Toronto (Buehrle 2-4), 1:07 p.m.
Minnesota (Correia 5-4) at Washington (G.Gonzalez 3-3), 4:05 p.m.
Cleveland (Masterson 8-4) at Detroit (Porcello 2-3), 4:08 p.m.
Baltimore (Gausman 0-2) at Tampa Bay (Hellickson 3-2), 4:10 p.m.
N.Y. Yankees (Pettitte 4-3) at Seattle (J.Saunders 4-5), 4:10 p.m.
Oakland (Milone 6-5) at Chicago White Sox (Joh.Danks 0-2), 4:10 p.m.
Houston (Bedard 1-2) at Kansas City (E.Santana 3-5), 7:15 p.m.
L.A. Angels (C.Wilson 4-4) at Boston (Buchholz 8-0), 7:15 p.m., 2nd game

Sunday's Games

Texas at Toronto, 1:07 p.m.
Cleveland at Detroit, 1:08 p.m.
L.A. Angels at Boston, 1:35 p.m.
Minnesota at Washington, 1:35 p.m., 1st game
Baltimore at Tampa Bay, 1:40 p.m.
Houston at Kansas City, 2:10 p.m.
Oakland at Chicago White Sox, 2:10 p.m.
N.Y. Yankees at Seattle, 4:10 p.m.
Minnesota at Washington, 7:05 p.m., 2nd game

Transactions

BASEBALL

American League

BALTIMORE ORIOLES – Optioned OF Xavier Avery to Norfolk (IL). Recalled LHP Mike Belfiore from Norfolk (IL).

BOSTON RED SOX – Sent OF Shane Victorino to Pawtucket (IL) for a rehab assignment.

CLEVELAND INDIANS – Signed LHP J.C. Romero to a minor league contract and assigned him to Columbus (IL).

KANSAS CITY ROYALS – Claimed 3B Edinson Rincon off waivers from San Diego and optioned him to Northwest Arkansas (TL). Designated RHP Nate Adcock for assignment. Sent OF Jarrod Dyson and LH Danny Duffy to Omaha (PCL) for rehab assignments.

LOS ANGELES ANGELS – Released RHP Mark Lowe. Sent OF Peter Bourjos to Salt Lake (PCL) for a rehab assignment.

NEW YORK YANKEES – Sent RHP Michael Pineda to Tampa (FSL) for a rehab assignment. Announced RHP Chien-Ming Wang exercised an out clause in his contract and been granted his release.

TEXAS RANGERS – Transferred RHP Colby Lewis to the 60-day DL.

National League

CINCINNATI REDS – Optioned RHP Pedro Villarreal to Louisville (IL). Recalled INF Henry Rodriguez from Louisville.

PHILADELPHIA PHILLIES – Sent LHP John Lannan to Clearwater (FSL) for a rehab assignment.

SAN DIEGO PADRES – Placed 1B Yonder Alonso on the 15-day DL, retroactive to June 1.

SAN FRANCISCO GIANTS–Sent LHP Eric Surkamp to San Jose (Cal) for a rehab assignment.

WASHINGTON NATIONALS – Claimed LHP Tyler Robertson off waivers from Minnesota and optioned him to Syracuse (IL). Agreed to terms with RHP Jake Johansen.

COLLEGE

NCAA – Placed Mississippi State's football program on probation for two years.

AUBURN – Named Andrew Pratt women's associate head golf coach.

BARTON – Named Chris Shaw women's soccer coach.

COLGATE – Named Paul Shaffner co-defensive coordinator and linebackers coach and Steve Casula tight ends and H-backs coach.

MISSISSIPPI – Signed baseball coach Mike Bianco to a contract extension through the 2015 season.

SUSQUEHANNA – Named Laura Tyler women's golf coach.

VANDERBILT – Named Garry Christopher men's basketball strength coach.

Today's Scorecard

To reach the sports department:
Call (304) 636-2121
Fax: (304) 636-8252
e-mail
jkittle@theintermountain.com
adavis@theintermountain.com
Submit scores via our Virtual Newsroom at
www.theintermountain.net/vnr

Today's Events

American Legion baseball

Elkins at Clarksburg, 4 p.m. (DH)

Babe Ruth

Fuzz Jones Memorial Tournament

TBA

Sports on TV

AUTO RACING

10 a.m.

11:30 a.m.

SPEED — NASCAR, Sprint Cup, "Happy Hour Series," final practice for Party in the Poconos 400, at Long Pond, Pa.

1 p.m.

NBCSN — Formula One, qualifying for Canadian Grand Prix, at Montreal

SPEED — ARCA, at Long Pond, Pa.

8 p.m.

ESPN — NASCAR, Nationwide Series, DuPont Pioneer 250, at Newton, Iowa

8:30 p.m.

ABC — IRL, IndyCar, Firestone 550, at Fort Worth, Texas

COLLEGE BASEBALL

Noon

ESPN — NCAA Division I, playoffs, super regionals, game 2, South Carolina at North Carolina

1 p.m.

ESPN2 — NCAA Division I, playoffs, super regionals, game 1, Mississippi St. at Virginia

3 p.m.

ESPN — NCAA Division I, playoffs, super regionals, game 1, Louisville at Vanderbilt

4 p.m.

ESPN2 — NCAA Division I, playoffs, super regionals, game 2, Rice at N.C. State

7 p.m.

ESPN2 — NCAA Division I, playoffs, super regionals, game 2, Oklahoma at LSU

10 p.m.

ESPN2 — NCAA Division I, playoffs, super regionals, game 2, UCLA at Cal St.-Fullerton

GOLF

3 p.m.

CBS — PGA Tour, St. Jude Classic, third round, at Memphis, Tenn.

TGC — LPGA, Wegman's Championship, third round, at Pittsford, N.Y.

7:30 p.m.

TGC — Champions Tour, The Tradition, third round, at Birmingham, Ala. (same-day tape)

HORSE RACING

5 p.m.

NBC — NTRA, Manhattan Handicap and Belmont Stakes, at Elmont, N.Y.

MAJOR LEAGUE BASEBALL

4 p.m.

MLB — Regional coverage, Minnesota at Washington or Cleveland at Detroit

7 p.m.

FOX — Regional coverage, L.A. Angels at Boston, St. Louis at Cincinnati, San Diego at Colorado, Houston at Kansas City, or Philadelphia at Milwaukee

NHL HOCKEY

8 p.m.

NBC — Playoffs, conference finals, game 5, Los Angeles vs. Chicago

Auto racing

NASCAR-Sprint Cup-Party in the Poconos 400 Lineup
After Friday qualifying; race Sunday
At Pocono Raceway
Long Pond, Pa.
Lap length: 2.5 miles
(Car number in parentheses)

1. (48) Jimmie Johnson, Chevrolet, owner points.
2. (99) Carl Edwards, Ford, owner points.
3. (15) Clint Bowyer, Toyota, owner points.
4. (20) Matt Kenseth, Toyota, owner points.
5. (29) Kevin Harvick, Chevrolet, owner points.
6. (88) Dale Earnhardt Jr., Chevrolet, owner points.
7. (5) Kasey Kahne, Chevrolet, owner points.
8. (18) Kyle Busch, Toyota, owner points.
9. (27) Paul Menard, Chevrolet, owner points.
10. (2) Brad Keselowski, Ford, owner points.
11. (24) Jeff Gordon, Chevrolet, owner points.
12. (43) Aric Almirola, Ford, owner points.
13. (16) Greg Biffle, Ford, owner points.
14. (55) Mark Martin, Toyota, owner points.
15. (56) Martin Truex Jr., Toyota, owner points.
16. (17) Ricky Stenhouse Jr., Ford, owner points.
17. (11) Denny Hamlin, Toyota, owner points.
18. (51) A J Allmendinger, Chevrolet, owner points.
19. (14) Tony Stewart, Chevrolet, owner points.
20. (78) Kurt Busch, Chevrolet, owner points.
21. (22) Joey Logano, Ford, owner points.
22. (1) Jamie McMurray, Chevrolet, owner points.
23. (39) Ryan Newman, Chevrolet, owner points.
24. (31) Jeff Burton, Chevrolet, owner points.
25. (42) Juan Pablo Montoya, Chevrolet, owner points.
26. (9) Marcos Ambrose, Ford, owner points.
27. (13) Casey Mears, Ford, owner points.
28. (34) David Ragan, Ford, owner points.
29. (47) Bobby Labonte, Toyota, owner points.
30. (10) Danica Patrick, Chevrolet, owner points.
31. (38) David Gilliland, Ford, owner points.
32. (7) Dave Blaney, Chevrolet, owner points.
33. (30) David Stremme, Toyota, owner points.
34. (83) David Reutimann, Toyota, owner points.
35. (36) J.J. Yeley, Chevrolet, owner points.
36. (35) Josh Wise, Ford, owner points.
37. (33) Landon Cassill, Chevrolet, attempts.
38. (32) Timmy Hill, Ford, attempts.
39. (93) Travis Kvapil, Toyota, attempts.
40. (87) Joe Nemechek, Toyota, attempts.
41. (98) Michael McDowell, Ford, attempts.
42. (19) Jason Leffler, Toyota, attempts.
43. (44) Scott Riggs, Ford, attempts.

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Prep foootball

North-South All-Star Classic rosters

CHARLESTON – Game to be played at 7 p.m. on June 15 at Laidley Field.

North

Mike Adkins, Tucker County, 6-1, 230, G/LB; Gary Awkard, Martinsburg, 6-0, 175, RB/DB; Ben Aylestock, South Harrison, 5-7, 135, RB/CB; Derek Barnhart, St. Marys, 5-9, 200, FB/LB; Tyler Bolen, Parkersburg South, 6-2, 185, WR/S; Cookie Clinton, Martinsburg, 5-10, 167, QB/Util.; **Devan Collins, Elkins, 6-3, 260, T/DT**; Shane Commodore, Morgantown, 6-2, 195, RB/S; Andrew Cosper, St. Marys, 5-8, 170, Util./S; Logan Cox, Parkersburg South, 6-3, 205, RB/S; Deion Cunningham, University, 5-11, 168, WR/S; Thane Cutter, Frankfort, 6-0, 190, WR/S; James Ellison, Wirt County, 5-10, 185, G/DE; Jermodd Garrett, Robert C. Byrd, 6-0, 210, FB/LB; Avery Goff, Williamstown, 6-3, 290, T/DT; Cory Goldstrom, Preston, 6-1, 195, RB/LB; Sammy Hall, Ritchie County, 6-4, 285, T/DT; Brett Hathaway, Bridgeport, 5-10, 185, RB/LB; **Wilson Harvey, Lewis County, 6-1, 240, G/DE**; Ryan Helmick, Grafton, 6-4, 260, OC/DL; Jonathan Lewis, University, 6-3, 240, T/DE; Wyatt Lucas, Braxton County, 6-1, 265, T/DT; Raleigh Mason, Brooke, 5-8, 210, FB/LB; Preston Murray, Oak Glen, 6-1, 250, T/DT; Josh Napier, Keyser, 6-1, 225, T/DT; Braxton Nolte, Wheeling Central, 6-0, 230, FB/DE; Ty Noss, Liberty (Harrison), 6-0, 165, Util/S; **Josh Parker, East Hardy, 6-2, 170, RB/CB**; Daniel Plaugher, Doddridge County, 6-4, 180, WR/CB; Allen Pratt, St. Marys, 6-0, 243, G/DT; Quashad Pugh, Wheeling Park, 6-0, 175, WR/S; Austin Ravenscroft, Keyser, 5-10, 185, Util/LB; Jared Sartin, Martinsburg, 6-0, 225, FB/LB; Jalen Thomas, Morgantown, 5-11, 230, FB/LB; Teague Wagner, Robert C. Byrd, 6-3, 280, G/DT; Adam White, Morgantown, 6-3, 280, T/DT, Zach Wise, Berkeley Springs, 5-10, 178, K/P

Head Coach: Jodi Mote (St. Marys); **Assistant Coaches**: Steve Barnhart (St. Marys), Sean Biser (Keyser), John Bowers (Morgantown); **Athletic Trainer**: Steve Lough (Ripley); **Managers**: Zac Long-Mote (St. Marys), Maddox Bowers (Morgantown)

South

Michael Bailey, Beckley, 6-0, 270, OL/DL; Dakota Ball, Scott, 6-1, 285, OL/DE; Ethan Barker, Midland Trail, 6-1, 183, WR/DE; Slayton Beard, Valley (Fayette), 5-10, 260, C/DT; Zach Bennett, Ripley, 5-8, 170, Util.; Caleb Craddock, Hurricane, 6-2, 270, OL/DL; Zach Cooper, Hurricane, 5-10, 173, WR/DB; Ramon Edwards, Beckley, 5-7, 165, RB/WR; Garrison Erwin, Buffalo, 6-1, 160, WR/CB; David Gaydosz, Cabell Midland, 5-11, 200, RB/DB; Trenton Gibbs, Wahama, 6-2, 205, QB/CB; Gage Gould, Cabell Midland, 6-0, 245, OL/DL; Jake Grimmett, Midland Trail, 5-11, 175, Util/LB; Dustin Hatfield, Wayne, 6-4, 200, TE-DE; Daryl Hicks, Ripley, 6-0, 290, OL/DL; Andrew Johnson, Beckley, 6-0, 173, QB/DB; Trevon Johnson, George Washington, 5-11, 200, RB/LB; Zack Johnson, Greenbrier West, 6-3, 265, OL/DL; Tony Kitts, Huntington, 6-0, 250, OL/DE; Seth Lewis, Winfield, 5-11, 215, RB/LB; Jared Martin, Huntington, 6-3, 220, TE/DE; Michael Molina, Hurricane, 5-9, 160, TE/K; Tre Moore, Greenbrier West, 5-7, 260 , RB/DL; Dustyn Murphy, Nicholas County, 6-3, 218, TE/DE; Dominic Orcutt, South Charleston, 6-3, 295, OL/DL; Tyler Parker, Greenbrier West, 6-0, 190, RB/LB; Sam Plantz, George Washington, 6-0, 200, C/DE; Marcus Reed, Riverside, 6-0, 165, WR/DB; Trevond Reese, South Charleston, 6-1, 205, WR/DB; Khaleel Reynolds, Logan, 5-8, 188, WR/DB; Bam Spurlock, Wayne, 5-7, 185, RB/DB; Brandon Thomas, River View, 6-3, 220, TE/DL; Davon Tyson, Capital, 5-10, 160, WR-DB; Tashan Vineyard, Mount View, 6-0, 168, DB; Zach Wamsley, Wahama, 6-0, 215, RB/LB; Jacob Whitlock, George Washington, 5-9, 200, OL/LB; Brandon Williams, Oak Hill, 5-11, 300, OL/DL

Head coach: Joe Dean, Midland Trail: **Assistant coaches**: Rob Haley, Midland Trail; Jim Martin, Beckley; Lewis McClung, Greenbrier West; **Athletic Trainer**: Heather Adams (South Charleston; **Manager**: Devin Steele (Midland Trail)

On this date

June 8

1986 – Larry Bird scores 29 points to lead the Boston Celtics to a 114-97 victory over the Houston Rockets for their 16th NBA title.

2005 – Freshman Samantha Findlay hits a three-run homer in the 10th inning to lead Michigan to a 4-1 win over UCLA for its first NCAA softball title. Michigan is the first team from east of the Mississippi River to win the national championship.

NHL playoffs

CONFERENCE FINALS
(Best-of-7; x-if necessary)

Saturday, June 1

Chicago 2, Los Angeles 1
Boston 3, Pittsburgh 0

Sunday, June 2

Chicago 4, Los Angeles 2

Monday, June 3

Boston 6, Pittsburgh 1

Tuesday, June 4

Los Angeles 3, Chicago 1

Wednesday, June 5

Boston 2, Pittsburgh 1, 2OT, Boston leads series 3-0

Thursday, June 6

Chicago 3, Los Angeles 2, Chicago leads series 3-1

Friday, June 7

Pittsburgh at Boston, (n)

Today

Los Angeles at Chicago, 8 p.m.

Sunday, June 9

x-Boston at Pittsburgh, 8 p.m.

Monday, June 10

x-Chicago at Los Angeles, 9 p.m.

Tuesday, June 11

x-Pittsburgh at Boston, TBD

Wednesday, June 12

x-Boston at Pittsburgh, TBD

NBA playoffs

NBA Finals Glance
(Best-of-7; x-if necessary)
San Antonio 1, Miami 0

Thursday, June 6: San Antonio 92, Miami 88
Sunday, June 9: San Antonio at Miami, 8 p.m.
Tuesday, June 11: Miami at San Antonio 9 p.m.
Thursday, June 13: Miami at San Antonio, 9 p.m.
x-Sunday, June 16: Miami at San Antonio, 8 p.m.
x-Tuesday, June 18: San Antonio at Miami, 9 p.m.
x-Thursday, June 20: San Antonio at Miami, 9 p.m.

Snowshoe

Snowshoe Mountain is seeking Volunteer Mountain Guides for the Summer 2013 Season.

Interest applicants may apply for the position online via Snowshoe Mountain's online hiring site www.snowshoemountain.com or in person at Snowshoe Mountain Human Resources. For more information about job openings, please call Human Resources at 304-572-5707.

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PUBLIC NOTICE

US Army Corps of Engineers

Request for information about the former Jenningston Training Area

Recently, the U.S. Army Corps of Engineers completed a Site Inspection at the former ***Jenningston Training Area. This site was used to provide division training consisting of rock climbing exercises, troop maneuver problems, pack mule training, and potential mortar firing from 1943 to 1944.***

The former ***Jenningston Training Area*** is one of many former military installations throughout the United States that will be reviewed under the Department of Defense' s Munitions Response Site Prioritization Protocol. This protocol is used to assess sites that may have unexploded ordnance, discarded military munitions or munitions constituents, and to assign priorities for any additional investigation or munitions removal that may be required.

The evaluation criteria, including types of munitions that may be present, ease of access to the site and number of people living near the site, are available for public review in the Site Inspection Report. A copy of the document is in the Public Information Repository located at the **U.S. Forest Service, Potomac Ranger District Office, 2499 N. Fork Highway, Petersburg, WV 26847.**

For more information or if you have additional information about past activities related to the former ***Jenningston Training Area***, please contact us at PA2@usace.army.mil or write to:

USACE, Huntington District
ATTN: WVMA Project Manager
(CELRH-PM-PP-P)
502 8th Street
Huntington, WV 25701

USACE, Huntington District
ATTN: Public Affairs Officer
(CELRH-PA)
502 8th Street
Huntington, WV 25701

APPENDIX C

INTERVIEW DOCUMENTATION

NO INTERVIEWS WERE CONDUCTED AT THIS SITE; THEREFORE, NO INTERVIEW DOCUMENTATION IS INCLUDED WITH THIS REPORT

Appendix D

Field Notes and Field Forms

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912PP-11-C-0007**	**DELIVERY ORDER NO.**	**0001**
JOB NO:	**748073-30001**	**DATE/DAY:**	12-May-12
SITE NAME:	WVMA (Jenningston Training Area MRS)	**REPORT NO:**	1
USACE DISTRICT:	**CELRH**	**SHEET:**	1
WEATHER:	High of 72°F, partly cloudy, 5 mph winds		

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
45	***Miles Driven***	**45**
0/0	***Number of Flights/Miles Flown***	**0/0**
3	***Number of Personnel***	**3**

2. Reconnaissance Details

33,844	***Linear Feet:(6.41 miles)***	**33,844**

3. MC Sampling Details

1	***Soil Samples***	**1**
0	***Sediment Samples***	**0**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

4. QC Activities

3	***Soil Samples***	**3**
0	***Sediment Samples***	**0**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

5. QA Activities

0	***Soil Samples***	**0**
0	***Sediment Samples***	**0**
0	***Water Samples***	**0**

Sampling Notes: No QA split samples for this program

6. Safety Activities

A tailgate safety briefing was conducted on site, prior to the start of field activities. Topics included communication, hospital directions, uneven terrain, severe weather, flash flooding, cold stress, hydration, types of dangerous vegetation, dangerous animals, insects, types of munitions, and slips, trips, and falls.

SITE VISIT TEAM (SVT)				On-site Yes/No	Tailgate Brief Yes/No
Parsons Field Team Leader	Lauren Ranker	Cell Phone:	(720) 988-4413	Yes	Yes
Parsons UXO Technician/SSHO	Rick White	Cell Phone:	(425) 577-8152	Yes	Yes
Eco Sampling Technician	Steven Saunders	Cell Phone:	(818) 397-2248	Yes	Yes
VISITORS					
Rick Meadows	CELRH	Cell Phone:	(304) 543-2755	Yes	Yes
Jeff Stutler	USFS Representative	Cell Phone:	(304) 636-4292	Yes	Yes

EQUIPMENT LIST:

Standard Field Kit Items:	Schonstedt GA-52Cx, Trimble GeoXT, Garmin Rhino 530HCx handheld GPS/radio, Iridium 9555 Satellite Phone, field computer, digital camera, first aid kit
Water Sampling Equipment	Horiba U-22 Water Meter

QC CHECKS (Place ' **X** ' in appropriate box)

QUALITY CONTROL CHECKS	**Analog Instrument**	**YES**	X	**NO**	
	Handheld GPS	**YES**	X	**NO**	
	GIS Data Logger	**YES**	X	**NO**	

ADDITIONAL INFORMATION:

All other site details recorded in PDA/logbook.

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

The SVT will conduct qualitative reconnaissance (QR) and sampling at the Jenningston Training Area MRS (MRS03) at the West Virginia Maneuver Area / Dolly Sods FUDS. The SVT will hold the soil samples on ice over the weekend until they can be shipped to the laboratory on Monday, May 14th.

REQUEST FOR PROJECT ACTION:

None

ACCIDENTS REPORTED TODAY: 0
ACCIDENTS TO DATE: 0 **PREPARED BY FTL:** Lauren Ranker

DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: **W912PP-11-C-0007**
Delivery Order Number: **0001**
Project Name: **MMRP FUDS SI**
Project Number: **748073-30001**
Site Location: **WVMA (Jenningston Training Area MRS)**
Date: **12-May-12**

DAILY FIELD SI ACTIVITIES CONDUCTED

The SVT conducted approximately 6.5 miles of QR and completed surface soil sampling at the Jenningston Training Area MRS (MRS03) at the West Virginia Maneuver Area / Dolly Sods FUDS.

The SVT conducted QR on the Mylius Trail and on Shavers Mountain Trail, both of which are on Shavers Mountain in the middle of the MRS. The team found no munitions debris, munitions and explosives of concern (MEC), or evidence of military use during the QR. The U.S. Army Corps of Engineers (USACE) project manager (Rick Meadows) and a cave specialist provided by the U.S. Forest Service (Jeff Stutler) attended the site visit for a portion of the Mylius Trail. Mr. Meadows led the team to some debris that had been found down the slope from the trail. This debris had been previously referred to as "the trash pit". However, after further investigation, there appeared to only be one rusted piece of metal pipe and two rusted 5-gallon metal drums. Mr. Stutler led the team to the cave where mortar canisters were reportedly found. He indicated that the trash was removed from the cave approximately 3 years ago. The SVT peered into the cave from the vertical opening and observed that the cave was empty. Soil sample WVMA-MRS03-SS-02-01 and duplicate soil sample WVMA-MRS03-SS-02-03 were collected adjacent to the cave opening. Matrix spike (MS) and matrix spike duplicate (MSD) samples were collected for sample SS-01 as well.

TOMORROW'S OPERATION PLAN

Weather permitting, the SVT will conduct QR and sampling at the Jenningston Training Area MRS (MRS03) at the West Virginia Maneuver Area / Dolly Sods FUDS. The SVT will hold the soil samples on ice over the weekend until they can be shipped to the laboratory on Monday, May 14th.

Water Sample Equipment Calibrations (list or provide attachment)

	pH (s.u.)	Conductivity (µS/cm)	Turbidity (NTU)	Temp. (ºC)	Time
Equip. Reading:	N/A	N/A	N/A	N/A	N/A

Field Instrument Measurements (list or provide attachment):

Water Sample ID:	Temp. (ºC)	Cond. (µS/cm)	Turbidity (NTU)	pH (s.u.)
N/A	N/A	N/A	N/A	N/A

Comments: N/A

List all field and quality control samples collected (list or provide attachment):

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
WVMA-MRS03-SS-02-01	Soil	1038	Metals*, Explosives, pH	5/14/2012	APPL, Inc.	MS/MSD
WVMA-MRS03-SS-02-03	Soil	1050	Metals*, Explosives, pH	5/14/2012	APPL, Inc.	FD of SS-02-01

*Metals: Al, Sb, Cu, Cr, Pb, Mn, Hg, and Zn

Departures from approved SAP:

Due to discussions with the USACE prior to the start of field work, the QR and sample locations were revised. Previously planned QR existed along the road on the east side of Shavers Mountain. However, the USACE requested that additional QR be conducted on Shavers Mountain, and in the Otter Creek Wilderness. This was based on historical information indicating that the Jenningston Training Area was used for training with mules and donkeys. Training of this kind would have likely been conducted along existing trails in the area. Also, due to lack of ROE for the private properties where samples were planned, the proposed sample locations were moved to land within the Monongahela National Forest.

Instructions given by government personnel:

None

Check all attachments:

	Field sampling forms (in separate submittal)
	Field-generated analytical results
X	Chain-of-custody forms (in separate submittal)

Signed by: Lauren N. Ranker

Name	Lauren Ranker, Field Team Leader	
Date:	12-May-12	
Phone	Cell: (720) 988-4413	Office: (303) 764-8830
Copies sent to:		
	Richard Meadows (CELRH PM)	Brian Jordan (CESPA)
	Laura Kelley (Parsons PM)	Mohammad Estiri (Eco - PM)
	Brenda Galloway (Parsons)	Opjit Ghuman (Eco)
	Sandra de las Fuentes (Parsons)	Carlos Hernandez (Eco)

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912PP-11-C-0007**	**DELIVERY ORDER NO.**	**0001**
JOB NO:	**748073-30001**	**DATE/DAY:**	13-May-12
SITE NAME:	WVMA (Jenningston Training Area MRS)	**REPORT NO:**	2
USACE DISTRICT:	**CELRH**	**SHEET:**	1
WEATHER:	High of 71°F, cloudy to rainy, 5 mph winds		

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
101	***Miles Driven***	**146**
0/0	***Number of Flights/Miles Flown***	**0/0**
3	***Number of Personnel***	**3**

2. Reconnaissance Details

26,201	***Linear Feet:(4.96 miles)***	**60,045**

3. MC Sampling Details

1	***Soil Samples***	**2**
3	***Sediment Samples***	**3**
3	***Water Samples***	**3**

Sampling Notes: See Attached DQCR

4. QC Activities

0	***Soil Samples***	**3**
3	***Sediment Samples***	**3**
3	***Water Samples***	**3**

Sampling Notes: See Attached DQCR

5. QA Activities

0	***Soil Samples***	**0**
0	***Sediment Samples***	**0**
0	***Water Samples***	**0**

Sampling Notes: No QA split samples for this program

6. Safety Activities

A tailgate safety briefing was conducted on site, prior to the start of field activities. Topics included communication, hospital directions, uneven terrain, severe weather, flash flooding, cold stress, hydration, types of dangerous vegetation, dangerous animals, types of munitions, and slips, trips, and falls.

SITE VISIT TEAM (SVT)				On-site Yes/No	Tailgate Brief Yes/No
Parsons Field Team Leader	Lauren Ranker	Cell Phone:	(720) 988-4413	Yes	Yes
Parsons UXO Technician/SSHO	Rick White	Cell Phone:	(425) 577-8152	Yes	Yes
Eco Sampling Technician	Steven Saunders	Cell Phone:	(818) 397-2248	Yes	Yes
VISITORS					
Rick Meadows	CELRH	Cell Phone:	(304) 543-2755	Yes	Yes

EQUIPMENT LIST:

Standard Field Kit Items:	Schonstedt GA-52Cx, Trimble GeoXT, Garmin Rhino 530HCx handheld GPS/radio, Iridium 9555 Satellite Phone, field computer, digital camera, first aid kit
Water Sampling Equipment	Horiba U-22 Water Meter

QC CHECKS (Place ' **X** ' in appropriate box)

QUALITY CONTROL CHECKS	**Analog Instrument**	**YES**	X	**NO**	
	Handheld GPS	**YES**	X	**NO**	
	GIS Data Logger	**YES**	X	**NO**	

ADDITIONAL INFORMATION:

All other site details recorded in PDA/logbook.

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

The SVT will take the day off. The samples collected on May 12th and May 13th will be shipped to the laboratory for delivery on Tuesday, May 14th.

REQUEST FOR PROJECT ACTION:

None

ACCIDENTS REPORTED TODAY: 0
ACCIDENTS TO DATE: 0 **PREPARED BY FTL:** Lauren Ranker

DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: **W912PP-11-C-0007**
Delivery Order Number: **0001**
Project Name: **MMRP FUDS SI**
Project Number: **748073-30001**
Site Location: **WVMA (Jenningston Training Area MRS)**
Date: **13-May-12**

DAILY FIELD SI ACTIVITIES CONDUCTED

The SVT conducted approximately 5 miles of qualitative reconnaissance (QR) and completed surface soil, surface water, and sediment sampling at the Jenningston Training Area MRS (MRS03) at the West Virginia Maneuver Area / Dolly Sods FUDS.

The SVT collected surface water and sediment samples WVMA-MRS03-SW-01 and WVMA-MRS03-SD-01 from Otter Creek at the northern end of the MRS, near Highway 72. Field duplicate (FD) samples WVMA-MRS03-SW-03 and WVMA-MRS03-SD-03 and matrix spike (MS) and matrix spike duplicate (MSD) samples were also collected at this location. Next, the SVT collected ambient surface water and sediment samples from Condon Run ijust south of the MRS. Condon Run empties into Otter Creek downstream from the sample location. Otter Creek flows northward through the MRS. The SVT also collected ambient surface soil sample WVMA-MRS03-AMB-SS-02 in the same area. Afterwards, the SVT conducted QR on the east face of Shavers Mountain. The U.S. Army Corps of Engineers (USACE) project manager (Rick Meadows) accompanied the SVT during the sampling but not during the QR on Shavers Mountain. During the QR, the SVT observed numerous 4WD roads traversing the mountain. The team followed one of these roads in order to investigate a couple of clearings mid-way up the face. The team was only able to investigate one of the clearings before retreating due to inclement weather. The 4WD roads were overgrown and covered with downed trees in several places. However, many of the roads were constructed well with gravel base and drainage controls such as culverts and metal drain pipes. The clearings and roads are likely remnants of logging in the area. The SVT found no munitions debris, munitions and explosives of concern (MEC) items, or subsurface metal anomalies within the clearing or along the QR.

TOMORROW'S OPERATION PLAN

The SVT will take the day off. The samples collected on May 12th and May 13th will be shipped to the laboratory for delivery on Tuesday, May 14th.

Water Sample Equipment Calibrations (list or provide attachment)

	pH (s.u.)	Conductivity (µS/cm)	Turbidity (NTU)	Temp. (ºC)	Time
Equip. Reading:	4.01	4.48	0	19.8	0930

Field Instrument Measurements (list or provide attachment):

Water Sample ID:	Temp. (ºC)	Cond. (µS/cm)	Turbidity (NTU)	pH (s.u.)
WVMA-MRS03-SW-01	11.3	0.042	4.4	5.04
WVMA-MRS03-AMB-SW-02	10.53	0.03	27.1	4.44

Comments: Turbidity reading was higher in Condon Run (27.1), although the water in the stream appeared clear.

List all field and quality control samples collected (list or provide attachment):

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
WVMA-MRS03-SW-01	SW	1010	Metals*, Explosives	5/14/2012	APPL, Inc.	MS/MSD
WVMA-MRS03-SD-01	SD	1010	Metals*, Explosives, pH	5/14/2012	APPL, Inc.	MS/MSD
WVMA-MRS03-SW-03	SW	1021	Metals*, Explosives	5/14/2012	APPL, Inc.	FD of SW-01
WVMA-MRS03-SD-03	SD	1021	Metals*, Explosives, pH	5/14/2012	APPL, Inc.	FD of SD-01
WVMA-MRS03-AMB-SW-02	SW	1239	Metals*, Explosives	5/14/2012	APPL, Inc.	
WVMA-MRS03-AMB-SD-02	SD	1239	Metals*, Explosives, pH	5/14/2012	APPL, Inc.	
WVMA-MRS03-AMB-SS-02-02	SS	1258	Metals*, Explosives, pH	5/14/2012	APPL, Inc.	

*Metals: Al, Sb, Cu, Cr, Pb, Mn, Hg, and Zn

Departures from approved SAP:

In addition to analyzing the sediment samples for metals and explosives as indicated in the work plan, the sediment samples (WVMA-MRS03-SD-01, WVMA-MRS03-AMB-SD-02, and WVMA-MRS03-SD-03) will also be analyzed for pH. A matrix spike (MS) and matrix spike duplicate (MSD) were collected for surface water and sediment sample couple WVMA-MRS03-SD-01/SW-01. Sample couple WVMA-MRS03-SD-03/SW-03 was collected as a FD of WVMA-MRS03-SD-01/SW-01.

Instructions given by government personnel:

None

Check all attachments:

	Field sampling forms (in separate submittal)
	Field-generated analytical results
X	Chain-of-custody forms (in separate submittal)

Signed by: Lauren N. Ranker

Name	Lauren Ranker, Field Team Leader	
Date:	13-May-12	
Phone	Cell: (720) 988-4413	Office: (303) 764-8830
Copies sent to:		
	Richard Meadows (CELRH PM)	Brian Jordan (CESPA)
	Laura Kelley (Parsons PM)	Mohammad Estiri (Eco - PM)
	Brenda Galloway (Parsons)	Opjit Ghuman (Eco)
	Sandra de las Fuentes (Parsons)	Carlos Hernandez (Eco)

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912PP-11-C-0007**	**DELIVERY ORDER NO.**	**0001**
JOB NO:	**748073-30001**	**DATE/DAY:**	15-May-12
SITE NAME:	WVMA (Jenningston Training Area MRS)	**REPORT NO:**	3
USACE DISTRICT:	**CELRH**	**SHEET:**	1
WEATHER:	High of 72°F, Low of 46°F, cloudy, 5 mph winds		

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
111	***Miles Driven***	**257**
0/0	***Number of Flights/Miles Flown***	**0/0**
3	***Number of Personnel***	**3**

2. Reconnaissance Details

28,889	***Linear Feet:(5.47 miles)***	**88,934**

3. MC Sampling Details

0	***Soil Samples***	**2**
0	***Sediment Samples***	**3**
0	***Water Samples***	**3**
	Sampling Notes: See Attached DQCR	

4. QC Activities

0	***Soil Samples***	**3**
0	***Sediment Samples***	**3**
0	***Water Samples***	**3**
	Sampling Notes: See Attached DQCR	

5. QA Activities

0	***Soil Samples***	**0**
0	***Sediment Samples***	**0**
0	***Water Samples***	**0**
	Sampling Notes: No QA split samples for this program	

6. Safety Activities

A tailgate safety briefing was conducted on site, prior to the start of field activities. Topics included communication, hospital directions, uneven terrain, severe weather, flash flooding, cold stress, hydration, types of dangerous vegetation, dangerous animals, types of munitions, and slips, trips, and falls.

SITE VISIT TEAM (SVT)				On-site Yes/No	Tailgate Brief Yes/No
Parsons Field Team Leader	Lauren Ranker	Cell Phone:	(720) 988-4413	Yes	Yes
Parsons UXO Technician/SSHO	Rick White	Cell Phone:	(425) 577-8152	Yes	Yes
Eco Sampling Technician	Steven Saunders	Cell Phone:	(818) 397-2248	Yes	Yes
VISITORS					
None					

EQUIPMENT LIST:

Standard Field Kit Items:	Schonstedt GA-52Cx, Trimble GeoXT, Garmin Rhino 530HCx handheld GPS/radio, Iridium 9555 Satellite Phone, field computer, digital camera, first aid kit
Water Sampling Equipment	Horiba U-22 Water Meter

QC CHECKS (Place ' **X** ' in appropriate box)

QUALITY CONTROL CHECKS	**Analog Instrument**	**YES**	X	**NO**	
	Handheld GPS	**YES**	X	**NO**	
	GIS Data Logger	**YES**	X	**NO**	

DAILY FIELD SI ACTIVITIES CONDUCTED

The SVT conducted approximately 5.5 miles of qualitative reconnaissance (QR) at the Jenningston Training Area MRS (MRS03) at the West Virginia Maneuver Area / Dolly Sods FUDS. The SVT attempted to hike the Dry Fork Trail along Otter Creek at the northern border of the MRS. Water levels in Otter Creek and Dry Fork were high and flowing strongly due to heavy rains the previous day. The SVT was only able to hike 0.8 miles westward before the trail was cut off by a gushing drainage. The SVT hiked the Big Springs Gap Trail in the Western portion of the MRS. The trail came to a dead end at Otter Creek after 1.5 miles. Next, the SVT conducted QR on the east face of Shavers Mountain and investigated one of the clearings. The SVT observed no munitions debris, munitions and explosives of concern (MEC) items, or evidence of Department of Defense use during the QR. No subsurface anomalies were found during the QR or within the clearing on Shaver's Mountain. All other site details recorded in PDA/logbook.

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

The SVT will conduct QR on the northern fork of the Shavers Mountain Trail in the Jenningston Training Area MRS of the West Virginia Maneuver Area / Dolly Sods FUDS.

REQUEST FOR PROJECT ACTION:

None

ACCIDENTS REPORTED TODAY: 0
ACCIDENTS TO DATE: 0 **PREPARED BY FTL:** Lauren Ranker

Check all attachments:

_____ Field sampling forms (in separate submittal)
_____ Field-generated analytical results
_____ Chain-of-custody forms (in separate submittal)

Signed by: Lauren N. Ranker

Name	Lauren Ranker, Field Team Leader	
Date:	15-May-12	
Phone	Cell: (720) 988-4413	Office: (303) 764-8830
Copies sent to:		
	Richard Meadows (CELRH PM)	Brian Jordan (CESPA)
	Laura Kelley (Parsons PM)	Mohammad Estiri (Eco - PM)
	Brenda Galloway (Parsons)	Opjit Ghuman (Eco)
	Sandra de las Fuentes (Parsons)	Carlos Hernandez (Eco)

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912PP-11-C-0007**	**DELIVERY ORDER NO.**	**0001**
JOB NO:	**748073-30001**	**DATE/DAY:**	16-May-12
SITE NAME:	WVMA (Jenningston Training Area MRS)	**REPORT NO:**	4
USACE DISTRICT:	**CELRH**	**SHEET:**	1
WEATHER:	High of 74°F, partly cloudy, 5-10 mph winds		

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
43	***Miles Driven***	**300**
0/0	***Number of Flights/Miles Flown***	**0/0**
3	***Number of Personnel***	**3**

2. Reconnaissance Details

35,598	***Linear Feet:(6.74 miles)***	**124,532**

3. MC Sampling Details

0	***Soil Samples***	**2**
0	***Sediment Samples***	**3**
0	***Water Samples***	**3**
	Sampling Notes: See Attached DQCR	

4. QC Activities

0	***Soil Samples***	**3**
0	***Sediment Samples***	**3**
0	***Water Samples***	**3**
	Sampling Notes: See Attached DQCR	

5. QA Activities

0	***Soil Samples***	**0**
0	***Sediment Samples***	**0**
0	***Water Samples***	**0**
	Sampling Notes: No QA split samples for this program	

6. Safety Activities

A tailgate safety briefing was conducted on site, prior to the start of field activities. Topics included communication, hospital directions, uneven terrain, severe weather, heat stress, cold stress, hydration, types of dangerous vegetation, dangerous animals, types of munitions, and slips, trips, and falls.

SITE VISIT TEAM (SVT)				On-site Yes/No	Tailgate Brief Yes/No
Parsons Field Team Leader	Lauren Ranker	Cell Phone:	(720) 988-4413	Yes	Yes
Parsons UXO Technician/SSHO	Rick White	Cell Phone:	(425) 577-8152	Yes	Yes
Eco Sampling Technician	Steven Saunders	Cell Phone:	(818) 397-2248	Yes	Yes
VISITORS					
None					

EQUIPMENT LIST:

Standard Field Kit Items:	Schonstedt GA-52Cx, Trimble GeoXT, Garmin Rhino 530HCx handheld GPS/radio, Iridium 9555 Satellite Phone, field computer, digital camera, first aid kit
Water Sampling Equipment	Horiba U-22 Water Meter

QC CHECKS (Place ' **X** ' in appropriate box)

QUALITY CONTROL CHECKS	**Analog Instrument**	**YES**	X	**NO**	
	Handheld GPS	**YES**	X	**NO**	
	GIS Data Logger	**YES**	X	**NO**	

DAILY FIELD SI ACTIVITIES CONDUCTED

The SVT conducted approximately 6.7 miles of qualitative analysis (QR) at the Jenningston Training Area MRS (MRS03) at the Former West Virginia Maneuver Area (WVMA) / Dolly Sods FUDS. The SVT conducted QR on the Mylius Trail and the north fork of the Shavers Mountain Trail. The team hiked approximately 2 miles north on the Shavers Mountain Trail before turning around. The SVT observed no munitions debris, MEC items, or evidence of Department of Defense use during the QR. However, the team did observe a camp site just east of the trail made with stone walls. Subsurface anomalies were detected within the camp site. A large metal nail and a rusted metal door to a stove were also found within the site. No other subsurface anomalies were found during the QR. All other site details recorded in PDA/logbook.

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

The SVT will conduct surface water and sediment sampling at the Bearden Knob Firing Range MRS (MRS05) at the WVMA / Dolly Sods FUDS.

REQUEST FOR PROJECT ACTION:

None

ACCIDENTS REPORTED TODAY: 0
ACCIDENTS TO DATE: 0 **PREPARED BY FTL:** Lauren Ranker

Check all attachments:

_____ Field sampling forms (in separate submittal)
_____ Field-generated analytical results
_____ Chain-of-custody forms (in separate submittal)

Signed by: Lauren N. Ranker

Name	Lauren Ranker, Field Team Leader	
Date:	16-May-12	
Phone	Cell: (720) 988-4413	Office: (303) 764-8830
Copies sent to:		
	Richard Meadows (CELRH PM)	Brian Jordan (CESPA)
	Laura Kelley (Parsons PM)	Mohammad Estiri (Eco - PM)
	Brenda Galloway (Parsons)	Opjit Ghuman (Eco)
	Sandra de las Fuentes (Parsons)	Carlos Hernandez (Eco)

APPL LABS

APPL, Inc.
908 N Temperance Ave
Clovis, CA 93611

Phone: (559) 275-2175
Fax: (559) 275-4422

CHAIN OF CUSTODY RECORD

2.0
2.0
2.5
67766

C.O.C. 37929

Report to: PLEASE PRINT	Invoice to: PLEASE PRINT
Company Name: Eco & Assoc. Inc. Phone: (714) 289-0995	Company Name: Eco & Assoc. Inc Phone: (714) 289-0995
Address: 1855 W. Katella Av. #340 Fax: (714) 289-0965	Address: 1855 W. Katella Av. #340 Fax: (714) 289-0965
Orange, CA 92867	Orange, CA 92867
Attn: Carlos Hernandez	Attn: Carlos Hernandez

Project Name/Number: ECO-11-452
Purchase Order Number:
Sampler (Print): Steven Saunders
Sampler (Signature):

Date Shipped: 5/14/12
Carrier: Fed Ex
Waybill No.: 8726 2266 2669
Comments: *Metals = Al, Sb, Cu, Pb, Mn, Hg

Sample Identification	Location	Date Collected	Time Collected	Time Zone	No. of Containers	Matrix: Aq	Matrix: Sed.	Matrix: Soil		Explosives 8330	Metals 6020*	pH									
WVMA-MRS03-SS-02-01	WVMA MRS03	5/12/12	1038	EDT	6			X		X	X	X									MS/MSD
WVMA-MRS03-SS-02-03	"	"	1050	"	2			X		X	X	X									
~~WVMA-MRS03-SS-02-04~~	~~"~~	~~"~~		~~"~~	~~2~~			~~X~~		~~X~~	~~X~~	~~X~~									SCS
WVMA-MRS03-SW-01	"	5/13/12	1010	"	9	X				X	X										MS/MSD
WVMA-MRS03-SD-01	"	"	1010	"	6		X			X	X	X									MS/MSD
WVMA-MRS03-AMB-SW-02	"	"	1239	"	3	X				X	X										
WVMA-MRS03-AMB-SD-02	"	"	1239	"	2		X			X	X	X									
WVMA-MRS03-SW-03	"	"	1021	"	3	X				X	X										
WVMA-MRS03-SD-03	"	"	1021	"	2		X			X	X	X									
~~WVMA-MRS03-AMB-02-02~~	~~"~~	~~"~~																			SCS
WVMA-MRS03-AMB-SS-02-02	"	"	1258	"	2			X		X	X	X									

Shuttle Temperature:

Turnaround Requested: Check one
☒ Standard 2-3wk ☐ One week ☐ 24/48 Hrs. ☐ Other

Sample Disposal:
☐ Return to client ☐ Disposal by Lab (30-day retention) Refer to contract

Relinquished by sampler:	Date 5/14/12	Time 11:30	Received by:	Relinquished by:	Date	Time	Received by:
Relinquished by:	Date	Time	Received by:	Relinquished by:	Date 5/15/12	Time 1115	Received at lab by:

White: Return to client with report Yellow: Laboratory Copy Pink: Sampler

See reverse side for Container Preservative and Sampling Information

APPENDIX E

PHOTOGRAPH DOCUMENTATION LOG

Field Team Leader's Site Observations
Jenningston Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area ***Area:*** MRS03 ***Time*** 9:59:33 AM ***Point_ID:*** 1

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note: None

Easting 620119.25
Northing 4313736.34

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Started QR on the Mylius Trail (Trail 128) from County Road 12. The beginning of the trail is a 4WD road.

A few pieces of trash have been thrown down the hill below the road. The team found nothing DoD-related.

Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

Barrier: None
Topography: Steep Slope
Surface Feature: 4WD road
Surface Debris: None

05122012_0952.JPG
A folded piece of rusted scrap metal.

05122012_0953b.JPG
Two small empty rusted metal containers.

05122012_0953c.JPG
Facing downhill toward the creek. UXO Tech scanning for subsurface metal debris.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area
Area: MRS03
Time 10:38:00 AM
Point_ID: 2

Team Leader: Lauren Ranker
Sampler: Steve Saunders
Sample ID: WVMA-MRS03-SS-02-01
Vegetation: Thin Trees
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Other
Surface Debris: None

Subsurface Met: Low Density
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619907.74
Northing 4313873.73

The field team veered off of the Mylius Trail to find this cave. Detected some small subsurface metal anomalies in front of the cave.

We collected soil sample WVMA-MRS03-SS-02-01, duplicate sample WVMA-MRS03-SS-02-03, and MS and MSD samples.

05122012_1020b.JPG
The cave reported in the Preliminary Assessment to contain mortar canisters. Cave appears empty.

05122012_1021.JPG
UXO Tech peering into the cave opening.

05122012_1032.JPG
The Sample Tech collecting the soil samples next to the cave opening.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 10:56:26 AM **Point_ID:** 3

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Grasses
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: None
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619974.326
Northing 4313884.148

Just below and to the east of the cave location, the field team investigated this grassy clearing that slopes down to the creek.

Found nothing of interest in area.

05122012_1057a.JPG
UXO Tech in background is scanning for subsurface metal debris using the Schonstedt.

05122012_1057b.JPG
The clearing slopes toward the creek and is covered in grass.

05122012_1057c.JPG
View of clearing.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area ***Area:*** MRS03 ***Time*** 11:06:43 AM ***Point_ID:*** 4

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note: None

Easting 619970.278
Northing 4313750.169

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Found another clearing in the trees.

Vegetation: Grasses
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

Barrier: None
Topography: Gentle Slope
Surface Feature: None
Surface Debris: None

The team found nothing of interest in this grassy clearing.

05122012_1106.JPG
Facing northwest. UXO Tech scanning the clearing for subsurface metal debris.

05122012_1107a.JPG
Facing north. FTL collecting observation point.

05122012_1107b.JPG
Facing northeast. Clearing is surrounded by dense trees.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 11:21:47 AM **Point_ID:** 5

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Grasses
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: None
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619965.744
Northing 4313537.753

Found another clearing in the trees.

The team found nothing of interest in this grassy clearing.

05122012_1120.JPG
Facing north. UXO Tech scanning the clearing for subsurface metal debris.

05122012_1121a.JPG
Facing northwest.

05122012_1121b.JPG
Facing east.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area ***Area:*** MRS03 ***Time*** 11:49:31 AM ***Point_ID:*** 6

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Thin Trees
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619337.744
Northing 4313925.528

Following the Mylius Trail up Shaver's Mountain.

05122012_1149a.JPG
Facing north along hiking trail.

05122012_1149b.JPG
Facing south. FTL collecting observation point.

05122012_1149c.JPG
Facing east. Medium density trees and brush on the steep hill. Ferns and many downed trees cover the ground.

Field Team Leader's Site Observations
Jenningston Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area | **Area:** MRS03 | **Time** 12:20:09 PM | **Point_ID:** 7

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Thin Trees
Drainage: None
SoilType: Clayey Silt
SoilColor: Black

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 618977.867
Northing 4314523.953

Campground at the intersection of the Mylius Trail (Trail 128) and the Shaver's Mountain Trail (Trail 129).

Trails go four directions from this location. The field team continued south on the Shaver's Mountain Trail from here.

05122012_1219a.JPG
Facing west. A cairn marks the trailhead.

05122012_1219b.JPG
Facing east. FTL collecting observation point. A cairn in the background (left) marks a trail.

05122012_1219c.JPG
Facing southwest. Fire pit at the center of the campground. Two cairns in the background mark another trail.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 1:23:42 PM **Point_ID:** 8

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
MRSPP Menu: None
MRSPP Note: None
Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A
Easting 618695.872
Northing 4313587.811

Nothing of interest.

Vegetation: Thin Trees
Drainage: Intermittent
SoilType: Clayey Silt
SoilColor: Brown
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

05122012_1323a.JPG
Facing north into the trees.

05122012_1323b.JPG
Facing west. FTL collecting observation point.

05122012_1323d.JPG
Facing east.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Saturday, May 12, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 2:13:22 PM **Point_ID:** 9

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: Intermittent
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619262.726
Northing 4314110.672

Nothing of interest.

05122012_1413a.JPG
Facing north. FTL collecting observation point.

05122012_1413b.JPG
Facing south along Shaver's Mountain Trail.

05122012_1413c.JPG
Facing east into the trees and brush down the hill.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Sunday, May 13, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 10:10:00 AM **Point_ID:** 10

Team Leader: Lauren Ranker
Sampler: Steve Saunders
Sample ID: WVMA-MRS03-SW-01

MRSPP Menu: None
MRSPP Note: None

Easting 620347.707
Northing 4322373.216

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Colleted samples WVMA-MRS03-SW-01 and WVMA-MRS03-SD-01 in Otter creek at the northern end of the MRS.

Field duplicate samples WVMA-MRS03-SW-03 and WVMA-MRS03-SD-03 and MS and MSD samples were also collected.

Vegetation: Mixed Trees + Brush
Drainage: Creek

Barrier: None
Topography: Steep Slope

SoilType: Clayey Silt
SoilColor: Brown

Surface Feature: Trail
Surface Debris: None

05132012_1005.JPG
Collecting surface water parameters in Otter Creek prior to sampling.

05132012_1009.JPG
Sample Tech collecting surface water sample.

05132012_1018b.JPG
Sample Tech collecting sediment sample.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Sunday, May 13, 2012

Property: West Virginia Maneuver Area | **Area:** Ambient | **Time** 12:39:00 PM | **Point_ID:** 11

Team Leader: Lauren Ranker
Sampler: Steve Saunders
Sample ID: WVMA-MRS03-AMB-SW-02

MRSPP Menu: None
MRSPP Note: None

Easting 615396.041
Northing 4311183.328

Vegetation: Heavy Brush
Drainage: Creek

Barrier: None
Topography: Gentle Slope

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Colleted samples WVMA-MRS03-AMB-SW-02 and WVMA-MRS03-AMB-SD-02 in Condon Run, just south of the MRS.

Condon Run empties into Otter Creek nearby, which then flows north through the MRS.

SoilType: Silty Sand
SoilColor: Tan

Surface Feature: None
Surface Debris: None

05132012_1234.JPG
Sample Tech collecting surface water sample in Condon Run.

05132012_1238a.JPG
Sample Tech collecting sediment sample.

05132012_1238b.JPG
Facing downstream.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Sunday, May 13, 2012

Property: West Virginia Maneuver Area ***Area:*** Ambient ***Time*** 12:58:00 PM ***Point_ID:*** 12

Team Leader: Lauren Ranker
Sampler: Steve Saunders
Sample ID: WVMA-MRS03-AMB-SS-02-02

MRSPP Menu: None
MRSPP Note: None

Easting 615413.057
Northing 4311227.266

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Collected ambient surface soil sample WVMA-MRS03-AMB-SS-02-02 near Condon Run.

Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

Barrier: None
Topography: Steep Slope
Surface Feature: None
Surface Debris: None

05132012_1251a.JPG
Sample Tech collecting soil sample.

05132012_1257.JPG
Sample Tech homogenizing soil in sample bag.

05132012_1258.JPG
Sample Tech filling sample jars.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Sunday, May 13, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 2:09:10 PM **Point_ID:** 13

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

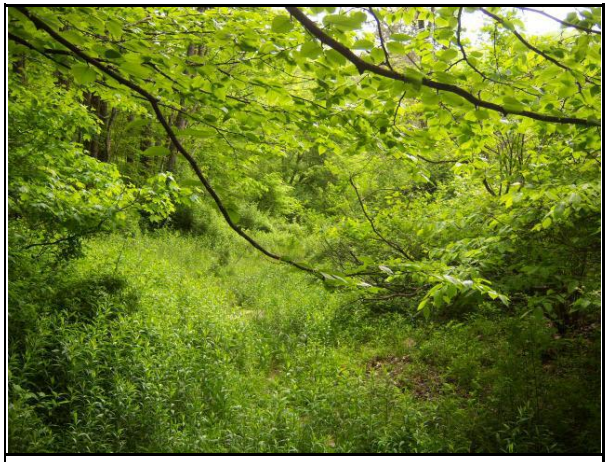
MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: 4WD road
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 622009.434
Northing 4315650.978

Started QR at the gated dead end on County Road 12, and headed west up the face of Shaver's Mountain.

Intersection of two 4wd roads. The road goes 4 directions here.



05132012_1416a.JPG
Facing southeast along 4WD road. The road is very overgrown.

05132012_1416b.JPG
Facing south along 4WD road. FTL collecting observation point.

05132012_1417.JPG
Facing northwest along road.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Sunday, May 13, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 2:39:18 PM **Point_ID:** 14

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Grasses
Drainage: Intermittent
SoilType: Clayey Silt
SoilColor: Brown

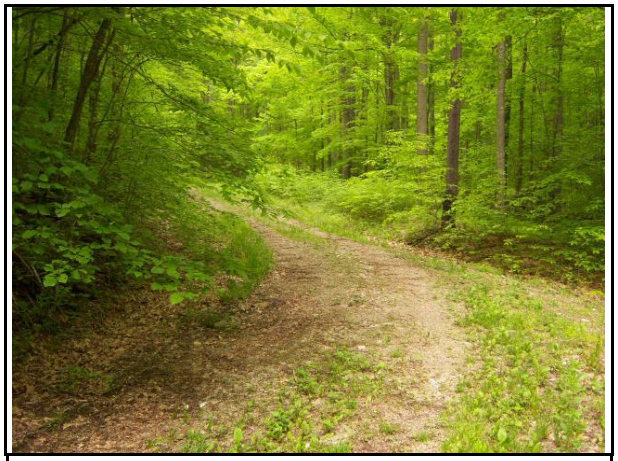
MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: 4WD road
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

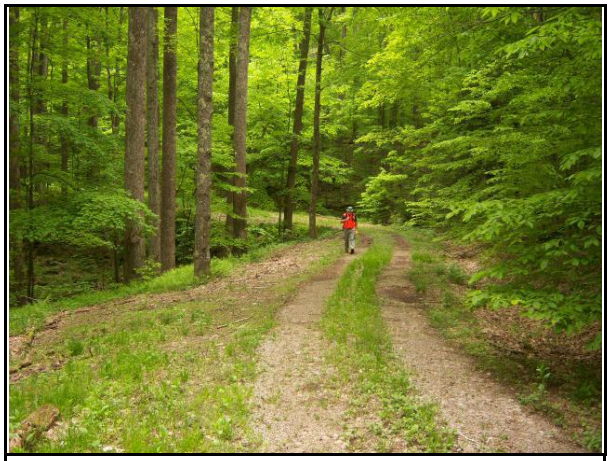
Easting 621555.129
Northing 4315840.695

After following an overgrown 4WD road up the mountain, we encountered this intersection with another 4WD road.

05132012_1438.JPG
Facing southeast. FTL collecting observation point.



05132012_1439a.JPG
Facing east along 4WD road.



05132012_1439b.JPG
Facing west along road. UXO Tech scanning for subsurface metal anomalies.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Sunday, May 13, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 3:08:11 PM **Point_ID:** 15

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Grasses
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: None
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620682.494
Northing 4315588.051

4wd roads traverse back and forth across the mountain. The field team left the road to explore this clearing in the trees.

Observed tree stumps in the field from trees that were cut down.

05132012_1528.JPG
Facing west. FTL collecting observation point in the pouring rain.

05132012_1529a.JPG
Facing southwest. UXO Tech scanning clearing for subsurface metal debris using Schonstedt.

05132012_1529b.JPG
Facing north along the clearing.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 9:10:31 AM **Point_ID:** 16

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: Intermittent
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620336.97
Northing 4322364.66

Conducting QR along the Otter Creek Trail (Trail 131) in the north part of the MRS. Started at the Dry Fork River, and headed west toward Otter Creek.

A waterfall flows down off the mountain and crosses the trail here.

05152012_0910.JPG
Facing south.

05152012_0911a.JPG
Facing west toward Otter Creek.

05152012_0911b.JPG
Facing northeast.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 9:35:53 AM **Point_ID:** 17

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note: None

Easting 619760.267
Northing 4322146.732

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

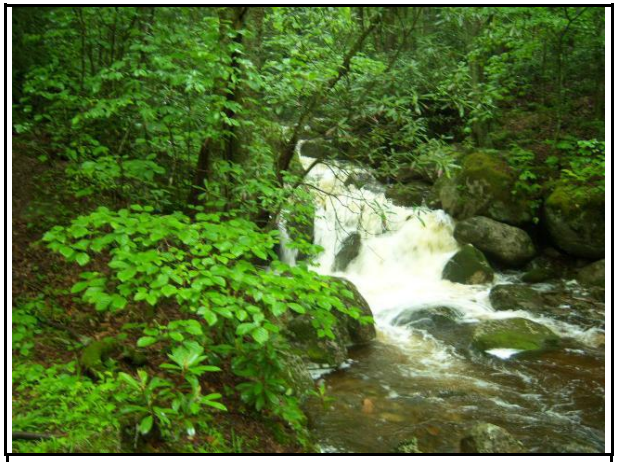
Vegetation: Mixed Trees + Brush
Drainage: Intermittent
SoilType: Silty Sand
SoilColor: Brown

Barrier: Drainage
Topography: Gentle Slope
Surface Feature: Trail
Surface Debris: None

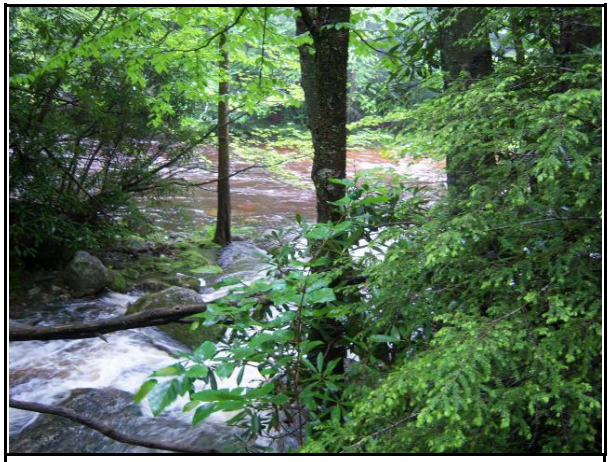
Drainage is flowing rapidly across the trail after the recent rains.

The field team could not find a safe way to cross the rushing water.

05152012_0936a.JPG
Facing southwest across the drainage at the other side of the trail.



05152012_0936b.JPG
Facing south, up the drainage.



05152012_0936c.JPG
Facing west toward Otter Creek.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 9:50:04 AM **Point_ID:** 18

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: Other
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620170.383
Northing 4322328.427

Found an old foundation next to the trail with stone walls, electrical wiring, and pieces of old stove at the center.

A second smaller foundation with similar stone walls is to the southwest of the larger foundation.

05152012_0949a.JPG
Facing south. UXO Tech investigating inside the foundation.

05152012_0950.JPG
Facing southeast. FTL standing on ground above foundation.

05152012_0953a.JPG
Facing southwest toward foundation for smaller structure.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 10:08:46 AM **Point_ID:** 19

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
MRSPP Menu: None
MRSPP Note: None
Subsurface Met: N/A
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A
Easting 620439.193
Northing 4322399.841

Suspension bridge over the Dry Fork River. Flow in the river is high after recent rains.

Vegetation: Barren
Drainage: River
SoilType: N/A
SoilColor: N/A
Barrier: None
Topography: Broken Terrain
Surface Feature: None
Surface Debris: None

05152012_1008a.JPG
Facing northeast. FTL collecting observation point on bridge.

05152012_1008b.JPG
Facing northwest, downstream.

05152012_1008c.JPG
Facing southeast, upstream.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area ***Area:*** MRS03 ***Time*** 11:30:51 AM ***Point_ID:*** 20

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: Creek
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

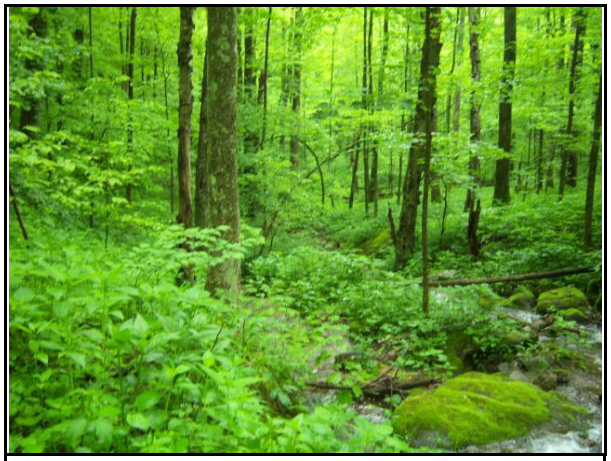
Easting 615775.954
Northing 4322458.248

Conducting QR along the Big Springs Gap Trail (Trail 151). Started at Big Springs Gap Trailhead, and headed east toward Otter Creek.

A stream crosses the trail here.

05152012_1129a.JPG
Facing southeast along the trail. FTL collecting observation point next to stream.

05152012_1129b.JPG
Facing south, upstream.



05152012_1130.JPG
Facing downstream.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 11:46:48 AM **Point_ID:** 21

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: Creek
SoilType: Clayey Silt
SoilColor: Brown

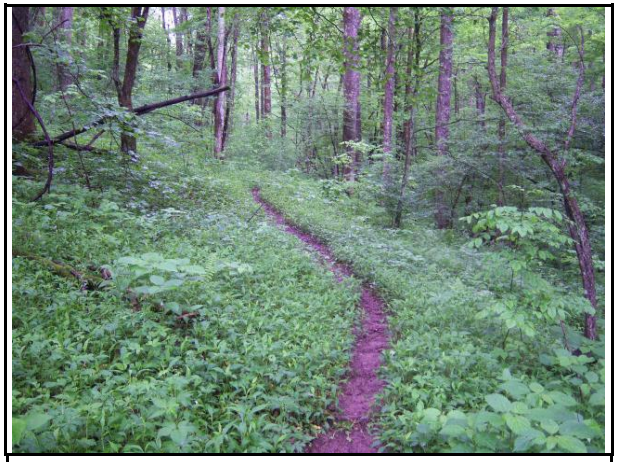
MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 616428.605
Northing 4322387.257

Several streams converge here.

05152012_1146a.JPG
Facing north up one of the streams. Thin trees and heavy brush.



05152012_1146b.JPG
Facing northwest,up the trail.

05152012_1146c.JPG
Facing southeast, down the trail.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 12:04:28 PM **Point_ID:** 22

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
MRSPP Menu: None
MRSPP Note: None
Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A
Easting 616737.168
Northing 4322119.305

Otter Creek is flowing high after the recent rains and cuts off the trail.

Vegetation: Mixed Trees + Brush
Drainage: Creek
SoilType: Sandy Silt
SoilColor: Brown
Barrier: Creek
Topography: Gentle Slope
Surface Feature: Trail
Surface Debris: None

05152012_1204a.JPG
Facing east. Trail continues on the other side of Otter Creek.

05152012_1204b.JPG
Facing north. Trees and brush along the creek.

05152012_1204c.JPG
Facing south along the bank of the creek.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 2:57:45 PM **Point_ID:** 23

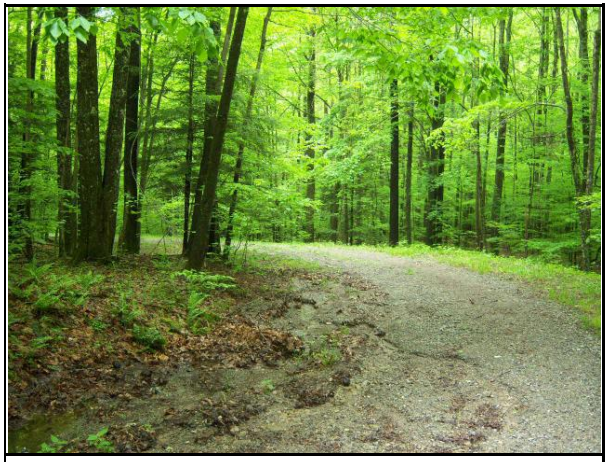
Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Gravel/rock road
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620187.28
Northing 4313916.83

Following the old jeep trail from County Route 12, just north of the Mylius Trail.



05152012_1457a.JPG
Facing southwest down the jeep trail.

05152012_1457b.JPG
Facing southeast up the jeep trail.

05152012_1457c.JPG
Facing north into the trees.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area ***Area:*** MRS03 ***Time*** 3:23:24 PM ***Point_ID:*** 24

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Grasses
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: None
Surface Debris: None

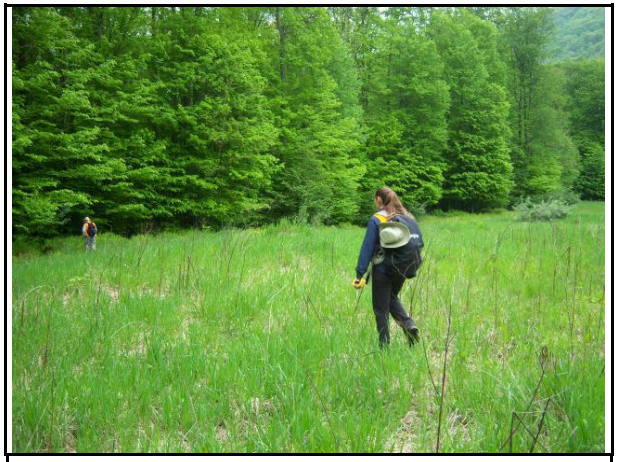
Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620419.671
Northing 4314469.101

Left the old jeep trail to explore this clearing in the trees.

Found nothing of interest in the area.

05152012_1517.JPG
Facing northwest. FTL exploring the clearing for debris.



05152012_1518.JPG
Facing southeast. UXO Tech in the background scanning for subsurface metal debris using the Schonstedt.

05152012_1522.JPG
Facing north.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Tuesday, May 15, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 3:51:10 PM **Point_ID:** 25

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Grasses
Drainage: Creek
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: Gravel/rock road
Surface Debris: None

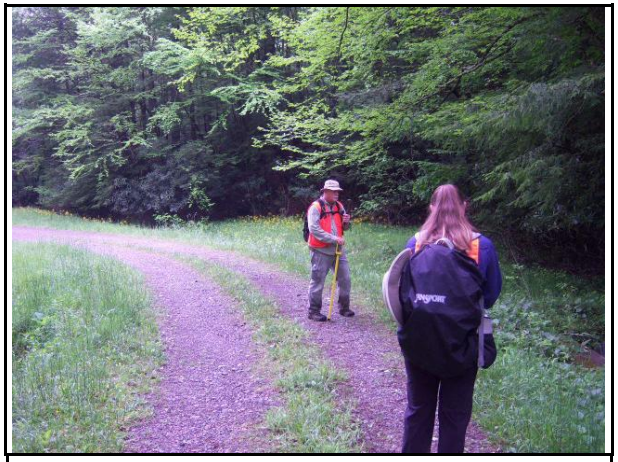
Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620601.434
Northing 4313817.182

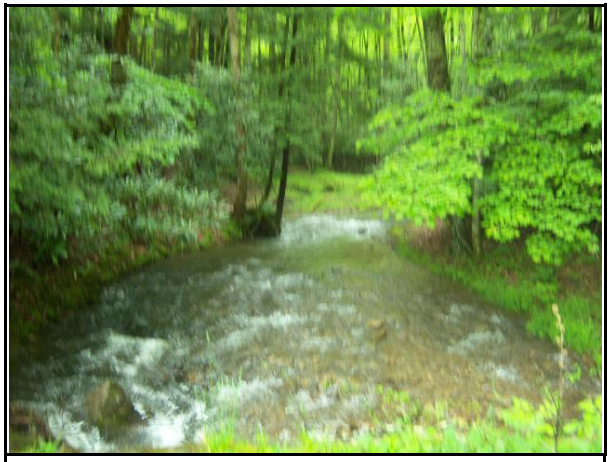
After exploring the clearing, the field team headed back down to the old jeep trail.

An unnamed tributary crosses under the road at the start of the old jeep trail.

05152012_1550a.JPG
Facing north. Gate on the old jeep trail is locked.



05152012_1550b.JPG
Facing south.



05152012_1550c.JPG
Facing west along creek.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Wednesday, May 16, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 9:04:20 AM **Point_ID:** 26

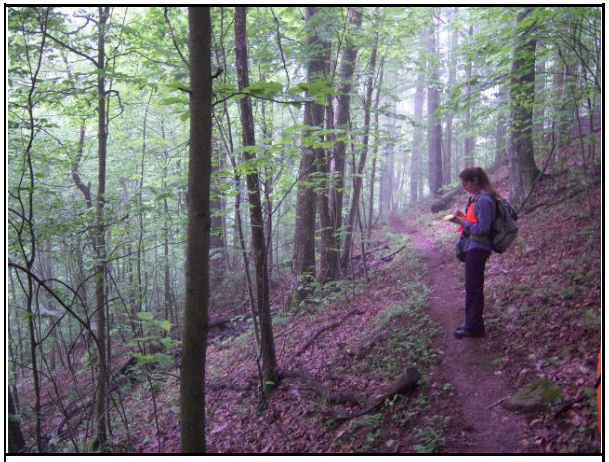
Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619584.66
Northing 4313558.02

Following the Mylius Trail again to get to the Shaver's Mountain Trail.



05162012_0903.JPG
Facing southeast along the trail. FTL collecting observation point.

05162012_0904a.JPG
Facing northwest, up the trail. The forest is foggy.

05162012_0904b.JPG
Facing northeast into the trees.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Wednesday, May 16, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 9:50:36 AM **Point_ID:** 27

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619068.08
Northing 4314673.19

Started QR along the north segment of the Shavers Mountain Trail (still Trail 129) from the camp ground at the intersection with Mylius Trail.

05162012_0952a.JPG
Facing southwest. FTL collecting observation point.

05162012_0952b.JPG
Facing southeast into the trees.

05162012_0953.JPG
Facing north at the start of the Shaver's Mountain Trail.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Wednesday, May 16, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 10:13:01 AM **Point_ID:** 28

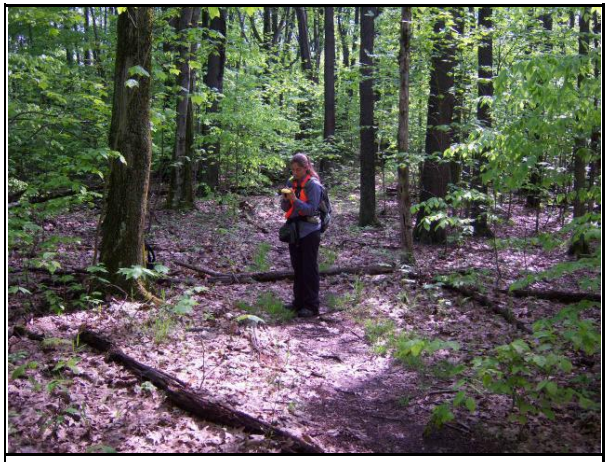
Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619445.59
Northing 4315111.8

Following Shaver's Mountain Trail to the north.



05162012_1012a.JPG
Facing east. FTL collecting observation point on the trail.

05162012_1012b.JPG
Facing north. Thin trees in the area. Ground is covered in dry leaves.

05162012_1013.JPG
Facing southwest along trail.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Wednesday, May 16, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 10:34:45 AM **Point_ID:** 29

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Steep Slope
Surface Feature: Other
Surface Debris: None

Subsurface Met: Low Density
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 619852.47
Northing 4315325.18

The field team found a man made campsite with rock wall just east of the trail.

Detected a few subsurface metal anomalies on the camp floor. Also found a long, rusted, metal nail and a metal door to a stove.

05162012_1033a.JPG
Facing northeast. A man made wall encloses a small camp spot next to the boulders on the side of the hill.

05162012_1034a.JPG
Facing east. Moss and trees on top of the boulders.

05162012_1034b.JPG
Facing west. A boulder field next to the camp.

Field Team Leader's Site Observations
Jennington Training Area MRS, Tucker and Randolph Counties, West Virginia

Wednesday, May 16, 2012

Property: West Virginia Maneuver Area **Area:** MRS03 **Time** 11:00:36 AM **Point_ID:** 30

Team Leader: Lauren Ranker
Sampler: None
Sample ID: None
Vegetation: Thin Trees
Drainage: None
SoilType: Clayey Silt
SoilColor: Brown

MRSPP Menu: None
MRSPP Note: None
Barrier: None
Topography: Gentle Slope
Surface Feature: Trail
Surface Debris: None

Subsurface Met: No Detect
MEC: None
MEC/MOD: N/A
MD: None
MD/MOD: N/A

Easting 620166.19
Northing 4315870.17

The vegetation changes to pines here at the top of the mountain.

05162012_1059.JPG
Facing southwest. FTL collecting observation point.

05162012_1100a.JPG
Facing northeast. UXO Tech scanning for subsurface metal anomalies.

05162012_1100b.JPG
Facing southeast. Ground is covered in downed trees and ferns.

APPENDIX F

ANALYTICAL DATA

THE ATTACHED CD-ROM INCLUDES THE ENTIRE ANALYTICAL DATA VALIDATION PACKAGE CASE NO.67766 IN PDF FORMAT

APPENDIX G

ANALYTICAL DATA QA/QC REPORT

DATA VALIDATION SUMMARY REPORT

for samples collected from the

JENNINGSTON TRAINING AREA

West Virginia

Data Validation by: Tammy Chang

Date: June 15, 2012

Parsons - Austin

INTRODUCTION

The following data validation summary report covers soil, sediment and surface water samples and field quality control (QC) samples collected from Jenningston Training Area (MRS03), West Virginia on May 12 and 13, 2012. Samples were logged in under the following Sample Delivery Group (SDG):

67766

All soil and sediment samples were analyzed for explosives, metals, and pH. Surface water samples were analyzed for explosives and metals. Metals included aluminum, antimony, chromium, copper, lead, manganese, zinc, and mercury. QC samples included one field duplicate (FD) and one pair of matrix spike/matrix spike duplicate (MS/MSD) for each matrix. The following table details the field sample identifications and requested parameters.

All samples were collected by Parsons and Eco & Associates, Inc. and were shipped to Agriculture and Priority Pollutants Laboratories, Inc. (APPL) in three coolers. These coolers were received by the laboratory at a temperature of 2.0°C, 2.0°C, and 2.5°C which were all within the 2-6°C range recommended by the PSAP

All samples were prepared and analyzed following the procedures outlined in the Project Sampling and Analysis Plan and Addendum (PSAP) for the Southeast Region and the site specific Sampling and Analysis Plan.

All APPL method detection limits (MDLs) and practical quantitation limits (PQLs) were below the lowest associated action level for all target analytes.

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	Matrix	Explosives & Metals	pH	Comments
WVMA-MRS03-SS-02-01	S	X	X	MS/MSD
WVMA-MRS03-SS-02-03	S	X	X	FD of WVMA-MRS03-SS-02-01
WVMA-MRS03-SW-01	SW	X		MS/MSD
WVMA-MRS03-SD-01	SD	X	X	MS/MSD
WVMA-MRS03-AMB-SW-02	SW	X		ambient sample
WVMA-MRS03-AMB-SD-02	SD	X	X	ambient sample
WVMA-MRS03-SW-03	SW	X		FD of WVMA-MRS03-SW-01

Sample ID	Matrix	Explosives & Metals	pH	Comments
WVMA-MRS03-SD-03	SD	X	X	FD of WVMA-MRS03-SD-01
WVMA-MRS03-AMB-SS-02-02	S	X	X	ambient sample

S = Soil; SW = surface water; SD = sediment

EXTRACTION, ANALYTICAL, AND REPORTING DETAILS

PARAMETER	MATRIX	EXTRACTION METHOD	ANALYTICAL METHOD	UNITS	DRY WT. VS. WET WT
Explosives	S/SD	8330B	8330B	mg/kg	Dry Wt.
Explosives	W	3535	8330B	µg/L	NA
Metals	S/SD	3050B	6010B	mg/kg	Dry Wt.
Metals	W	3010A	6010B	µg/L	NA
Mercury	S/SD	NA	7471A	mg/kg	Dry Wt.
Mercury	W	NA	7470A	µg/L	NA
pH	S/SD	NA	9045D	NA	NA

See the end of this report for detailed description of the sample preparation procedures.

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the Project Work Plan, site specific Sampling and Analysis Plan, and PSAP. Information reviewed in the data packages included sample results; field and laboratory quality control results; calibrations; case narratives; raw data; cooler receipt forms, and chain-of-custody (COC) forms. The analyses and findings presented in this report are based on the reviewed information, and whether guidelines in the Work Plan were met.

Due to the flagging requirements of the electronic data deliverable (EDD) software, Automatic Data Review (ADR), the following rules were applied for flagging the data:

If an analyte was detected in the method blank, the associated sample concentrations were examined. If the analyte was detected in a sample at a concentration similar to that found in the blank (five times the blank concentration for most analytes, or ten times the blank concentration for common laboratory contaminants), the PQL for that analyte was raised to the detected level and the result was flagged “U” for that particular sample.

Approval was also received from a USACE chemist for laboratory to use the historically developed control limits to evaluate accuracy for explosives. The approved accuracy and precision criteria for explosives are as follows:

Analyte	Accuracy Criteria for Soil & Sediment	Accuracy Criteria for Water	Maximum RPD (%)
HMX	75-125%	80-115%	30
RDX	70-135%	50-160%	30
1,3,5-Trinitrobenzene	75-125%	65-140%	30

1,3-Dinitrobenzene	80-125%	45-160%	30
Nitrobenzene	75-125%	50-140%	30
Tetryl	10-150%	20-175%	30
Nitroglycerin	68-131%	71-126%	30
2,4,6-Trinitrotoluene	55-140%	50-145%	30
4-Amino-2,6-dinitrotoluene	80-125%	55-155%	30
2-Amino-4,6-dinitrotoluene	80-125%	50-155%	30
2,4-Dinitrotoluene	80-125%	60-135%	30
2,6-Dinitrotoluene	80-120%	60-135%	30
3-Nitrotoluene	75-120%	50-130%	30
PETN	69-132%	65-115%	30
2-Nitrotoluene	80-125%	45-135%	30
4-Nitrotoluene	75-125%	50-130%	30
1,2-Dinitrobenzene (Surrogate)	70-130%	70-130%	NA

For metals, the accuracy criteria for the laboratory control sample (LCS), MS, and MSD are 80-120%.

The precision requirement for parent and FD is relative percent difference (%RPD) ≤70% for soil and sediment and ≤40% for surface water.

EXPLOSIVES

General

The explosives portion of this SDG consisted of three (3) soil samples, three (3) sediment samples, and three (3) surface water samples. These samples were collected on May 12 and 13, 2012 and were analyzed for the full list of explosives as specified in the Work Plan.

The explosives analyses were performed according to the United States Environmental Protection Agency (USEPA) SW846 Method 8330B. These samples were analyzed following the procedures outlined in the laboratory Standard Operation Procedure (SOP) which was approved by USACE. All samples were prepared and analyzed within the holding time required by the method.

The explosives samples were extracted in two analytical batches (#120518W for surface water and #120525S for sediment and soil). Samples were analyzed under two sets of single initial calibration (ICAL). Sample analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the two LCSs, three sets of MS/MSD, and the surrogate spikes.

All LCSs and surrogate spike recoveries were within acceptance criteria.

The only non-compliant MS/MSD result is RDX was recovered at 69.3% in the MSD of the soil pair which is <1% less than the lower control limit of 70%. The "J" flag applied by the lab to the parent sample result of WVMA-MRS03-SS-02-01 was removed by Parsons' data validator.

Precision

Precision was evaluated based on the %RPD of MS/MSD results and parent/FD results.

All %RPDs of the three pair of MS/MSD were compliant.

None of the target explosives were detected in all three pairs of parent and FD samples.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating holding times; and
- Examining laboratory blanks for cross contamination of samples during sample preparation and sample analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. All samples were prepared and analyzed within the holding time required by the method and the Work Plan.

- All initial calibration criteria were met.
- All secondary source verification criteria were met.
- All initial calibration verification (ICV) criteria were met.
- All continuing calibration verification (CCV) criteria were met.
- The limits of detection (LODs) were verified quarterly according to the DoD Quality System Manual (QSM) version 4.2 requirements.
- All sample-specific MDL and PQL values were below the lowest associated action level as listed in the PSAP for this site with one exception. The PQL for 1,3-dinitrobenzene exceeded the lowest action level of 0.073 mg/kg at 0.40 mg/kg. However, the MDL for this compound was well below the action level at 0.003 mg/kg.

There were two method blanks associated with the explosives analyses in this SDG. All target explosives were non-detect in both method blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All explosives results for the samples in this SDG were considered usable. The completeness for the explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

METALS

General

The metals portion of this SDG consisted of three (3) soil, three (3) sediment, and three (3) surface water samples. All samples were collected on May 12 and 13, 2012. These samples were analyzed for aluminum, antimony, chromium, copper, lead, manganese, and zinc.

The metals analyses were performed using USEPA SW846 Method 6010B. All samples were analyzed following the procedures outlined in the Work Plan. All samples were prepared and analyzed within the holding time required by the method and the Work Plan.

All samples were digested in two batches (#120605A for soil and sediment, #120529A1 for surface water) and were analyzed under two sets of ICAL. All water analyses were performed undiluted. Antimony in soil and sediment was analyzed undiluted. All other metals in soil and sediment samples were analyzed at a 5x dilution.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the two LCSs and three pairs of MS/MSD.

All LCS recoveries were within acceptance criteria.

For the water pair, the only non-compliant %R in the MS/MSD analyses was zinc with a %R of 74.3% which was lower than the lower control limit of 80%. "J" flag was applied to zinc in the parent result.

For soil and sediment, results of MS/MSD analyses are listed below:

WVMA-MRS03-SD-01

Metals	MS, %R	MSD, %R	Criteria, %R
Aluminum	0	0	
Antimony	52	54	
Chromium	57	58	
Copper	66	72	80-120
Lead	61	70	

Manganese	0	1030	
Zinc	27	54	

It should be noted that the concentration of aluminum and manganese were significantly greater than the spiked amount. "J" flags were applied to all parent sample results.

WVMA-MRS03-SS-02-01

Metals	MS, %R	MSD, %R	Criteria, %R
Aluminum	0	0	
Antimony	27	34	
Chromium	47	44	
Copper	62	61	80-120
Lead	40	44	
Manganese	0	0	
Zinc	40	41	

It should be noted that the concentration of aluminum and manganese were significantly greater than the spiked amount. "J" flags were applied to all parent sample results.

Precision

Precision was evaluated based on the RPD of MS/MSD results and parent/FD results.

For the water pair of MS/MSD, all %RPDs were greater than 20%, except antimony. The exceedances were not significant, all within 4%, therefore, all "J" flags applied by the lab to the parent sample results were removed by Parsons' data validator.

For the sediment pair of MS/MSD, all %RPDs were compliant except manganese which had %RPD of 52%. Since "J" has already been applied to the parent sample result, no additional flagging is needed.

For the soil pair of MS/MSD, all %RPDs were compliant except antimony which had %RPD of 22%. Since "J" has already been applied to the parent sample result, no additional flagging is needed.

The precision of the parent/FD result RPDs is compliant.

WVMA-MRS03-SW-01

Metals	Parent, µg/L	FD, µg/L	%RPD	Criteria, %RPD
Aluminum	170	180	5.7	
Manganese	13	13	0	≤40

WVMA-MRS03-SD-01

Metals	Parent, mg/Kg	FD, mg/Kg	%RPD	Criteria, %RPD
Aluminum	4900	5400	9.7	
Chromium	8.1	8.0	1.2	
Copper	3.9	4.4	12	≤70
Lead	7.8	9.2	16	
Manganese	330	320	3.1	
Zinc	71	74	4.1	

WVMA-MRS03-SS-02-01

Metals	Parent, mg/Kg	FD, mg/Kg	%RPD	Criteria, %RPD
Aluminum	24000	12000	67	
Chromium	30	15	67	
Copper	10	6.3	45	≤70
Lead	19	14	30	
Manganese	730	590	21	
Zinc	81	50	47	

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating preservation and holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

All samples were analyzed following the COC and the analytical procedures described in the Work Plan. All samples were prepared and analyzed within the holding times required by the method.

- All instrument initial calibration criteria were met.
- All metals met criteria in the low-level check standards.
- All second source criteria were met. The ICV samples were prepared using a secondary source.
- All CCV criteria were met.
- All interference check (ICSA/ICSAB) criteria were met.
- The dilution test (DT) was not applicable for the water batch.

- The post digestion spike (PDS) was performed with sample WVMA-MRS01-SW-01 which is a sample collected from MRS01 of the same base; it was delivered to the lab under SDG 67746:

WVMA-MRS01-SW-01

Metals	%D	Criteria, %D
Aluminum	90	75-125
Antimony	98	
Chromium	103	
Copper	99	
Lead	99	
Manganese	98	
Zinc	85	

- The DT was performed on sample WVMA-MRS03-SD-01. The DT was only applicable for aluminum, chromium, manganese and lead, since no other metals were detected in the parent sample at a concentration of 50 times the MDL or greater. Aluminum met criteria in the DT, as follow:

Metal	%D	Criteria
Aluminum	1.1	%D ≤ 10
Chromium	0.53	
Manganese	1.3	
Lead	4.1	

- The post digestion spike (PDS) was performed on the same sample as the DT. The PDS was applicable for antimony, copper, and zinc only. All three metals met criteria in the PDS, as follows:

Metal	%R	Criteria
Antimony	82	75 – 125%
Copper	95	
Zinc	86	

- The LODs were verified quarterly according to the DoD QSM version 4.2 requirements.
- All sample-specific MDL and PQL values were below the lowest associated action level as listed in the PSAP for this site.

There were two method blanks and several calibration blanks associated with the metals analyses in this SDG. All blanks were compliant.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All metal results for all samples in this SDG were considered usable. Therefore, the completeness for the metal portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

MERCURY

General

The mercury portion of this SDG consisted of three (3) soil samples, three (3) sediment samples and three (3) surface water samples. These samples were collected on 12 and 13 of May, 2012 and were analyzed for mercury.

The mercury analyses were performed using USEPA SW846 Method 7471A for soil and sediment and Method 7470A for surface water. The samples were analyzed following the procedures outlined in the Work Plan. All samples were prepared and analyzed within the holding time required by the method. Some of the screening values are below the PQL; however all are above the MDL. Therefore any detection between the MDL and PQL would be identified for decision-making purposes.

The samples for mercury were digested in two batches, #120523A1 for water and #120604A for soil and sediment. The samples were analyzed in two batches under two ICAL. All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recoveries obtained from the two LCS and three pairs of MS/MSD samples.

All LCS recoveries and MS/MSD were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD concentrations. Precision was further evaluated by comparing the two sets of parent/FD analyte results.

All MS/MS RPDs were within acceptance criteria.

Mercury was not detected in the any of the parent/FD pair at or above the RL.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan;
- Evaluating preservation and holding times; and
- Examining laboratory blanks for cross contamination of samples during analysis.

All samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. The samples were prepared and analyzed within the holding times required by the method.

- All instrument tune criteria were met.
- All initial calibration criteria were met.
- All low-level check standard criteria were met.
- All second source verification criteria were met. The ICV sample was prepared using a secondary source.
- All CCV criteria were met.
- The MDLs were verified annually.

There were two method blanks and several calibration blanks associated with the mercury analyses. Mercury was not detected above one-half the RL in the method blanks.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All mercury results for the samples in this SDG were considered usable. Therefore, the completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

pH

General

The pH portion of this SDG consisted of three (3) soil and there (3) sediment samples. All samples were collected on May 12 and 13, 2012 and were tested for pH.

The pH analyses were performed using USEPA SW846 Method 9045D. All samples were analyzed following the procedures outlined in the Work Plan. All samples were tested on the same day when samples were delivered to the lab.

Accuracy

The pH meter was calibrated with pH 7.00 buffer standard solution.

Precision

Precision was evaluated based on parent and lab duplicate (LD) pH readings. Lab performed the lab duplicate with the soil sample WVMA-MRS03-SS-02-01 and sediment sample WVMA-MRS03-SD-01.

For the soil pair, both parent and LD samples had pH reading of 5.4.

For the sediment pair, the parent sample had pH reading of 6.4 and its LD had pH reading of 6.3. The %RPD was 1.6 which was less than the 3% lab internal control limit.

Parent Sample ID	pH, parent	pH, FD
WVMA-MRS03-SS-02-01	5.4	5.6
WVMA-MRS03-SD-01	6.4	6.1

There is no precision limit set up for the pH reading of parent and FD.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the Work Plan;
- Comparing actual analytical procedures to those described in the Work Plan; and
- Evaluating preservation and holding times.

All soil and sediment samples in this SDG were analyzed following the COC and the analytical procedures described in the Work Plan. All calibration criteria were met.

- All calibration verification criteria were met.

Completeness

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

All pH result for the soil and sediment samples in this SDG was considered usable. The completeness for the pH portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

COMPARABILITY

All data was generated using contract-specific standard methods and reported with known data quality, type of analysis, units, etc.

DATA USABILITY

The purpose of this data validation report is to ensure the integrity and reliability of analytical laboratory data. The data quality is evaluated based on precision, accuracy, representativeness, comparability, and completeness (PARCC) characteristics of the data. The laboratory quality control samples and evaluated criteria included lab duplicate, method blanks, laboratory control spike samples, and surrogates. The validated data indicated that the laboratory correctly performed the analyses. Based on the data quality assessment, none of the data were qualified as rejected.

All calculations were spot checked and verified. All data in this SDG are considered usable for the purposes of this project. All sample MDLs and PQLs met the requirements listed in the approved site specific Sampling and Analysis Plan except as previously noted in this report.

APPL Inc Non- Incremental Sampling Procedures for Soil

Sample Drying to a Constant Weight:

Place approximately 20-30 grams of the sample into a labeled plastic weigh boat (or tray). Dry soil samples at room temperature (or less) to a “constant weight” as described below:

Record the date / time and the weight of the tray plus sample in a laboratory log book. Leave soil samples overnight to dry on shelves in a dark room.

The following morning weigh the tray containing the sample and record the weight, date and time, and place the trays back in the rack. After one hour record the weight, date and time again.

If the weight is consistent with the previous weighing (within +/- 3%), then this step is complete. If the weight is still not constant, continue drying and subsequent weighing until a constant weight is achieved before proceeding to the next step.

SAMPLE SIEVING AND GRINDING

Crush the dried soil in the weigh boat using a mortar and pestle. Pass the sample through a #30 mesh screen sieve and into a clean, labeled weigh boat in order to eliminate rocks and sticks. Wash the sieve in between each sample with soap and water and rinse with acetone.

SAMPLE WEIGHING

Weigh 10 grams of sample from the weigh boat into a labeled and tared 4oz. glass jar. Record the weight to the nearest 0.01 grams on the extraction sheet.

One method blank and one LCS are prepared with every analytical batch of 20 samples, using clean commercial sand. The LCS is spiked after sieving and grinding. The blank and LCS are taken through the exact same procedures as field samples.

Matrix Spike / Matrix Spike Duplicates are included for every analytical batch of 20 samples, based on the client's project requirements.

SAMPLE EXTRACTION

Add the appropriate amount of the 8330 Soil Surrogate (See SOP HPL002 Standard and Spike Prep) for the Blank, the LCS, MSD/MSD and field samples.

Add the appropriate amount of the 8330 Spike Mix (See SOP HPL002 Standard and Spike Prep) for the LCS and MSD/MSD.

Add 20mL Acetonitrile to each jar containing the spiked /surrogated soil. Place jars on a mechanical shaker for at least 18 hours.

Allow the extracts to settle for 30 minutes and remove approximately 8mL of the extract and place in a labeled 8mL amber screw-cap vial. Centrifuge the vials for approximately 10 minutes. Store extracted samples in a refrigerator between 2°C and 6°C.

Using a digital auto pipettor, remove 0.4mL of the final extract and combine with 0.4mL of DI water in an injection vial. Store under refrigeration until analysis.

APPENDIX H

GEOGRAPHIC INFORMATION SYSTEMS DATA

THE ATTACHED CD ROM INCLUDES THE ENTIRE GEOGRAPHICAL INFORMATION SYSTEMS LAYER

APPENDIX I

GEOPHYSICAL DATA

THERE WAS NO GEOPHYSICAL INVESTIGATION FOR THIS SI EVALUATION

APPENDIX J

CONCEPTUAL SITE MODEL

CONCEPTUAL SITE MODEL – MUNITIONS AND EXPLOSIVES OF CONCERN

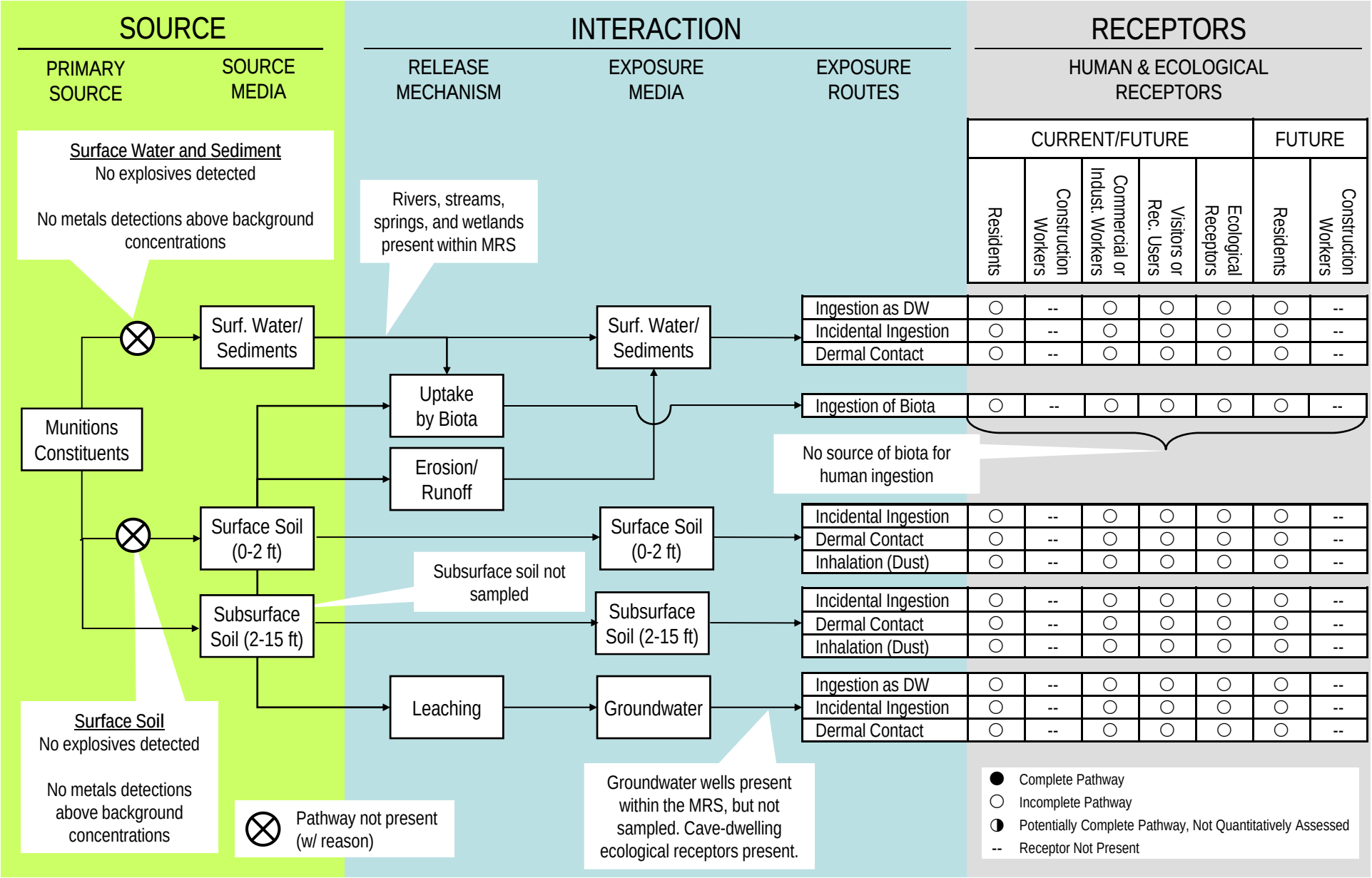
JENNINGSTON TRAINING AREA MRS, RANDOLPH AND TUCKER COUNTIES, WEST VIRGINIA

Subsite / Range	Acreage	Suspect Past DoD Activities	Potential MEC / Munitions Debris Present	MEC / Munitions Debris Found Since Closure	Previous Investigation / Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	SI Field Sampling / Qualitative Reconnaissance
JENNINGSTON TRAINING AREA	40,000	Infantry division troop maneuver area	Projectile, 155mm, HE, M102 Projectile, 155mm, white phosphorus, M110 Cartridge, 105mm, HE, M1 Cartridge, 105mm, smoke, hexachloroethane, M84 Cartridge, 81mm, HE, M43 Cartridge, 81mm, smoke, white phosphorus (WP), M57 Cartridge, 81mm, target practice (TP), M43 Cartridge, 60mm, HE, M49A2 Rocket, 3.25-inch, target, Mk 1 through Mk 4 Grenade, hand, fragmentation, MkII (1917 – present) Grenade, hand, practice, MkII Charge, demolition, block, ¼ lb, ½ lb, 1 lb Firing device, demolition, pull, M1 Cap, blasting, non-electric, M7 Fuse, blasting, time, M700 General small arms ammunition: Cartridge, .22 caliber Cartridge, .30 caliber (includes carbine) Cartridge, .38 caliber Cartridge, .45 caliber Cartridge, .50 caliber, machine gun	The PA reports that 60mm and 81mm mortar shipping canisters were found within the MRS in 2006; however, without the presence of MD relating to the ordnance item within the containers, it is an indication that the shipping containers were used for training purposes only, not for transport of actual munitions. There are no known training activities that used actual munitions at this MRS. A field visit was conducted in September 2007 for the 2009 PA. No MEC or MD was found. No MEC or munitions debris were found during the 2012 SI site visit.	2009 PA 2010 INPR 2012 SI No documentation of site clearance was found for this site.	Predominantly owned by the U.S. Department of Agriculture, managed by the U.S. Forest Service as a portion of the Monongahela National Forest. Partly privately owned and consisting of farmland with residences, and commercial properties, including the communities of Jenningston, Dryfork, Elk, and Gladwin.	Current and future residents, Commercial/Industrial workers (e.g., U.S. Forest Service personnel), Recreational users (e.g., hikers and spelunkers), site visitors	Yes Presence of potentially hazardous MEC is confirmed or suspected and the site is accessible to receptors.	Approximately 23.6 miles of QR CRREL 7-point wheel soil sampling: 2 surface soil samples: WVMA-MRS03-SS-02-01 WVMA-MRS03-AMB-SS-02-02 Grab Samples: 2 surface water samples: WVMA-MRS03-SW-01 WVMA-MRS03-AMB-SW-02 2 sediment samples: WVMA-MRS03-SD-01 WVMA-MRS03-AMB-SD-02 Associated QC samples: WVMA-MRS03-SS-02-03 WVMA-MRS03-SW-03 WVMA-MRS01-SD-03
				Source: PA (2009) INPR (2010) SI (2012)	CRREL = Cold Regions Research and Engineering Laboratory DoD = Department of Defense MEC = munitions and explosives of concern MRS = Munitions Response Site PA = Preliminary Assessment QR = qualitative reconnaissance SD = sediment SI = Site Investigation SS = surface soil SW = surface water				

CONCEPTUAL SITE EXPOSURE MODEL

MRS Name: WEST VIRGINIA MANEUVER AREA: Jenningston Training Area MRS

Created/Revised By: Emily Baxter, PARSONS ***Last Revision Date:*** July 9, 2013



APPENDIX K

MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL EVALUATION

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: Jenningston Training Area

Component: U.S. Army Corps of Engineers (FUDS)

Installation/Property Name: WV Maneuver Area/Dolly Sods

Location (City, County, State): Dry Fork, Tucker and Randolph Counties, West Virginia

Site Name (RMIS ID)/Project Name (Project No.): Proj. No. G03WV0013/FFID WV39799F346000

Date Information Entered/Updated: 13 June 2013

Point of Contact (Name/Phone): Mr. Richard Meadows (304) 543-2755

Project Phase (check only one):

❑ PA	☑ SI	❑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	☑ Sediment (human receptor)
☑ Surface soil	☑ Surface Water (ecological receptor)
☑ Sediment (ecological receptor)	☑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

The Jenningston Training Area MRS is located in Tucker and Randolph Counties, West Virginia. The site is located approximately 9 miles northeast of the City of Elkins (2013 SI Report, Figure 2.1). The total FUDS acreage is 2,180,367 acres, including the 40,000-acre Jenningston Training Area MRS (2013 SI Report Section 2.1). The Jenningston Training Area was developed for use in the WVMA from 1943-44, near Gladwyn, Sully, Jenningston, Red Creek, and Dry Fork, WV. The purpose of the Jenningston Training Area was to provide division training consisting of rock climbing exercises and troop maneuver problems. (2013 SI Report Section 2.3).

In 2006, shipping containers for 60mm and 81mm mortars were found in a vertical cave located near Three Springs Run within the Otter Creek Wilderness Area. No known training activities within the MRS required actual munitions. Without the presence of munitions debris relating to the ordnance item within the shipping containers (mortars), it is an indication that the shipping containers were merely used for training purposes, not transport or use of munitions. Because no other information on the use of MEC at the MRS is available, it is assumed that the munitions potentially used at the site include all of the munitions utilized at the FUDS including: 155mm high explosive (HE) projectiles; 105mm HE and smoke round (SR) cartridges; 81mm HE and SR cartridges; 75mm HE and SR shells; 60mm HE and SR shells; 4.2-inch HE and SR shells; 3.25-inch target rockets; practice antitank mines; fragmentation, smoke, and practice hand grenades; demolition charge blocks, demolition firing devices, blasting caps, time fuses, and general small arms ammunition (.22, .30, .38, .45, and .50 caliber); (Table 2.2).

No MEC or MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03 (2013 SI Report ES, page ES-2).

Description of Pathways for Human and Ecological Receptors: The most likely pathway is direct contact to human and ecological receptors. Groundwater exposure pathways are potentially complete but have not been quantitatively assessed for human and ecological receptors. Soil, surface water and sediment pathways are incomplete for all receptors.

Description of Receptors (Human and Ecological): Human receptors include current and future residents, commercial and industrial workers including U.S. Forest Service personnel, recreational users, and visitors to the area. Ecological receptors would include species expected to live in a mountainous, forested area of the Otter Creek Wilderness Area or the Monongahela National Forest, such as deer, rabbits, grouse, etc.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	0

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

No MEC or MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03 (2013 SI Report, ES and Section 2.3). As a result of no evidence of munitions, Tables 2-9 have been omitted.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			**0**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

No MEC and no MD indicating the presence of MEC have been found since DoD use at Jenningston Training Area MRS and training activities were not known to utilize actual munitions, thus no explosive risk has been identified for MRS03 (2013 SI Report Section 7.1).

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	0

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no evidence of CWM use at the MRS. Based on historical information, the potential munitions used at the site include 155mm high explosive (HE) projectiles; 105mm HE and smoke round (SR) cartridges; 81mm HE and SR cartridges; 75mm HE and SR shells; 60mm HE and SR shells; 4.2-inch HE and SR shells; 3.25-inch target rockets; fragmentation, smoke, and practice hand grenades; practice antitank mines; demolition charge blocks, demolition firing devices, blasting caps, time fuses, and general small arms ammunition (.22, .30, .38, .45, and .50 caliber) (2013 SI Report Section 2.3). As a result, Tables 12-19 are omitted.

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration (μg/L)	Comparison Value (μg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ☐

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration (μg/L)	Comparison Value (μg/L)	Ratios

Table 21 Comments: Groundwater wells are located within the Jenningston Training Area MRS. Therefore, the groundwater exposure pathway is considered potentially complete but has not been quantitatively assessed for human and ecological receptors at the MRS (2013 SI Report, Subchapter 5.3.2.6).

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration (μg/L)	Comparison Value (μg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard	☑

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration (μg/L)	Comparison Value (μg/L)	Ratios

Table 22 Comments: The surface water exposure pathways are incomplete for human and ecological receptors. None of the metals were detected at concentrations exceeding background values (2013 SI Report, Subchapter 5.2.3.6).

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the site's sediment and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☑

Table 23 Comments: The sediment exposure pathways are incomplete for human and ecological receptors. None of the metals were detected at concentrations exceeding background values. (2013 SI Report, Subchapter 5.2.3.6).

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for ecological endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration (μg/L)	Comparison Value (μg/L)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☑

Table 24 Comments: The surface water exposure pathways are incomplete for human and ecological receptors. None of the metals were detected at concentrations exceeding background values (2013 SI Report, Subchapter 5.2.3.6)

Table 25

HHE Module: Sediment– Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for ecological endpoints present in the sediment, select the box at the bottom of the table.

.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☑

Table 25 Comments: The sediment exposure pathways are incomplete for human and ecological receptors. None of the metals were detected at concentrations exceeding background values. (2013 SI Report, Subchapter 5.2.3.6).

Table 26

HHE Module: Surface Soil – Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Soil MC Hazard ☑

Table 26 Comments: The soil exposure pathways are incomplete for human and ecological receptors. The maximum detected concentrations of each metal did not exceed its respective background concentration (2013 SI Report, Subchapter 5.2.4.6).

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Only use this table if there are more than five contaminants present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Remember not to add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard, Migration Pathway, and Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box below.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	***No Known or Suspected MC Hazard***

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the **MRS or Alternative Priority** box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		*No Known or Suspected MC Hazard*	
MRS or ALTERNATIVE PRIORITY				*No Known or Suspected Hazard*	

APPENDIX L

REFERENCE COPIES

NOTE:

Selected pages from reference documents have been included in the hard copy of the Site Inspection Report. An electronic version containing full documents is on the CD-ROM included with this report.

FORMER WV MANEUVER AREA/DOLLY SODS
GRANT, PRESTON, PENDLETON, TUCKER AND RANDOLPH COUNTIES, WEST VIRGINIA
FUDS Property Number G03WV0013

PRELIMINARY ASSESSMENT

VOLUME I
REPORT AND APPENDICES A - K

Final Version

Prepared by
U.S. Army Corps of Engineers
Huntington, WV District
502 8th Street
Huntington, WV 25701-2070

February 2009

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KY 40201-0059

http://www.lrl.usace.army.mil/

CELRL-ED-E

DEC 1 2010

MEMORANDUM FOR Commander, Great Lakes and Ohio River Division, ATTN: CELRD-PDM/Patty Bertsch, 550 Main Street, Rm. 10032, Cincinnati, Ohio 45202-3222

SUBJECT: Defense Environmental Restoration Program – Formerly Used Defense Sites (DERP-FUDS) Inventory Project Report (INPR) for Property No. G03WV0013, WV Maneuver Area/Dolly Sods, Davis, West Virginia

1. Reference ER 200-3-1, Environmental Quality, Formerly Used Defense Sites (FUDS) Program Policy, Department of the Army, U.S. Army Corps of Engineers, Washington, D.C., 20314, 10 May 2004.

2. This memorandum transmits the INPR for the subject DERP-FUDS property. This INPR requests after-the-fact approval for one existing Military Munitions Response Program (MMRP) project and proposes seven new MMRP projects.

3. Office of Counsel, Real Estate, and the Environmental and Munitions Center of Expertise (EM CX) have reviewed this INPR and concur that the property was formerly used by the Department of Defense (DoD) and that the projects described in paragraph 5 below are appropriate.

4. A Property Survey Summary Sheet including property maps and photographs is included at Enclosure 1. The revised FDE, dated 7 January 1992, is included at Enclosure 2. The property had an original FDE, dated 21 May 1990, but was subsequently revised to clarify the eligibility of Blackbird Knob. The revised FDE indicates a Property Number of G03WV0065 which is a duplicate of G03WV0013. The INPR checklist is included at Enclosure 3. The Executive Summary of the WV Maneuver Area/Dolly Sods Preliminary Assessment is included at Enclosure 4.

5. The following is a summary of the existing and proposed projects at the subject property:

a. **G03WV001304 (MMRP)** – *Dolly Sods Removal.* This existing MMRP project was approved on 25 May 1990 to address munitions-related contamination at an area of the property known as the Dolly Sods Region. While it was approved as MMRP project G03WV006500, all funding has been recorded under MMRP project G03WV001304. Consequently, this INPR seeks after-the-fact approval of this on-going MMRP project. The Dolly Sods Region consists of approximately 18,000 acres located in the northwest portion of the WV Maneuver Area/Dolly Sods property. Project 04 has transitioned to the Long-Term Management (LTM) phase. An Archives Search Report (ASR), Engineering Evaluation and Cost Analysis (EE/CA), Remedial Investigation/Feasibility Study (RI/FS), and a Munitions and Explosives of Concern (MEC)

Trip Report: Shavers Mountain Project's *Very* Unusual Find

By Linda Tracy

This trip report spans several trips that began with a trip to the Shavers Mountain Project area by Bill Good (Mountain State Grotto) and his "wizard stick" in the Three Springs Run area, and concluded with the Army indulging in the consumption of ramps.

Bill was poking along in his usual manner when the wizard stick began to wobble wildly. Responding in his usual manner, Bill commenced to digging. He soon got a peek at several metal items in the cave he had uncovered. A few days later, Bill returned with Michael Good and Jeff Stutler (Mountain State Grotto) to investigate further. They soon uncovered a number of pieces of metal: some were disk-shaped embossed with"60 mm 6 rounds," and some were clover-shaped, one of which had "81 mm" stenciled on it in yellow paint. They reported their findings to me at the Forest Service.

Because of the Monongahela National Forest's history as a training ground for the military in the early to mid-1940s and the unexploded ordnance situation in Dolly Sods, the Forest Service has a procedure it follows in response to reports of possible ordnance on the Monongahela National Forest.

An Army unit arrived by evening the same day as the report of possible ordnance.

The cave – not officially named yet, but referred to as Ordnance Trash Pit in the interim - is a 10-foot deep dead bottom pit that is about 3 feet by 4 feet on the pit floor. Although the entrance was filled in when Bill found it, the void exposed when the rock and dirt cap was removed contained highly weathered and damaged popcorn, ribbon, stalactite, and flowstone formations. A pile containing humus, dirt and rock, and ordnance remnants was mounded up in the center of the pit floor.

Early in the morning following their arrival, the Army unit went to Ordnance Trash Pit to make an investigation. They were accompanied by Forest Service folks Carol Whetsell (Recreation Manager) and myself, and Jeff Stutler. Assisted by Jeff's vertical equipment, his technical guidance and skill, and Chuck Hempel's cable ladder, Army staff entered the cave. After examining it, they declared the cave free of ordnance, and safe for continued use and exploration (with proper equipment and skills, of course).

The items found were determined to be discarded mortar shipping or transport containers, and lids or end caps for containers that held mortar rounds. No evidence of unexploded ordnance was found.

During the expedition, some Army staff tried ramps. Then they all ate some, since they had to ride together to return to their base.

Bill and Jeff received a Certificate of Appreciation from Monongahela National Forest Supervisor Clyde Thompson for their time and effort.

Jeff Stutler set up a belay (above) to support personnel (below) investigating Ordnance Trash Pit for additional signs of ordnance. (Photos by Linda Tracy 4/22/06)

Discarded mortar shipping containers and lids that were removed from Ordnance Trash Pit. (Photos by Linda Tracy, 4/22/06)

TUCKER
RANDOLPH
CO
CO
OTTER
CREEK
WILDERNESS
Devils Gulch
Possession Camp Run
Shavers Mtn
Krafts Ridge
Panther Camp Ridge
Sully
Panther Camp Run
Hog Knob
Hog Run
Brushy Ridge
Brushy Ridge Cr
Quarry
Ordnance Trash Pit
Otter Cr
Harper Run
Woodford Run
Glady
Five Lick Ridge
Five Lick Creek
Ford
Beech Pen Ridge
Baker Camp Run
Ash Lick
Birch Lick
Wolf Run
Flannigan Run
Low Gap Run
Low Gap
Hertig Knob
Alpena
ALPENA GAP
Picnic Area
Big Knob
Evenwood
Wymer
Laurel Fork
Snyder Run
Coon Bone Island
Cave Run
Shavers
BM 2601
5,900 2,950 0 5,900 Feet

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

February 8, 2012

Carlos Hernandez
Eco & Associates, Inc.
1855 West Katella Avenue, Suite 340
Orange, California 92867

SUBJECT: United States Army Corps of Engineers
West Virginia Maneuver Area
Town of Davis, Tucker County, West Virginia

Dear Mr. Hernandez:

The United States Environmental Protection Agency (EPA) Region III Drinking Water Branch is in receipt of your emails dated January 10 and 18, 2012, regarding the above referenced project. Eco & Associates, Inc., on behalf of the United States Army Corps of Engineers, is conducting an environmental study of the former West Virginia Maneuver Area to assess potential impacts to surface and ground waters in the vicinity of the defunct training area. You requested the location of wellhead protection areas, tribal drinking water sources, and public and private water supply wells within four miles of the MRS05 and MRS06 sites as outlined in the GIS shapefile you conveyed on January 19, 2012. You also requested the location of surface water intakes within fifteen miles of these sites.

This office neither maintains a database of delineated state or local source water protection areas nor a database of private water supply wells; you are encouraged to contact the West Virginia Department of Health and Human Resources for assistance in obtaining these areas, if available. Also, please be advised that at present there are no federally recognized tribal areas within EPA Region III.

Furthermore, the specific locations of public water supply wells and intakes are treated as sensitive information and, as such, we are disinclined to release the exact locations of these sources. However, based upon the GIS layer of the MRS05 and MRS06 sites you submitted, we have determined that the following public water systems and/or sources may fall within the aforementioned radii:

State	County	Public Water System	PWSID	Source Type	Buffer
WV	Grant	Town of Petersburg	WV3301204	Intake	15 miles of MRS05 and MRS06
WV	Tucker	Canaan Valley State Park	WV9947044	Intake	15 miles of MRS05 and MRS06
WV	Tucker	Hamrick PSD	WV3304704	Intake	15 miles of MRS05 and MRS06
WV	Tucker	City of Parsons	WV3304707	Intake	15 miles of MRS05 and MRS06
WV	Tucker	Davis Water Works	WV3304701	2 Intakes	15 miles of MRS05 and MRS06

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Customer Service Hotline: 1-800-438-2474

State	County	Public Water System	PWSID	Source Type	Buffer
WV	Tucker	City of Thomas	WV3304709	Intake	15 miles of MRS05 and MRS06
WV	Grant	Mountain Top PSD	WV3301205	Intake	15 miles of MRS05 and MRS06
WV	Tucker	Timberline Four Season Resort Management	WV3304711	Well	4 miles of MRS05 and MRS06
WV	Tucker	Canaan Valley National Wildlife Reserve	WV9947006	Well	4 miles of MRS05 and MRS06
WV	Tucker	Canaan Village Inn	WV9947029	Well	4 miles of MRS05 and MRS06
WV	Tucker	Canaan Valley Stores	WV9947036	Well	4 miles of MRS05 and MRS06
WV	Tucker	Deerfield Village	WV9947039	3 Wells	4 miles of MRS05 and MRS06
WV	Tucker	WV Resorts	WV9947002	2 Wells	4 miles of MRS05 and MRS06
WV	Tucker	Beaver Ridge Resort	WV9947032	2 Wells	4 miles of MRS05 and MRS06
WV	Tucker	North Point Subdivision	WV9947042	Well	4 miles of MRS05 and MRS06
WV	Tucker	Black Bear Woods	WV9947031	4 Wells	4 miles of MRS05 and MRS06
WV	Tucker	Mettiki Coal LLC-Mtn View Mine	WV9947047	Well	4 miles of MRS05 and MRS06

If you would like to discuss this further, please contact me at (215) 814-5733.

Sincerely,

Alysa Suero

Alysa Suero, P.G.
Lead, Drinking Water Sensitive Data Security
Drinking Water Branch

MRS03 Jenningston
Red Creek, WV 26289

Inquiry Number: 3360517.3w
July 10, 2012

EDR DataMap™ Well Search Report

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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GEOCHECK VERSION 2.1
SUMMARY

FEDERAL DATABASE WELL INFORMATION

MAP ID	WELL ID
1	USGS2249202
2	USGS2249197
5	USGS2249167
7	USGS2249374
7	USGS2249375
8	USGS2249367
9	USGS2249366
10	USGS2249362
11	USGS2249361
13	USGS2249356
13	USGS2249354
14	USGS2249355
15	USGS2249350
16	USGS2249340
17	USGS2249338
18	USGS2249339
20	USGS2249331
22	USGS2249328
23	USGS2249327
27	USGS2249320
27	USGS2249319
28	USGS2249316
29	USGS2249313
30	USGS2249311
31	USGS2249309
32	USGS2249310
33	USGS2249306
34	USGS2249304
35	USGS2249302
37	USGS2249297
38	USGS2249298
38	USGS2249296
39	USGS2249295
41	USGS2249293
42	USGS2249292
43	USGS2249290
44	USGS2249289
45	USGS2249286
46	USGS2249284
47	USGS2249281
48	USGS2249278
49	USGS2249277
49	USGS2249481
50	USGS2249276
51	USGS2249479

GEOCHECK VERSION 2.1
SUMMARY

FEDERAL DATABASE WELL INFORMATION

MAP ID	WELL ID
48	USGS2249480
52	USGS2249475
53	USGS2249474
54	USGS2249468
55	USGS2249466
56	USGS2249460
57	USGS2249454
59	USGS2246544
59	USGS2246540
60	USGS2246519
61	USGS2246514
62	USGS2246513
63	USGS2246511
65	USGS2246477
66	USGS2246475
67	USGS2246472
67	USGS2246470
70	USGS2246461
72	USGS2246459
73	USGS2246457
74	USGS2246456
75	USGS2246455
76	USGS2246452
77	USGS2246450
78	USGS2246680
79	USGS2247064
80	USGS2246676
82	USGS2246673
79	USGS2246675
79	USGS2246674
79	USGS2246671
83	USGS2246672
83	USGS2246670
79	USGS2247065
83	USGS2246669
84	USGS2246668
83	USGS2246667
89	USGS2246666
90	USGS2246655

STATE WATER WELL INFORMATION

MAP ID	WELL ID
5	1395
6	2595
6	2594
17	2589
19	2588
19	2587
21	2620
24	2621
26	1392
27	2586

GEOCHECK VERSION 2.1
SUMMARY

STATE WATER WELL INFORMATION

MAP ID	WELL ID
27	1391
27	2603
31	1377
36	1390
40	2574
42	1388
47	2553
47	1389
58	2597
64	1765
68	1755
69	2583
76	334
81	2567
79	1306
79	1307
85	2286
79	1296
86	2497
87	1305
88	1756
88	1286
88	1285
88	2582

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID
1	WVOG80000054947
2	WVOG80000017305
3	WVOG80000034863
4	WVOG80000099438
5	WVOG80000055099
6	WVOG80000037751
7	WVOG80000055092
8	WVOG80000055093
9	WVOG80000037753
10	WVOG80000078505
11	WVOG80000001950
12	WVOG80000034864
13	WVOG80000099442
14	WVOG80000001955
15	WVOG80000047053
16	WVOG80000000415
17	WVOG80000091410
18	WVOG80000101788
19	WVOG80000091765
20	WVOG80000050133
21	WVOG80000030474
22	WVOG80000001952
23	WVOG80000001951
24	WVOG80000001953
25	WVOG80000032420

GEOCHECK VERSION 2.1
SUMMARY

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID
26	WVOG80000050135
27	WVOG80000078640
28	WVOG80000078643
29	WVOG80000078637
30	WVOG80000078509
31	WVOG80000078514
32	WVOG80000007759
33	WVOG80000078642
34	WVOG80000050918
35	WVOG80000108746
36	WVOG80000035698
37	WVOG80000090085
38	WVOG80000082232
39	WVOG80000022918
40	WVOG80000010091
41	WVOG80000015112
42	WVOG80000065409
43	WVOG80000065403
44	WVOG80000073485
45	WVOG80000075635
46	WVOG80000010089
47	WVOG80000065404
48	WVOG80000010084
49	WVOG80000010090
50	WVOG80000092343
51	WVOG80000050929
52	WVOG80000010082
53	WVOG80000065410
54	WVOG80000092334
55	WVOG80000010086
56	WVOG80000010087
57	WVOG80000033982
58	WVOG80000033981
59	WVOG80000050928
60	WVOG80000015910
61	WVOG80000033976
62	WVOG80000010088
63	WVOG80000084614
64	WVOG80000010085
65	WVOG80000065405
66	WVOG80000041195
67	WVOG80000065402

PUBLIC WATER SUPPLY SYSTEM INFORMATION

Map ID: 3
PWS ID: WV9947041
PWS Name: CAMP KIDD
HOOLY MEADOWS COUNTRY CLUB RD
PARSONS, WV 26287
PWS currently has or had major violation(s) or enforcement:

GEOCHECK VERSION 2.1
SUMMARY

PUBLIC WATER SUPPLY SYSTEM INFORMATION

Map ID: 4
PWS ID: WV3304707
PWS Name: COMMUNITY OF PARSONS
341 SECOND ST.
341 SECOND STREET
PARSONS, WV 26287
PWS currently has or had major violation(s) or enforcement:

Map ID: 12
PWS ID: WV3304704
PWS Name: HAMRICK PSD
PO BOX 228
HENDRICKS, WV 26271
PWS currently has or had major violation(s) or enforcement:

Map ID: 25
PWS ID: WV3304707
PWS Name: COMMUNITY OF PARSONS
341 SECOND ST.
341 SECOND STREET
PARSONS, WV 26287
PWS currently has or had major violation(s) or enforcement:

Map ID: 71
PWS ID: WV3304204
PWS Name: COMMUNITY OF HARMAN
BOX 68
HARMAN, WV 26270
PWS currently has or had major violation(s) or enforcement:

Map ID: 87
PWS ID: WV9942043
PWS Name: LINDA BURKE
BOWDEN, WV 26254
PWS currently has or had major violation(s) or enforcement:

USGS TOPOGRAPHIC MAP(S)

38079-H4 LANEVILLE, WV
38079-H5 HARMAN, WV
38079-H6 BOWDEN, WV
38079-H7 ELKINS, WV
39079-A4 BLACKWATER FALLS, WV
39079-A5 MOZARK MOUNTAIN, WV
39079-A6 PARSONS, WV
39079-A7 MONTROSE, WV

AREA RADON INFORMATION

GEOCHECK VERSION 2.1
SUMMARY

AREA RADON INFORMATION

EPA Region 3 Statistical Summary Readings for Zip Code: 26287

Number of sites tested: 26.

Maximum Radon Level: 14.6 pCi/L.
Minimum Radon Level: 0.3 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
20 (76.92%)	5 (19.23%)	1 (3.85%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26260

Number of sites tested: 12.

Maximum Radon Level: 2.3 pCi/L.
Minimum Radon Level: 0.6 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
12 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26283

Number of sites tested: 15.

Maximum Radon Level: 12.3 pCi/L.
Minimum Radon Level: -0.2 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
12 (80.00%)	2 (13.33%)	1 (6.67%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26269

Number of sites tested: 7.

Maximum Radon Level: 4.8 pCi/L.
Minimum Radon Level: 1.1 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
4 (57.14%)	3 (42.86%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

GEOCHECK VERSION 2.1
SUMMARY

AREA RADON INFORMATION

EPA Region 3 Statistical Summary Readings for Zip Code: 26271

Number of sites tested: 3.

Maximum Radon Level: 3.7 pCi/L.
Minimum Radon Level: 3.1 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
3 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26241

Number of sites tested: 187.

Maximum Radon Level: 15.7 pCi/L.
Minimum Radon Level: 0.3 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
149 (79.68%)	30 (16.04%)	8 (4.28%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26254

Number of sites tested: 2.

Maximum Radon Level: 16.1 pCi/L.
Minimum Radon Level: 16.1 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
0 (0.00%)	0 (0.00%)	2 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26270

Number of sites tested: 4.

Maximum Radon Level: 6.2 pCi/L.
Minimum Radon Level: 0.4 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
3 (75.00%)	1 (25.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

GEOCHECK VERSION 2.1
SUMMARY

AREA RADON INFORMATION

EPA Region 3 Statistical Summary Readings for Zip Code: 26263

Number of sites tested: 5.

Maximum Radon Level: 2.5 pCi/L.
Minimum Radon Level: 0.8 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
5 (100.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)

EPA Region 3 Statistical Summary Readings for Zip Code: 26884

Number of sites tested: 17.

Maximum Radon Level: 23.7 pCi/L.
Minimum Radon Level: 2.3 pCi/L.

pCi/L <4	pCi/L 4-10	pCi/L 10-20	pCi/L 20-50	pCi/L 50-100	pCi/L >100
3 (17.65%)	8 (47.06%)	4 (23.53%)	2 (11.76%)	0 (0.00%)	0 (0.00%)

Federal Area Radon Information for TUCKER COUNTY, WV

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	4.800 pCi/L	83%	17%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

Federal Area Radon Information for RANDOLPH COUNTY, WV

Number of sites tested: 16

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	2.013 pCi/L	94%	6%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	3.525 pCi/L	75%	25%	0%

Federal Area Radon Information for PENDLETON COUNTY, WV

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.633 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	7.825 pCi/L	50%	50%	0%

Received
Sep 2, 2011
sc

WEST VIRGINIA
Division of Culture and History

The Culture Center
1900 Kanawha Blvd., E.
Charleston, WV 25305-0300
Randall Reid-Smith, Commissioner
Phone 304.558.0220 • www.wvculture.org
Fax 304.558.2779 • TDD 304.558.3562
EEO/AA Employer

August 29, 2011

Mr. Gabriel Cosyleon
Senior Scientist
Parsons
1700 Broadway
Suite 900
Denver, CO 80290

RE: Army National Guard Munitions Response Sites – Proposed Site Inspections
FR#: 11-990-Multi

Dear Mr. Cosyleon:

We have reviewed the information submitted for the above referenced project. As required by Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800: "Protection of Historic Properties," we submit our comments.

According to the submitted information, Parsons is performing site inspections (SI) for the Department of Defense (DoD) under the US Army Corps of Engineers (COE) for the Formerly Used Defense Sites (FUDS) Military Munitions Response Program (MMRP). The sites are part of the former West Virginia Maneuver Area/Dolly Sods FUDS. The Munitions Response Sites (MRS) include: MRS01 – Dailey Infiltration Camp; MRS02 – WV Maneuver Area Ammunition Depot; MRS03 – Jenningston Training Area; MRS04 - Fore Knobs/Bear Rocks Firing Range; MRS05 – Beardon Know Firing Range; MRS06 – Brown/Cabin Mountain Firing Ranges; and MRS07 – Buena Small Arms Firing Ranges.

A search of our records indicates that archaeological resources have been recorded across the landscape within the general vicinity of the proposed project areas. However, it is our understanding that the project consists of taking samples from the ground that are a half-inch in diameter and zero to two inches in depth. It is also our understanding that no construction, auguring or trenching is proposed for this project, which will result in minimal or no new disturbance. As a result, we are of the opinion that the proposed project will have no adverse effect to any archaeological resources that are eligible for or listed in the National Register of Historic Places. No further consultation is necessary.

We appreciate the opportunity to be of service. *If you have any questions regarding our comments or the Section 106 Process, please contact Lora A. Lamarre-DeMott, Senior Archaeologist, at 304-558-0220*

Sincerely,

Susan M. Pierce

Susan M. Pierce
Deputy State Historic Preservation Officer

SMP/LAL

From:	Johnson, Lauren
To:	ssaunders@ecoinc.info
Subject:	FW: Monongahela NF maneuver area sites
Date:	Wednesday, July 27, 2011 2:46:49 PM

From: Johnson, Lauren
Sent: Monday, July 25, 2011 2:31 PM
To: 'Carlos Hernandez'; 'Opjit Ghuman'
Cc: Kelley, Laura; Cosyleon, Gabriel
Subject: FW: Monongahela NF maneuver area sites

Carlos and Opjit,

This is an email from Eric Sandeno with the Forest Service regarding three of the MRSs, and whether they have any archeological information on these sites.

Lauren.

Hi Lauren

I reviewed three locations with our Forest Archaeologist (Dailey Infiltration Site, Jenningston Training Area, Fore Knobs).

Dailey Infiltration Site - other than US Army use, no other Cultural Resource issues have been indicated at this location. It had a full Cultural Resource survey completed in 1989.

Jenninston Training Area - Based on our discussion on Thursday, much of the area was removed from study, other than the cave/sinkhole area. The Archeologist has been to this site and has no concerns for cultural resources. Our Cave and Karst Manager has the exact location and will provide me information, which I will forward to you.

Fore Knobs - As this is basically an extension of the Dolly Sods site, he has reviewed the location for cultural resource issues and has none.

If you have any questions, please let me know.

ERIC SANDENO
Recreation/Wilderness Program Manager
Monongahela National Forest
200 Sycamore Street
Elkins, West Virginia 26241
Region 9 Recreation Accessibility Coordinator
304-636-1800, ext 280