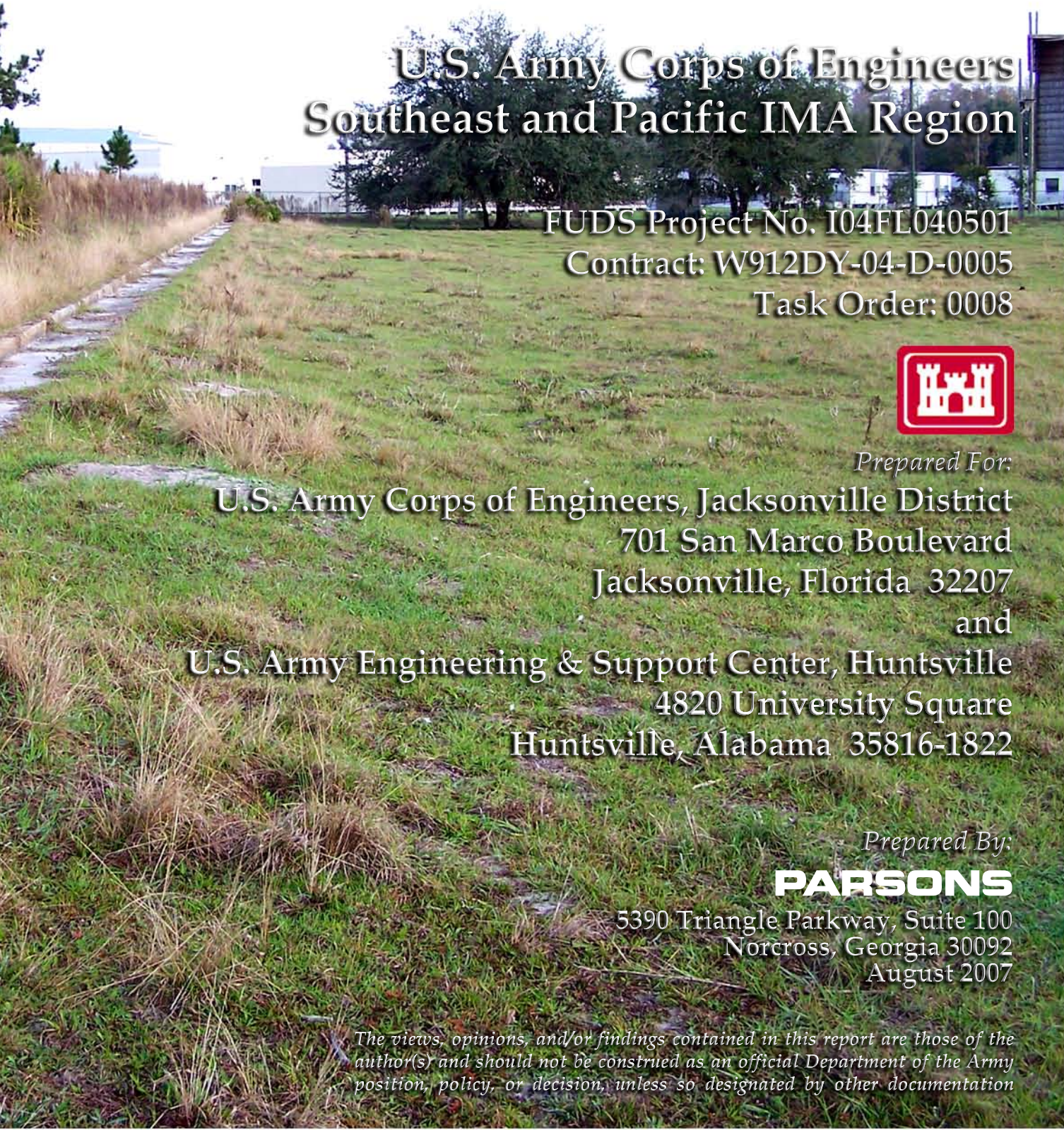
FINAL
Site Inspection Report
Pinecastle Jeep Range Site
Orange County, Florida



U.S. Army Corps of Engineers
Southeast and Pacific IMA Region

FUDS Project No. I04FL040501
Contract: W912DY-04-D-0005
Task Order: 0008

Prepared For:

U.S. Army Corps of Engineers, Jacksonville District
701 San Marco Boulevard
Jacksonville, Florida 32207
and
U.S. Army Engineering & Support Center, Huntsville
4820 University Square
Huntsville, Alabama 35816-1822

Prepared By:

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092
August 2007

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Parsons has completed the Final Site Inspection report for the Pinecastle Jeep Range, Orange County, Florida. 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, as defined in the Quality Control Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions was verified. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the 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 13, 2007

Study/Design Team Leader and Team Members

August 13, 2007

Independent Technical Review Team Leader

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 13, 2007

Parsons Program Manager(s)

PARSONS
Parsons Infrastructure & Technology Group, Inc.
5390 Triangle Parkway • Suite 100 • Norcross, Georgia 30092 • (770) 446-4900 • Fax: (770) 446-4910 • www.parsons.com

August 13, 2007

U.S. Army Engineer Center Huntsville
CEHNC-OE-DC (Mr. Doug Garretson)
4820 University Square
Huntsville, AL 35816-1822
(256)895-1066

Subject: Contract W912DY-04-D-0005, Delivery Order 0008
MMRP SI for SE and Pacific IMA Region – Final SI Report,
Pinecastle Jeep Range, Florida

Dear Mr. Garretson:

Parsons has prepared this Final Site Inspection (SI) Report in accordance with the Performance Work Statement (PWS) to include the completed Munitions Response Site Prioritization Protocol (MRSPP). In addition, copies of previous reports are included as appendices. Two copies have been provided for your record.

We have simultaneously forwarded 5 copies of this document to Mr. Charles Fales of the Jacksonville District for his record. We have submitted single copies of this Final document to HTRW CX and MM CX. Electronic copies have also been provided.

If you have any questions or comments, please contact me at (678) 969-2384 or (404) 606-0346 (cell) or the Deputy Project Manager (Ms. Laura Kelley) at (678) 969-2437.

Sincerely,

PARSONS

Don Silkebakken, P.E.
MMRP SI Project/Program Manager

cc: Charles Fales – 5 copies/5 CDs
Betina Johnson/Deborah Walker (MM CX) – 1 copy/1 CD
Heidi Novotny (HTRW CX) - 1 CD
Jeff Waugh – 1 CD
Laura Kelley/Project File (744647.03000)

U.S. Army Corps of Engineers
Southeast and Pacific IMA Region

FINAL
Site Investigation Report
Pinecastle Jeep Range
Orange County, Florida

FUDS Project No. I04FL040501
August 2007

In Support of

FUDS MMRP Site Inspections Project

Prepared by:
PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Prepared for:
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701 San Marco Boulevard
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and

U.S. Army Engineering and Support Center, Huntsville
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ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
AAB	Army Air Base
AAF	Army Air Field
ADR	Automatic Data Review
ARC	Annual Report to Congress
ASR	Archive Search Report
bgs	Below Ground Surface
BTAG	U.S. Army Biological Technical Assistance Group
CCV	Continuing Calibration Verification
CEMVS	USACE St. Louis District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAJ	USACE Jacksonville District
CFR	Code of Federal Regulations
COC	Chain-of-Custody
CSEM	Conceptual Site Exposure Model
CSM	Conceptual Site Model
CWM	Chemical Warfare Material
CZMP	Coastal Zone Management Program
DEP	Defense Environmental Programs
DERP	Defense Environmental Restoration Program
DOACS	Department of Agriculture and Consumer Services
DoD	Department of Defense
DQO	Data Quality Objective
DT	Dilution Test
EDD	Electronic Data Deliverable
EPA	Environmental Protection Agency
EPD	Environmental Protection Division
ER	Engineer Regulation
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FL SHPO	Florida State Historic Preservation Office
FNAI	Florida Natural Areas Inventory
fps	Feet Per Second
FTL	Field Team Leader
FTM	Field Team Member
FTS	Field Team Safety
FUDS	Formerly Used Defense Site

FUDSMIS	FUDS Management Information System
FWC	Fish and Wildlife Conservation Commission
GIS	Geographic Information System
GPS	Global Positioning System
HRS	Hazard Ranking System
ICAL	Initial Calibration
IH	Interstate Highway
INPR	Inventory Project Report
LCS	Laboratory Control Sample
MC	Munitions Constituent
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
mg/kg	Milligrams Per Kilograms
MQL	Method Quantitation Limit
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MSSL	Media-Specific Soil Screening Level
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAI	No DoD Action Indicated
NHA	National Heritage Areas
NHL	National Historic Landmarks
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
NRIS	National Register Information System
NWI	National Wetlands Inventory
NWRS	National Wildlife Refuge System
OCHP	Office of Cultural and Historical Programs
Parsons	Parsons Corporation
PCL	Protective Concentration Level
PSAP	Programmatic Sampling and Analysis Plan
PRG	Preliminary Remediation Goal
PWP	Programmatic Work Plan
QA	Quality Assurance
QC	Quality Control

QR	Qualitative Reconnaissance
RAC	Risk Assessment Code
RI/FS	Remedial Investigation/Feasibility Study
RL	Reporting Limit
RPD	Relative Percent Difference
SDG	Sample Delivery Group
SI	Site Inspection
SLERA	Screening Level Ecological Risk Assessment
SOP	Standard Operating Procedure
SPD RSC	South Pacific Division Range Support Center
SSL	Soil Screening Level
SS-WP	Site-Specific Work Plan
STL	Severn Trent Laboratories
SVT	Site Visit Team
T&E	Threatened and Endangered
TCRA	Time Critical Removal Action
TESS	Threatened and Endangered Species System
TPP	Technical Project Planning
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAESCH	United States Army Engineering and Support Center, Huntsville
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
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance

GLOSSARY OF TERMS

Anomaly	Any item that deviates from the expected subsurface ferrous and non-ferrous material at a site (*i.e.*, pipes, power lines, *etc.*).
Magnetometer	An instrument for measuring the strength of a magnetic field; used to detect buried iron and other metal objects.
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 nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.
Munitions Debris	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 Site (MRS)	A discrete location 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

ES.1 The objective of this site inspection (SI) was to determine whether the former Pinecastle Jeep Range site in Orange County, Florida warrants further evaluation under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) beyond the SI stage. The recommendation for each munitions response site (MRS) located within the site could include further evaluation as part of a Remedial Investigation/Feasibility Study (RI/FS), a Time Critical Removal Action (TRCA), Non Time Critical Removal Action (NTCRA), or No Department of Defense (DoD) Action Indicated (NDAI).

ES.2 The inspection of the former Pinecastle Jeep Range, which operated as a training, demonstration, and tactical bombing and strafing range from 1943 to 1946, was performed to confirm known target locations and to evaluate the evidence for the presence of munitions and explosives of concern (MEC) and munitions debris (MD) at the site. To accomplish this objective, qualitative reconnaissance (QR) and munitions constituent (MC) sampling were performed.

ES.3 The SI technical approach was agreed on at the April 12, 2006 Technical Project Planning (TPP) meeting by the TPP Team. At the time of the TPP meeting and preparation of the Site-Specific Work Plan (SS-WP) there was sufficient information to presume a likely recommendation for the next phase. It was proposed during the TPP process and documented in the SS-WP that collection of sixteen soil samples and conduct of QR across the site would be sufficient to meet the SI project objectives.

ES.4 For the purposes of this SI sixteen soil samples were collected, as proposed in the SS-WP and agreed to by the TPP Team (with the exception of sample PJR-TR-SS-02-05), from the three of the four MRSs comprising the impact area of the former Pinecastle Jeep Range as having the highest likelihood for residual MEC and MC contamination, if present (Figure ES-1). The SI evaluation also included performing approximately 34.08 miles of QR. The sixteen soil samples collected from the target area were selected with maximum bias to represent the highest likelihood for the presence of MEC or MC contamination.

ES.5 ***During the QR, munitions debris (MD) was identified at the site***. The QR located a small pile of separated .50 caliber cartridges and balls, that appeared to have been collected and left in one area next to the southeast end of the concrete jeep range (Range Complex 1 - MRS 03). Multiple large craters and three possible DoD-related burial pits were located in Range Complex No. 2 (MRS 04), although no MD was found in this area. Sample PJR-TR-SS-02-05 was collected from one of the craters found. This sample was initially proposed in the Air-to-Ground Rocket Range (MRS 02), but due to lack of ROE for the proposed sample location, the sample was relocated. No other MEC was identified within the FUDS site boundary during the SI; however, after completion of the field work one landowner reported possible MEC on his property located within MRS 04. An emergency response action was conducted by the explosives ordnance disposal (EOD) team from Patrick Air Force Base on July 16, 2007. ***The EOD incident report confirmed the disposal of unexploded ordnance (UXO)***,

including three Practice Fragmentation Bombs with live fuses and one M64 6 lb. live incendiary bomblet.

ES.6 TestAmerica, Inc. (formerly, Severn Trent Laboratories [STL]) in Arvada, Colorado analyzed soil samples for explosives and metals. The analytical results from the soil sampling were screened by comparison to the lower of the, Florida Administrative Code (FAC) 62-777 and the Leachability to Groundwater FAC 62-777. Nitroglycerin was detected in three soil samples collected from one of the four MRS sites. Potassium and Titanium were detected above the FAC in all the soil samples collected.

Table ES.1
Summary of Results
Former Pinecastle Jeep Range

MRS	MEC/MD Found	MC Contamination	Recommendation
Chemical Demonstration Range (MRS 01)	No	No	NDAI for original DoD usage; however, this MRS is entirely within MRS 04. MRS 01 should be included in any future response actions conducted for MRS 04.
Air-to-Ground Rocket Range (MRS 02)	No	No, although MC detected just outside boundary of MRS 02 near the firing point.	RI/FS
Range Complex No. 1 (MRS 03)	Yes	Yes	RI/FS
Range Complex No. 2 (MRS 04)	Yes[1]	Yes	TCRA, followed by RI/FS

1) MEC (UXO) reported post-SI by landowner. Emergency response conducted by Patrick Air Force Base EOD Team.

ES.7 Munitions were used at the former Pinecastle Jeep Range from 1943 to 1946. The reported munitions included AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M38A2 100-lb Practice Bomb; HVAR 5-inch Rocket, 11.75-inch Practice Tiny Tim Rocket; M38A2 100-pound practice bombs, M1A1 spotting charges, and M3 and M5 spotting charges. Only small arms were located during the SI.

ES.8 An exposure pathway is not considered to be completed unless all four of the following elements are present (USEPA, 1989):

- A source and mechanism for chemical release;

- An environmental transport/exposure medium;
- A receptor exposure point; and
- A receptor and a likely route of exposure at the exposure point.

ES.9 One explosive compound and two metals were detected in the Air-to-Ground Rocket Range (MRS 02) soil samples above the agreed-to screening levels or background. Therefore, it is likely that human or ecological receptors would be exposed. Completed exposure pathways were identified at Air-to-Ground Rocket Range (MRS 02), Range Complex No. 1 (MRS 03), and Range Complex No. 2 (MRS 04), and potential risks to human health and the environment are likely.

ES.10 Due to the confirmed MEC at Range Complex No. 2 (MRS 04, encompassing MRS 01), it is recommended that a TCRA be conducted in the area immediately around the documented MEC, followed by an RI/FS for the remaining MRS land. Due to the presence of large craters, the past DoD use of the jeep track, the existence of possible DoD-related burial areas, and the rapid encroachment of residential and commercial development located within the Air-to-Ground Rocket Range (MRS 02), it is recommended that this MRS also proceed to an RI/FS. Further evaluation of MC is recommended at this site during the RI/FS based on the screening level risk assessment indicating potential risk to human and ecological receptors.

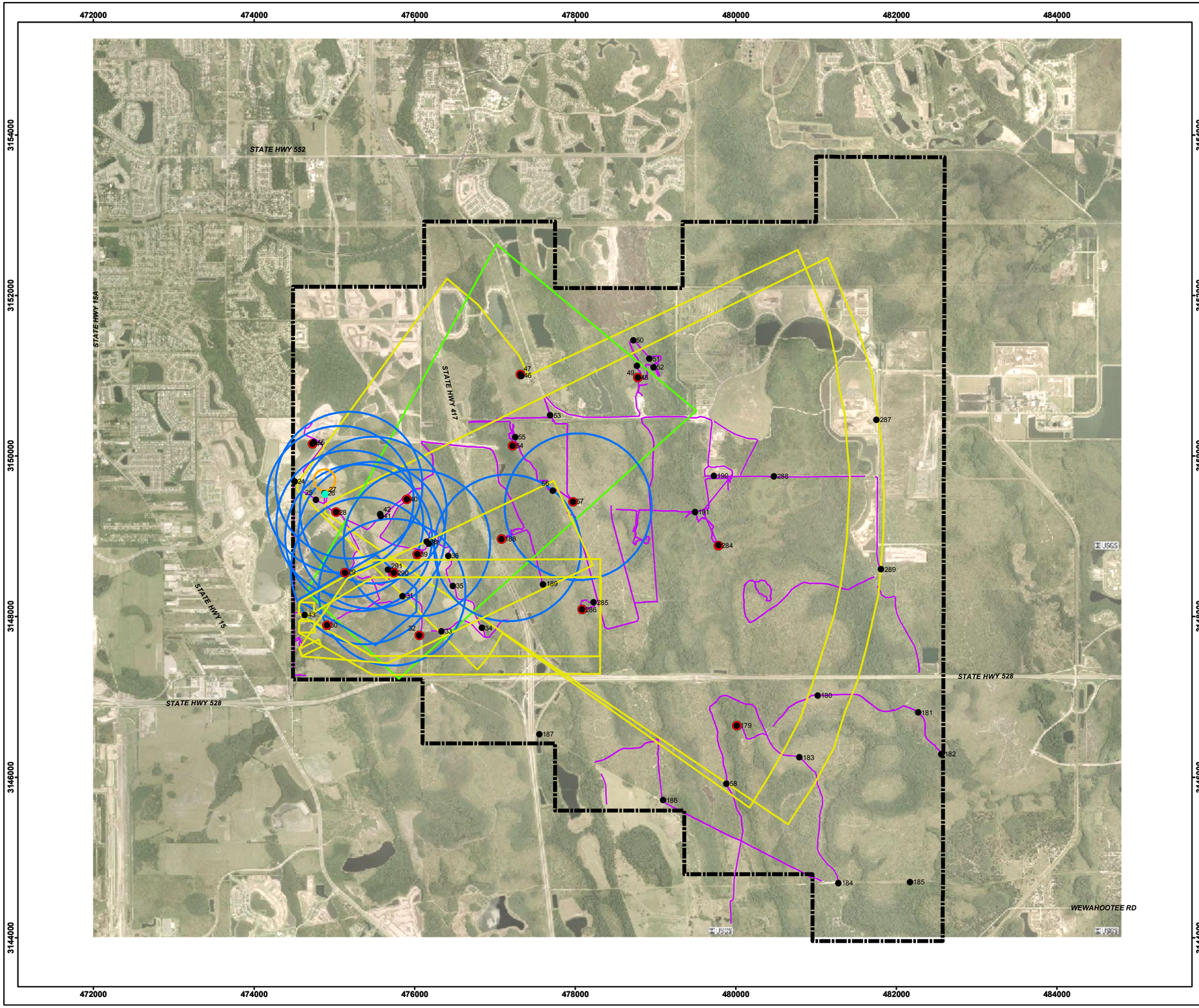

Figure ES.1

General Site Overview
Pinecastle Jeep Range

Orlando, Florida
Orange County

Legend

- Small Arm (.50 Cal) Location
- Other Field Observation Location
- Soil Sample Location
- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- Qualitative Reconnaissance Track
- FUDS Boundary

N

Image Source: 2002 Orthophotos
Projection: UTM Zone 17 NAD83, Map Units in Meters

Feet
4,000 2,000 0 4,000

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	General Site Overview		
DRAWN BY: BT			
CHECKED BY: JU	SCALE: As Shown	PROJECT NUMBER: 744647.03000	
SUBMITTED BY: DS	DATE: August 2007	PAGE NUMBER: ES-4	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\FigES_1.mxd		

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Parsons Corporation (Parsons) received Contract No. W912DY-04-D-0005, Task Order No. 0008, from the United States Army Corps of Engineers (USACE), Engineering and Support Center, Huntsville (USAESCH) to perform a Site Inspection (SI) at the Pincastle Jeep Range Formerly Used Defense Site (FUDS) located in Orange County, Florida. The land comprising the range was and still is in some areas, primarily swamp land. The U.S. Government leased 12,483 acres in 1943 to establish a gunnery and demonstration range for testing in the methods of bombing and strafing. The range included a ground-to-ground moving jeep track target, turret gunnery range, air-to-ground rocket range, aerial targets and several rifle ranges for small arms. As such, the Pinecastle Jeep Range has been declared FUDS #I04FL040501. For the purposes of this SI Report, the Chemical Demonstration Range, Air-to-Ground Rocket Range, Range Complex No. 1, and Range Complex No. 2 have been established as Munitions Response Sites (MRSs). Figure 1.1 depicts the FUDS boundaries for the overall site. The coordinates for the center point of each MRS is listed in Table 1.1. The coordinates are in meters [Universal Transverse Mercator (UTM) Zone 11 North American Datum (NAD) 83].

Table 1.1
Former Pinecastle Jeep Range MRSs

MRS	MRS Acreage*	X-Coordinate (meters)	Y-Coordinate (meters)
MRS 01 – Chemical Demonstration Range	5 acres	474894.09 E	3149732.66 N
MRS 02 – Air-to-Ground Rocket Range	1419 acres	477454.78 E	3150951.68 N
MRS 03 – Range Complex No. 1	5194 acres	474966.16 E	3147675.10 N
MRS 04 – Range Complex No. 2	2452 acres	476377.02 E	3149077.59 N

*- Acreage based on review of the Archives Search Report (ASR) Supplement and FUDS Management Information System (FUDSMIS).

1.2 PROJECT OBJECTIVES

1.2.1 The Department of Defense (DoD) has 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, DoD's Executive Agent for the FUDS program.

1.2.2 Pursuant to USACE's Engineer Regulation (ER) 200-3-1 (USACE, 2004b) and the Management Guidance for the Defense Environmental Response Program (DERP) (Office of the Deputy Under Secretary of Defense [Installations and Environment], September 2001), USACE is conducting FUDS response activities in accordance with the DERP statute (10 United States Code [USC] 2701 et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC §9620), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations (CFR) Part 300). As such, USACE is conducting remedial SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

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

1.2.4 The primary objective of the MMRP SI is to determine whether a FUDS project warrants further response action under CERCLA or not. The SI collects a sufficient amount of information necessary to make this determination. Additionally, it (i) determines the potential need for a removal action (ii) collects or develops additional data, as appropriate, for Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA); and (iii) collects data, as appropriate, to characterize the release for effective and rapid initiation of the Remedial Investigation and Feasibility Study (RI/FS). An additional objective of the MMRP SI is to collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

1.2.5 The SI was performed to evaluate the potential for MEC/MC contamination at the four MRSs. All work adhered to the DERP for FUDS and relevant U.S. Army regulations and guidance for MMRP programs. As specified in the task order, this report is prepared to summarize the SI sampling events for the Pinecastle Jeep Range and presents an accounting of the MEC/MC contamination within the MRSs at the site.

1.3 PROJECT SCOPE

1.3.1 No MEC/MD of any kind was observed during the 1997 field visit in support of the ASR; however, the ASR team speculated ordnance contamination, supported by unspecified field evidence. At the time of the Technical Project Planning (TPP) meeting, no confirmed MEC findings are known to have been reported during the post-military and on-going use as the Pinecastle Jeep Range. As a result, the TPP Team concurred that the SI would proceed in a manner to support a RI/FS. The SI for the Pinecastle Jeep Range evaluated the potential presence of MEC (to include small arms) and MC in each MRS.

1.3.2 The USACE Jacksonville (CESAJ) facilitated a TPP meeting on April 12, 2006 that included representatives of CESAJ, Parsons, Florida Department of Environmental Protection, and Orange County Environmental Protection Division. The TPP Team developed and unanimously concurred with the final Technical Approach presented in the Final TPP Memorandum (Parsons, 2006b), including the locations of the sixteen surface soil samples, sampling methods, and laboratory analyses for explosives, metals constituents. The TPP Team concurred that comparison criteria for soil sample results would be the Florida Administrative Code (FAC) 62-777 Soil Cleanup Target Levels, and Leachability to Groundwater FAC 62-777.

1.3.3 The TPP Team concurred that the SI data collection efforts would focus on screening for MC contamination in soil. A total of 16 surface soil samples along with the appropriate Quality Assurance/Quality Control (QA/QC) samples and field duplicates were collected within the Pinecastle Jeep Range. All of the initial proposed ambient and surface water samples from the TPP meeting were agreed to be converted to surface soil samples to aid in the support of an RI/FS.

1.3.4 The primary project planning documents used to perform the SI include the Site-Specific Work Plan (SS-WP) Addendum for the Pinecastle Jeep Range (Parsons 2006c), the Programmatic Work Plan (PWP) (Parsons, 2005), the Programmatic Sampling and Analysis Plan (PSAP) (USACE, 2005), and the PSAP Addendum (Parsons, 2006b). The performance work statement for this project is in Appendix A.

1.3.5 After the conduct of the SI, a landowner reported possible MEC on his land located in Range Complex No. 2 (MRS 04) to the local law enforcement. An emergency response was initiated and the explosives ordnance disposal (EOD) team from Patrick Air Force Base responded. The EOD team reportedly disposed of unexploded ordnance (UXO) including, three Practice Fragmentation Bombs with live fuses and one M64 6 lb. live incendiary bomblet by detonation.

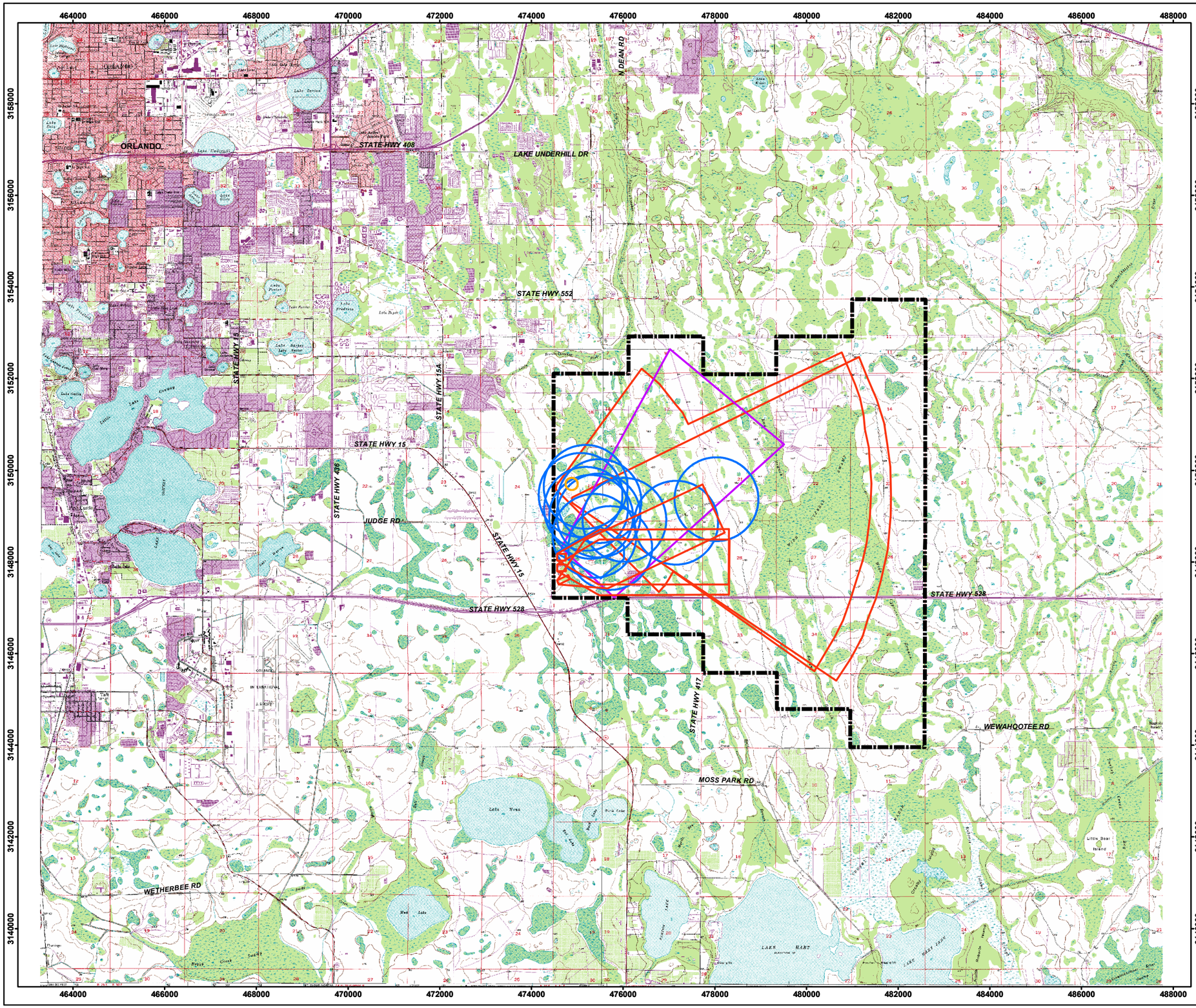

Figure 1.1

Site Location
Pinecastle Jeep Range

Orlando, Florida
Orange County

Legend

- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- FUDS Boundary

Site Location in Florida

N

Image Source: USGS 7.5' Topo Quadrangles, 1980
Projection: UTM Zone 17 NAD83, Map Units in Meters, Distance Units in Feet

7,000 3,500 0 7,000 Feet

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Site Location**		
DRAWN BY: BT			
CHECKED BY: JU	SCALE: As Shown	PROJECT NUMBER: 744647.03000	
SUBMITTED BY: DS	DATE: August 2007	PAGE NUMBER: 1-4	
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CHAPTER 2

PROPERTY DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The Pinecastle Jeep Range is located in central Florida, approximately three miles east-northeast of the Orlando International Airport, Orlando, Florida. It is situated in Orange County, Florida. The site comprises approximately 12,483 acres of land. The location and boundaries are shown on Figure 2.1.

2.2 SITE LOCATION AND SETTING

2.2.1 Topography and Vegetation

The topographic across the various ranges is relatively flat with minor rolling hills to swampy regions. Sections of the terrain among the ranges have been altered due to the many areas of residential and industrial growth. General areas of the Pinecastle Jeep Range are characterized by low rolling topography with north to south oriented ridges. The terrain vegetation ranges from medium grassy or swampy areas to heavy underbrush and forested regions along with the intermingled highways and developments.

2.2.2 Soil

2.2.2.1 Pinecastle Jeep Range is located in the central Floridian Section of the Coastal Plain physiographic province. This peninsular area of Florida falls entirely within the Central or Mid-peninsular Zone, which is characterized by a series of ridges and valleys that parallel both the Atlantic coastline and the longitudinal axis of the peninsula. Southwest of, and parallel to, the Peninsular arch is the Ocala Uplift, which affects only rocks of middle Eocene age and newer. It is a gentle anticlinal flexure about 230 miles long and 70 miles wide exposed near the surface in west-central Florida.

2.2.2.2 The parent material of the site soils consists of beds of sandy and clayey materials that were transported by the sea, which often covered the area during the Pleistocene Epoch. Soils are nearly level to gently sloping, very poorly drained to moderately well-drained in the urban areas. The majority of the site has upper subsoil to a depth of 22” that is black, fine sand and the lower subsoil to 27” is dark brown fine sand.

2.2.3 Climate

The Pinecastle Jeep Range area temperatures are modified greatly by winds that sweep across the peninsula from the Atlantic Ocean and the Gulf of Mexico. The climate of the area is subtropical, characterized by long, warm and relative humid summers and mild and relatively dry winters. The summertime temperatures are seldom above 95° F. The rainy season extends from June through September.

2.2.4 Significant Structures

The area is served by State Highway 528, which runs east/west and recently constructed State Highway 417, which runs north/south through the FUDS boundary. Multiple new residential construction developments are now expanding rapidly into the western portion of the FUDS boundary area to the north and south. New street construction (Lee Vista Boulevard) and the Odyssey Middle School Complex are now built in the western area. Part of the northern edge of the concrete jeep track had to be disassembled to accommodate the new school property. The Orange County Landfill has also expanded its operation to the south and southwest areas.

2.2.5 Demographics

2.2.5.1 The nearest city to the Pinecastle Jeep Range is Orlando, Florida, approximately 3 miles east-northeast of the Orlando International Airport (Figure 2.2). The site is located in Orange County, Florida. Based on census data for the year 2000, the population of Orange County, Florida is approximately 896,344. The City of Orlando has an estimated population of 185,941, making up approximately 20% of the total population of Orange County, Florida (U.S. Census Bureau, 2000).

2.2.5.2 The segment of the population in Orange County under the age of 18 is 25.3%, while 10.0% are over the age of 65. The median age is 33 years. Approximately 68.6% of the population is White, 18.2% Black or African American, 3.4% Asian, and 0.3% American Indian and Alaska Native. There are 336,286 households within the county with an average household size of 2.61. The occupational breakdown in the county is as follows:

- Management, professional, and related occupations – 32.4%
- Service occupations – 17.9%
- Sales and office occupations – 29.7%
- Farming, fishing, and forestry occupations – 0.4%
- Construction, extraction, and maintenance occupations – 8.9%
- Production, transportation, and material moving occupations – 10.6%

2.2.6 Current and Future Land Use

The site is owned by several local government agencies and private individuals. Currently there are multiple residential and commercial developments in progress next to many other completed residential complexes and local middle school, two major highways currently cut through the former ranges along with other newly improved roads throughout the area. The county landfill area continues to be expanded south of its current location. Other portions of the range are still undeveloped pasture lands but are currently bordered by residential properties. It is anticipated that future development will encroach into the undeveloped land.

2.3 SITE OWNERSHIP AND HISTORY

2.3.1 Pinecastle Jeep Range was established during 1943, when the U.S. Government leased 12,483 acres of land in Orange County, Florida for its use. The site was also known as the Tactical Demonstration Range, the Orlando Range, Pincastle Range, Pinecastle Bombing Range and Pinecastle Chemical Demonstration Range, and was an off-post site of Pinecastle Army Air Field (AAF). Pinecastle AAF used the range as a gunnery and demonstration range, while the Army Air Forces Tactical Center at Orlando Army Air Base (AAB), used the site for testing and troop instruction in methods of tactical bombing and strafing.

2.3.2 By a General Order in July 1945 the name of the base changed from the 903rd AAF Base Unit to the 621st AAF Base Unit. Demonstration Air Force and project works remained at Pinecastle AAF after this reorganization, while most Radar Projects were sent to Eglin Field.

2.3.3 Pinecastle Jeep Range was reported as surplus on December 2, 1946, and by December 5, 1947, the War Department terminated the lease on the 12,483-acre range. Currently, local government agencies and private individuals own the former site and use it for various purposes (CEMVS, 1997).

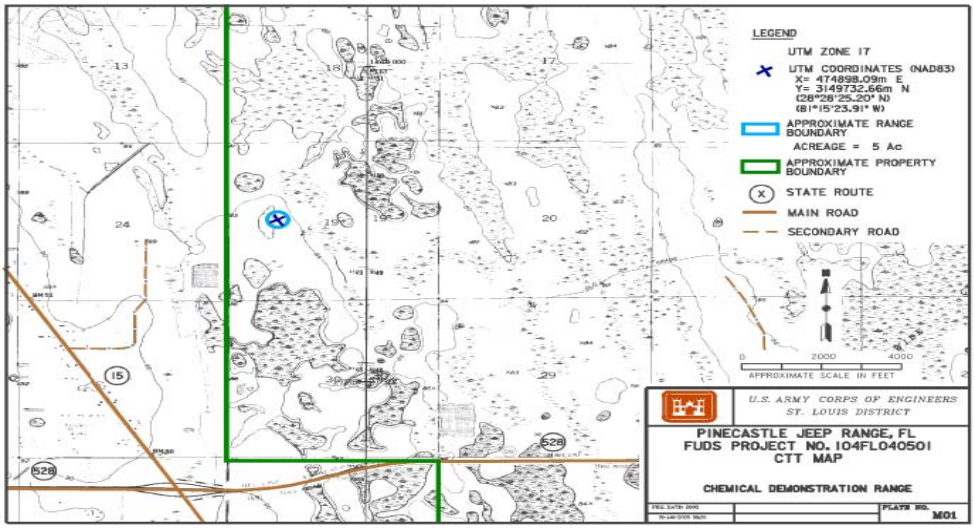
2.4 SITE OPERATIONS AND WASTE CHARACTERISTICS

2.4.1 Munitions Response Site-Specific Descriptions/Operations

The Pinecastle Jeep Range consists of four MRSs totaling 9,070 acres (USACE, 2004b), which corresponds to the target ranges shown on Figure 2.1. The MRSs are currently owned by multiple real estate developers and the City of Orlando. The risk assessment code (RAC) score for this site was “1,” with scores of “1” to “5” indicating the highest to lowest hazard potentials, respectively.

- **MRS 01 - Chemical Demonstration Range** – The 5–acre area is approximately 410 feet east of the northern end of the jeep range with an arbitrary boundary represented as a 264 feet radius circle (USACE, 2004b). There is no evidence that CWM was used for training activities that took place within Chemical Demonstration Range (MRS 01) (USACE, 2004b). The demonstrations

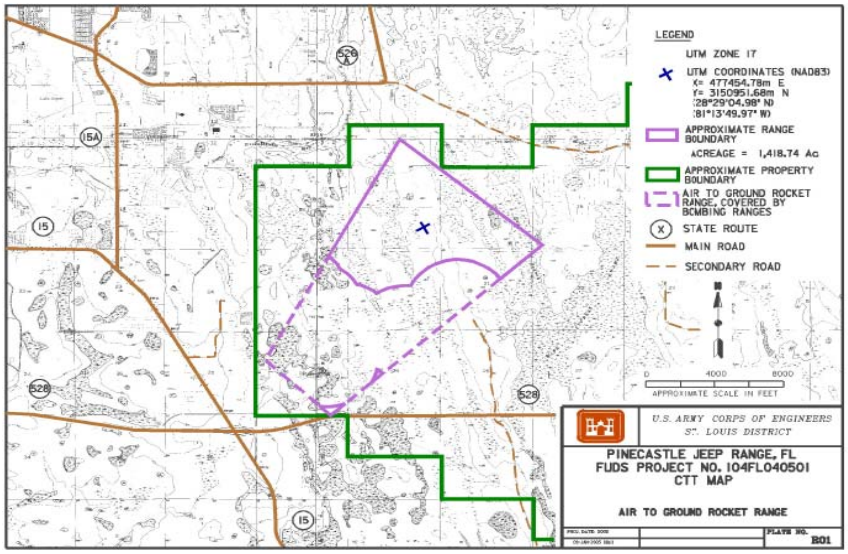
conducted at the range consisted of CWM stimulant use only, including water, and molasses residuum. As part of the recent development in this area, a local middle school was constructed in the location of the northern half of the range and the southern half of this range is still on pasture land. The Chemical Demonstration Range (MRS 01) falls within Range Complex No. 2 (MRS 04). No MEC or MD has been reported in MRS 01 following deactivation and disposal of the property by DoD in 1946. Due to the Chemical Demonstration Range (MRS 01) being located within the boundary of Range Complex No. 2 (MRS 04) which stated the use of high explosive and incendiaries in the ASR Supplement (USACE, 2004b), the ASR Supplement indicated a RAC score of 1 for Chemical Demonstration Range (MRS 01) which shares the same RAC score as MRS 04. Past CWM Study Actions have indicated that no chemical warfare agent was used on the range and is recommended that the Chemical Demonstration Range (MRS 01) proceed toward a Project Closeout for CWM only. For purposes of this SI Report, the Chemical Demonstration Range (MRS 01) will be considered part of Range Complex No. 2 (MRS 04).



Map excerpt from 2004 ARS Supplement

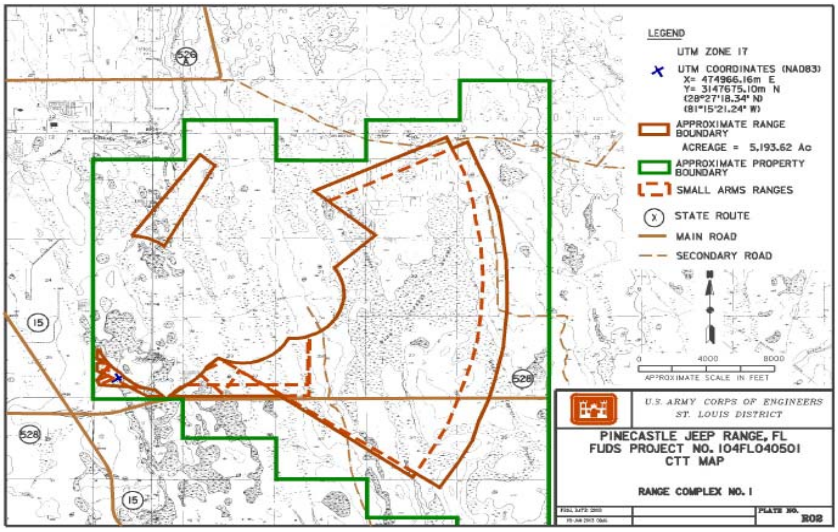
- **MRS 02 - Air-to-Ground Rocket Range** – 1,419 acres in the west central portion of the FUDS boundary, highway 417 was constructed through the center of the range running north / south. Majority of the southern area remains undeveloped as a cattle pasture with remote areas of swampland. The Orange County Landfill has now encompassed a large section of the northeast corner area of the range, with scattered residential and commercial properties in the north corner of the range. The Air-to-Ground Rocket Range (MRS 02) is also intermixed with Range Complex No. 1 (MRS 03) and Range Complex No. 2 (MRS 04). No MEC or MD has been reported in this area following deactivation and disposal of the property by DoD in 1946. The ASR Supplement indicated a RAC score of 2 for the Air-to-Ground Rocket Range (MRS 02) with a Hazard Severity Value of "critical" based on the potential residual presence of explosive

bombs and rockets and a Hazard Probability of "probable" based on the proximity of inhabited structures and lack of a barrier system (USACE, 2004b).



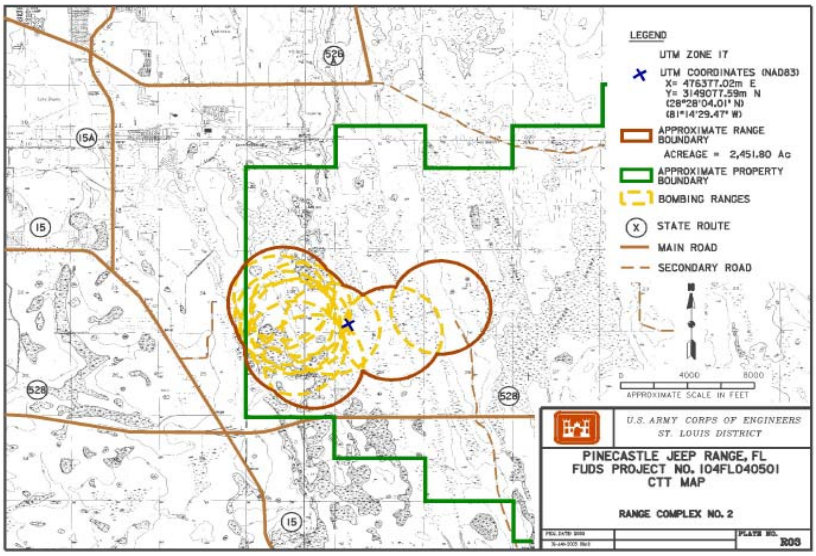
Map excerpt from 2004 ARS Supplement

- **MRS 03 - Range Complex No. 1** – 5,194 acres in the east portion of the FUDS boundary with the firing points located in the southwest corner, Majority of the southeastern area remains undeveloped as a hunting preserve for members only with the northeast corner being cleared by the Orange County Landfill or already built on for landfill operations. The Range Complex No. 1 (MRS 03) is also intermixed with the Air-to-Ground Rocket Range (MRS 02) and Range Complex No. 2 (MRS 04). No MEC or MD has been reported in this area following deactivation and disposal of the property by DoD in 1946. The ASR Supplement indicated a RAC score of 5 for the Range Complex No. 1 (MRS 03) with a Hazard Severity Value of "none" based on the potential residual presence of small arms and a Hazard Probability of "none" based on the proximity of inhabited structures (USACE, 2004b).



Map excerpt from 2004 ARS Supplement

- **MRS 04 - Range Complex No. 2**– 2,452 acres in the southwestern portion of the FUDS boundary. Currently, the majority of the land is pastureland and swamp. It is bordered by State Highway 428 to the south and a portion of State Highway 417 through the west end of the Range Complex No. 2 (MRS 04). The northern part of Range Complex No. 2 (MRS 04) boundary has multiple residential housing units and a local middle school recently built and many other housing units under construction. The range complex consisted of series of ten individual bomb targets used for demonstrations to give students a practical illustration of equipment and tactics discussed in classroom lectures. The demonstrations consisted of mostly practice an inert filled munitions, but the use of high explosives, fragmentation bombs, and strafing were also reported to have been used on these individual targets (USACE, 2004b). The Range Complex No. 2 (MRS 04) overlaps with the Chemical Demonstration Range (MRS 01), Air-to-Ground Rocket Range (MRS 02) and Range Complex No. 1 (MRS 03). Prior to the recent July 2007 UXO findings, no MEC or MD had been reported in this area following deactivation and disposal of the property by DoD in 1946, with the exception of .50 caliber casings and balls found near the concrete jeep track. The ASR Supplement indicated a RAC score of 1 for Range Complex No. 2 (MRS 04) with a Hazard Severity Value of "critical" based on the potential residual presence of explosive bombs and rockets, practice bombs with spotting charges, and incendiary materials and a Hazard Probability of "frequent" based on the proximity of inhabited structures and lack of a barrier system (USACE, 2004b).



Map excerpt from 2004 ARS Supplement

2.4.2 REGULATORY COMPLIANCE

The USACE conducted the SI at the Pinecastle Jeep Range 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

2.5.1 Parsons performed a historical document review for the Pinecastle Jeep Range which was an off post site for the Pinecastle AAF, also known as the Tactical Demonstration Range, The Orlando Range, Pinecastle Range, Pinecastle Bombing Range and the Pinecastle Chemical Demonstration Range (USACE, 1997). Documents reviewed included the 1994 Inventory Project Report (INPR, USACE, 1994), the 1997 ASR (USACE, 1997), and the 2004 ASR Supplement (USACE, 2004b). The INPR identified the site as a FUDS.

2.5.1 1994 Inventory Project Report

The INPR was completed by CESAJ on July 14, 1994 (USACE, 1994). The INPR established the Pinecastle Jeep Range as a FUDS, established the preliminary site boundary, assigned the FUDS Project Number I04FL040501, and recommended an investigation to determine further appropriate action on the potential MEC. The Findings and Determination of Eligibility for the site concluded that Pinecastle Jeep Range was used as a bombing target by the Army and Navy between 1943 and 1946.

2.5.2 1997 Archives Search Report

The ASR was completed by USACE, St. Louis District (CEMVS) in May 1998. The ASR was prepared after reviewing available records, interviews, site inspection, analysis and reports that documented the history of the site. The ASR is the source of most of the historical information pertaining to site operations and identifies the key areas

of focus for the SI. As part of the ASR, a site visit was conducted on May 19-20, 1997. The site visit team did not identify any munitions debris in the eastern portion of the site and were unable to gain access to the properties on the western end of the site. The ASR team did observe what looked to be bomb craters on some of the historical photos but could not gain access to many of these areas.

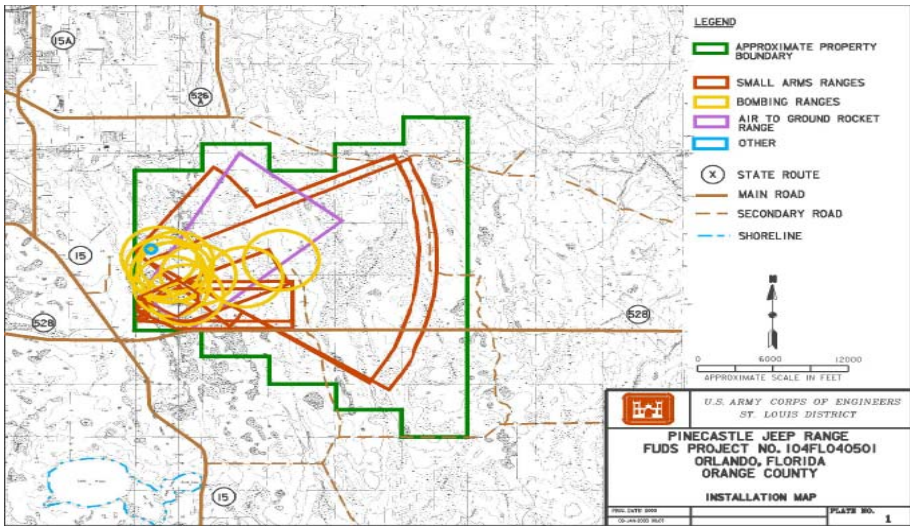
2.5.3 2004 Archives Search Report Supplement

2.5.3.1 The ASR Supplement was prepared by USACE, St. Louis District as a supplement to the 1997 ASR. This document identified range areas and types of munitions that may have been used, for the list of ranges and munitions refer to the Conceptual Site Exposure Model (CSEM) found in Appendix J of this report.

2.5.3.2 The ASR Supplement was prepared in 2004 (USACE, 2004b) and summarizes the information from the 1997 ASR and other associated investigations. The ASR Supplement provides a summary of the retained areas of concern (MRSs), the acreage for each MRS, and other pertinent information. The ASR Supplement provided a breakdown for each MRS with the standard range configuration based on the use of each MRS. The MRSs identified in the ASR Supplement for the Pinecastle Jeep Range, their suspected acreage, and the types of munitions used include:

- **MRS 01 -** Chemical Demonstration Range (RAC: 1) with 5 acres; suspected use of CWM simulants (water and molasses residuum), Detonation; Blasting Caps
- **MRS 02 -** Air-to-Ground Rocket Range (RAC: 2) with 1,419 acres; Small Arms, General; .50 Caliber Machine Gun; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M38A2 100-lb Practice Bomb; HVAR 5-inch Rocket
- **MRS 03 -** Range Complex No. 1 (RAC: 5) with 5,194 acres Small Arms, General; .50 Caliber Machine Gun
- **MRS 04 -** Range Complex No. 2 (RAC: 1) with 2,452 acres; Small Arms, General; AN-M30 100-lb General Purpose Bomb; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; AN-M67 10-lb Incendiary Bomb; AN-M50 4-lb Incendiary Bomb; AN-M69 6-lb Incendiary Bomb; M48 20-lb Practice Bomb; M1A1 Spotting Charge; M38A2 100-lb Practice; Bomb, 5-inch, Rocket, HVAR; 5-inch, Rocket, HVAR, Practice; 11.75-inch, Rocket, Practice

2.5.3.3 The Defense Environmental Programs (DEP) Annual Report to Congress for fiscal year 2005 had no available data recorded in the MMRP Inventory (DEP, 2007).



Map excerpt from 2004 ARS Supplement

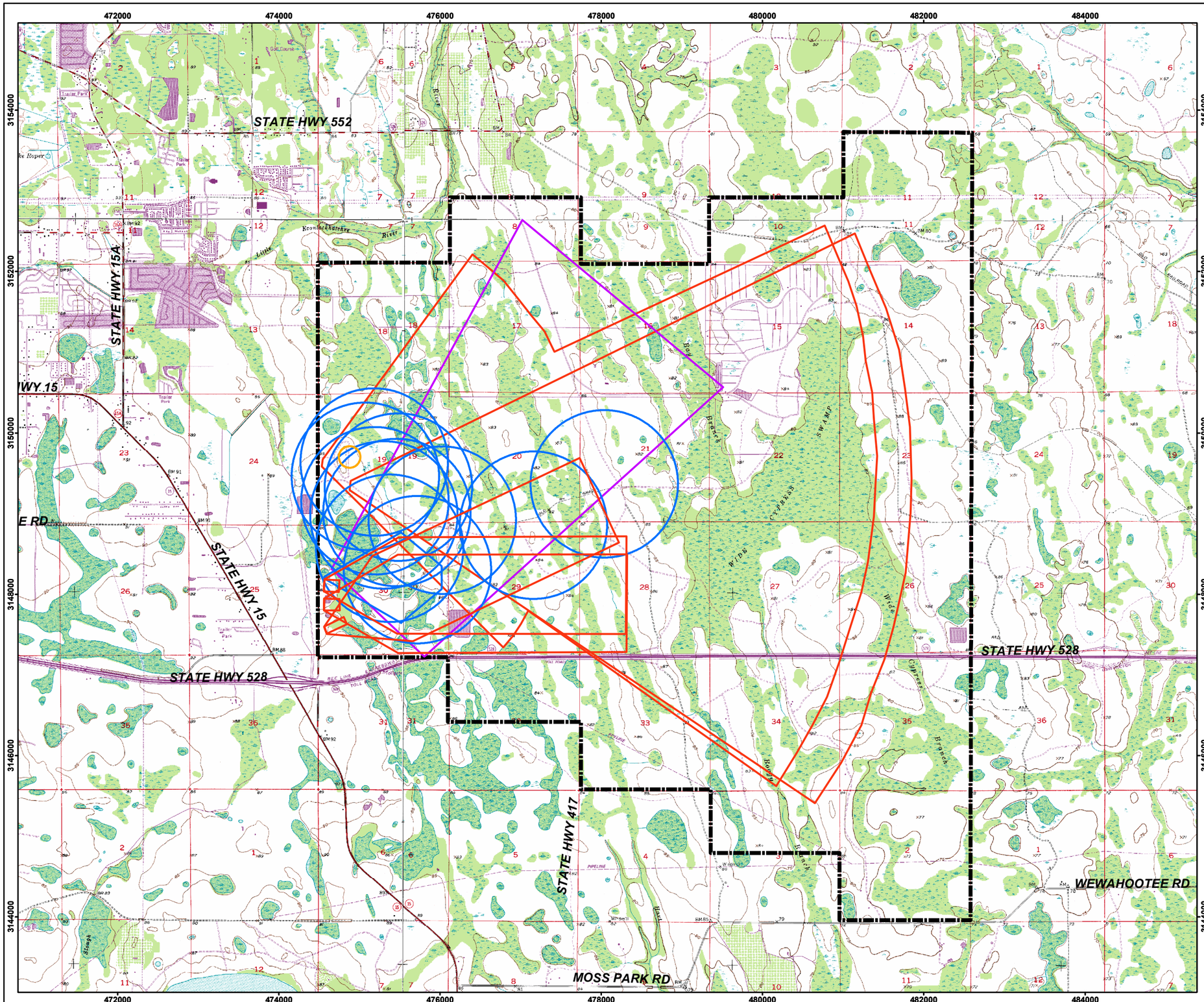


Figure 2.1

Site Setting
Pinecastle Jeep Range

Orlando, Florida
Orange County

Legend

- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- FUDS Boundary

N

Image Source: USGS 7.5' Topo Quadrangles, 1980
Projection: UTM Zone 17 NAD83, Map Units in Meters

4,000 2,000 0 4,000 Feet

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

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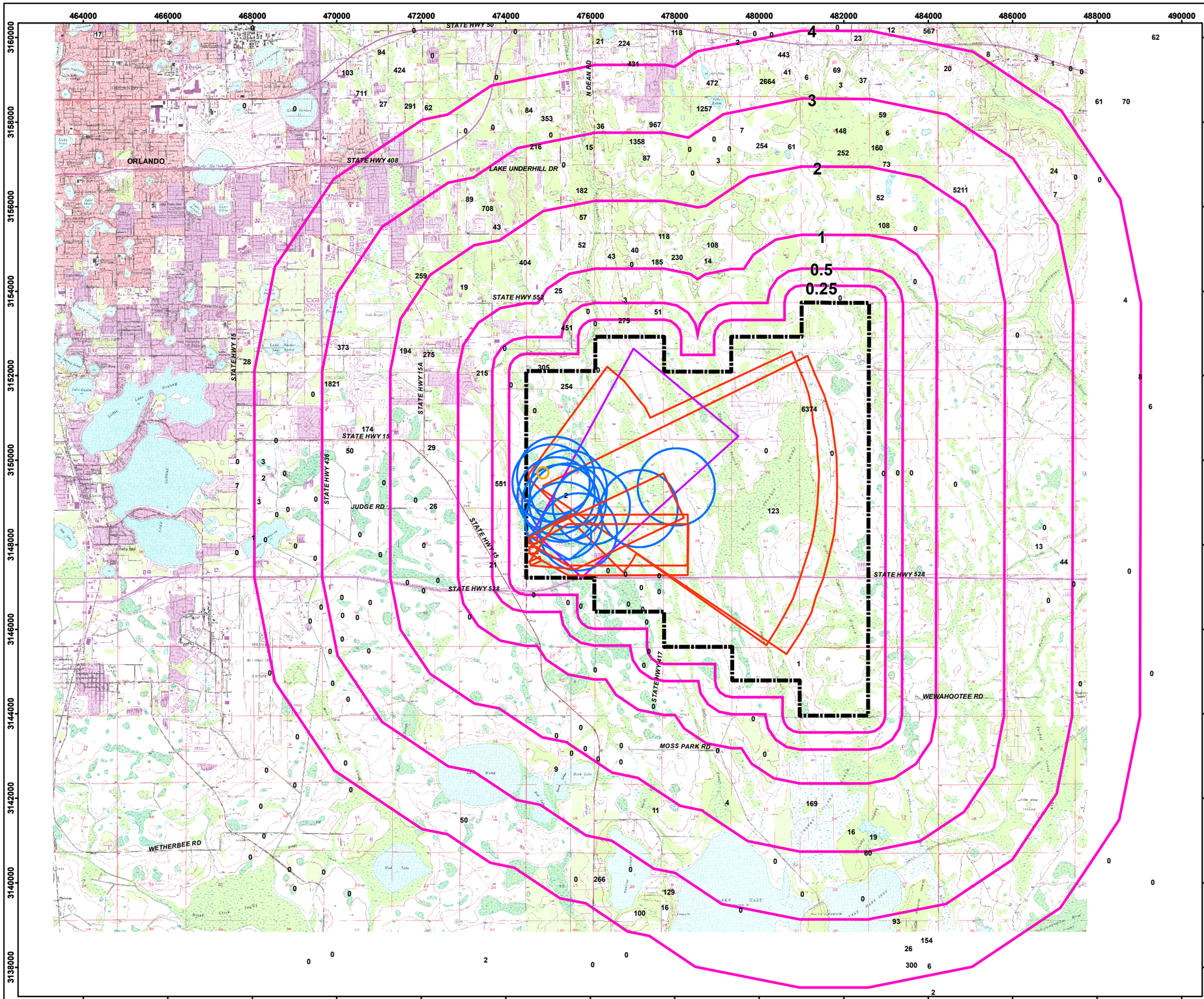


Figure 2.2

2000 Census Data
Pinecastle Jeep Range

Orlando, Florida
Orange County

Legend

- 6 — 2000 Census Block Boundary with Total Population
- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- FUDS Boundary
- Buffer (Mile)

Site Location in Florida

N

Image Source: USGS 7.5' Topo Quadrangles, 1980
Projection: UTM Zone 17 NAD83, Map Units in Meters

Miles
1 0.5 0 1

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	2000 Census Data		
DRAWN BY: BT			
CHECKED BY: JU	SCALE: As Shown	PROJECT NUMBER: 744647.03000	
SUBMITTED BY: DS	DATE: August 2007	PAGE NUMBER: 2-11	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig2_2.mxd		

CHAPTER 3

SITE INSPECTION TASKS

3.1 HISTORICAL RECORD REVIEW

Parsons performed a document review for the Pinecastle Jeep Range. Documents reviewed included the 1994 INPR (USACE, 1994), the 1997 ASR (USACE, 1997), and the 2004 ASR Supplement (USACE, 2004b).

3.2 TECHNICAL PROJECT PLANNING

The Pinecastle Jeep Range falls under the purview of the CESAJ, which facilitated a TPP meeting on April 12, 2006. Participants included representatives of the CESAJ, USAESCH, Parsons, Florida Department of Environmental Protection (FDEP), and Orange County Environmental Protection Division (EPD). The purpose of the TPP meeting was to develop the technical approach presented in the Final TPP Memorandum (Parsons, 2006c) (see Appendix B). Key TPP findings and decisions are summarized below:

- The TPP Team concurs with the Technical Approach (likely an anticipated RI/FS) as agreed at the TPP meeting on April 12, 2006 inclusive of number, type, and location of samples as well as sampling methodology and laboratory analyses. At the request of FDEP discrete sampling will replace the programmatic approach of composite sampling for this site.
- The Project Team agreed to convert the proposed water samples and the proposed ambient soil condition samples to additional soil samples to help aid in the delineation of the target ranges for an anticipated RI/FS. A total of 16 soil samples will be collected, all biased to the highest likely areas for residual MC.
- The TPP Team concurs with soil screening levels to include the most conservative between the FAC 62-777 Direct Contact (Residential) values and FAC Leachability to Groundwater for explosives and metals. The inclusion of ecological screening will be presented in the SI Report in accordance with the recently approved “white paper” regarding this subject.

3.3 NON-MEASUREMENT DATA COLLECTION

3.3.1 Site information presented in this report was prepared by reviewing existing site documents, doing research via the Internet, and requesting information from agency contacts. The following sources were consulted for identifying environmental and cultural resources at the Pinecastle Jeep Range SI:

- Topographic Map – U.S. Geological Survey (USGS)
- Wetlands Online Mapper – National Wetlands Inventory (NWI), U.S. Fish and Wildlife Service (USFWS)

- Threatened and Endangered Species System (TESS) – Endangered Species Program, U.S. Fish and Wildlife Service
- National Wildlife Refuge System (NWRS) – USFWS
- Florida Endangered and Threatened Species – Florida Fish and Wildlife Conservation Commission (FWC)
- Florida Fish and Wildlife Conservation Commission (FWC)
- Florida Department of Agriculture and Consumer Services (DOACS)
- Florida Natural Areas Inventory (FNAI) – Orange County
- National Register Information System (NRIS) – National Register of Historic Places (NRHP), National Park Service (NPS)
- List of National Historic Landmarks (NHL) – National Historic Landmarks Program, NPS
- List of National Heritage Areas (NHA) – National Heritage Areas Program, NPS
- Florida State Historic Preservation Office (FL SHPO) – Florida Office of Cultural and Historical Programs (OCHP)
- National Oceanic and Atmospheric Administration (NOAA) - Coastal Zone Management Program (CZMP)
- September 1997 ASR Findings for Pinecastle Jeep Range, Orlando, Florida

3.3.2 According to the NRHP, the NHL Program, the NHA Program, there are no known cultural resources within the boundaries of the Pinecastle Jeep Range site. According to the SHPO Division of Historical Resources there are eight previously recorded archeological sites and one standing structure within the site boundaries. However, after review of the SHPO archeological site map there appears to be only four archeological areas on site and the standing structure was not identified on the SHPO map.

3.3.3 Ecological resources are identified in Subchapter 6.3 of this report.

3.4 SITE-SPECIFIC WORK PLAN

3.4.1 The SS-WP (Parsons, 2006a) augments the PWP and 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.

3.4.2 The PWP and PSAP are intended to be 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 were taken to the site for reference by the site visit team (SVT) during SI field activities.

3.4.3 The SS-WP includes the project description, the field investigation plan, the sampling and analysis plan, the environmental protection plan, and the health and safety plan specific to the Pinecastle Jeep Range. The field investigation plan developed a technical approach to guide sample collection and analysis for MEC and MC to ensure that the results were sufficient to determine whether additional investigations or implementation of a remedy are necessary for the site. Key elements of the technical approach include the CSM to help

determine types of samples and their locations, data quality objectives (DQO) to ensure the data acquired are sufficient to characterize MEC and MC at the site, and QR to confirm known target locations and evaluate the presence or absence of MEC/MC in remote portions of the site. The SS-WP included a sampling rationale for each sample location and the latitude and longitude of the final sample locations. The sampling rationale has been updated to show actual conditions observed by the SVT and is included in Table 3.1

3.4.4 The sampling and analysis plan discusses procedures for soil sample acquisition from locations biased toward the highest potential for MEC contamination; QC and QA for the sampling process; sample shipment to an approved, independent laboratory; and analysis of the samples by the laboratory. The environmental protection plan evaluates compliance with Army Regulation 200-2 by presenting procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during site field activities. 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

Majority of the QR paths were attempted to follow the proposed QR as much as possible. Due to the numerous number of swamp areas, creeks, and manmade obstacles the QR paths were diverted, creating additional amounts of QR path in other areas of the MRSs and in some areas outside of the MRSs. Sample PJR-TR-SS-02-05 was relocated south of the original proposed location due to a lack of ROE for the proposed location. The relocated sample was used as a discretionary sample and utilized in an area that had numerous large bomb craters. The actual QR paths and locations of the samples collected are discussed in more detail in the MRS-specific sections in Chapter 5.

Table 3.1 SAMPLING RATIONALE

Pinecastle Jeep Range, Orlando, Florida

Sample ID	Sample Coordinates Longitude	Sample Coordinates Latitude	Media	Analysis	Munitions	Rationale
PJR-TR-SS-02-01	-81.2581638	28.477754	Soil	Metals, Explosives	None Found	Sample collected at north end of Ship Target, Circular Target, and Warehouse Target
PJR-TR-SS-02-02	-81.2551799	28.470059	Soil	Metals, Explosives	Small Arms, General; 50 Cal. Machine Gun	Sample collected near firing point of Turret Gunnery Range, CQ-3 Range, and near the center and edges of Ship Target, Convoy Target, Tank (new and old), Circular Target, Target #1, and Warehouse Target
PJR-TR-SS-02-03	-81.2540260	28.463297	Soil	Metals, Explosives	None Found	Sample collected near center and edges of the Tank (new and old), Target #1, and Simulated Enemy Airstrip
PJR-TR-SS-02-04	-81.2562915	28.457343	Soil	Metals, Explosives	None Found	Sample collected near firing point of Pistol Range, Small Arms Range, Rifle Ranges No. 1 and No. 2 , and a portion of Target No. 1
PJR-TR-SS-02-05	-81.2477868	28.463264	Soil	Metals, Explosives	None Found	Sample relocated due to ROE issues and was collected from bomb crater in the area of the Air-to-Ground Rocket Range, Turret Gunnery Range, CQ-3 Range, Ship Target, Convoy Target, Tank (new and old), Circular Target, Target #2, and Warehouse Target
PJR-TR-SS-02-06	-81.2461400	28.471532	Soil	Metals, Explosives	None Found	Sample collected at center and edges of the Air-to-Ground Rocket Range, Turret Gunnery Range, CQ-3 Range, Ship Target, Convoy Target, Tank (new and old), Circular Target, Target #2, and Warehouse Target
PJR-TR-SS-02-07	-81.2448193	28.465365	Soil	Metals, Explosives	None Found	Sample collected at center and edges of the Air-to-Ground Rocket Range, Turret Gunnery Range, CQ-3 Range, Rifle Range #1, Tank (new and old), Targets #1 and #2, and Simulated Enemy Airstrip.
PJR-TR-SS-02-08	-81.2445572	28.456229	Soil	Metals, Explosives	None Found	Sample collected at center and edges of the Air-to-Ground Rocket Range, Rifle Ranges #1 and #2, Small Arms Range, and Simulated Enemy Airstrip
PJR-TR-SS-02-09	-81.2238457	28.459185	Soil	Metals, Explosives	None Found	Sample collected at the east end of the Turret Gunnery Range, CQ-3 Range, Rifle Range #2, and Small Arms Range
PJR-TR-SS-02-10	-81.2341117	28.467070	Soil	Metals, Explosives	None Found	Sample collected at the east end of the Rifle Range #1, south center area of Air-to-Ground Rocket Range, south center areas of the Turret Gunnery Range, and CQ-3 Range, and center of Target #3
PJR-TR-SS-02-11	-81.2250094	28.471311	Soil	Metals, Explosives	None Found	Sample collected at south edge and center areas of Air-to-Ground Rocket Range, Turret Gunnery Range, and CQ-3 Range, and center of Target #4
PJR-TR-SS-02-12	-81.232716	28.477596	Soil	Metals, Explosives	None Found	Sample collected at north and center areas of Air-to-Ground Rocket Range, Turret Gunnery Range, and CQ-3 Range
PJR-TR-SS-02-13	-81.2317309	28.485591	Soil	Metals, Explosives	None Found	Sample collected at north end of Air-to-Ground Rocket Range and north boundary of Turret Gunnery Range
PJR-TR-SS-02-14	-81.2168015	28.485297	Soil	Metals, Explosives	None Found	Sample collected at south end corner of Air-to-Ground Rocket Range, and north center area of the Turret Gunnery Range and CQ-3 Range
PJR-TR-SS-02-15	-81.2064901	28.466416	Soil	Metals, Explosives	None Found	Sample collected at east center area of Turret Gunnery Range, and CQ-3 Range
PJR-TR-SS-02-16	-81.2041242	28.446151	Soil	Metals, Explosives	None Found	Sample collected at the south east end of Turret Gunnery Range, and CQ-3 Range

CHAPTER 4

MUNITIONS AND EXPLOSIVES OF CONCERN FINDINGS

4.1 GENERAL INFORMATION

4.1.1 Qualitative Reconnaissance

4.1.1.1 As stated previously, the primary task of the SI was to evaluate the potential presence of MEC, MD, or MC. To assess the presence of MEC and MD, the SVT conducted the QR by walking slightly more than 34.08 miles throughout the site from January 13 through 17, 2006.

4.1.1.2 Site QR consisted of visual reconnaissance of the site surface to provide qualitative data on potential subsurface anomalies, and the identification of visual indicators of suspect areas, including earthen berms, distressed vegetation, stained soil, ground scars or craters, target remnants, and visible metallic debris. Four MRSs are located within the range: Chemical Demonstration Range, Air-to-Ground Rocket Range, Range Complex No. 1, and Range Complex No. 2. QR activities focused on the area within the three of the four MRS's, with the most likely area to contain MEC contamination. No QR data or field observation was conducted in the Chemical Demonstration Range other than a visual of the area. However, some additional QR was conducted in other portions of the FUDS boundary, as well.

4.1.1.3 The QR involved a three-person SVT walking single file at a five meter separation distance along the track shown on Figure 3.1. An unexploded ordnance (UXO) Technician was in the front of the group using a Schonstedt GA-92XT*i* magnetometer for anomaly avoidance to ensure the safety of the team personnel. SVT members conducted QR along the path shown on Figure 3.1, stopping occasionally to note field observations and/or to collect soil samples. Soil sampling results are presented in Chapter 5.

4.1.1.4 Figure 3.1 shows the QR paths and observation locations. If MEC or MD was observed along the path, the SVT stopped to note an observation. The SVT also stopped at other locations to take photographs and to note field conditions, vegetation, areas where subsurface anomalies were identified, or other features of interest. As discussed in the SS-WP, the QR route was not limited to the proposed path, but was determined in the field by the field team leader (FTL) based on the baseline QC procedures described in Chapter 3 of the PWP, visual observations, and areas of predetermined focus (Parsons, 2006a). The QR was conducted by the SVT on January 13-17, 2007, the dates the samples were collected. Table 4.1 presents the potential MEC anticipated to be present at the site based on the ASR and ASR Supplement. The MEC CSM is included in Appendix J.

Table 4.1
Chemical Composition of Munitions and Explosives of Concern and Potential Munitions Constituents, Former Pinecastle Jeep Range

General Munition Type	Type/Model	Case Composition	Filler	Potential Constituent
Small Arms, General .50 Caliber	M2 Ball M1 Tracer M10 Tracer M17 Tracer M21 Tracer M2 AP Propellant Primer, Percussion	Brass, steel, aluminum	Soft steel Tracer Composition Tracer Composition Tracer Composition Tracer Composition Tungsten Chrome Steel Single- or double-base powder Primer Composition	Calcium, iron, strontium, lead, magnesium, molybdenum, antimony, potassium, perchlorate
20-lb Fragmentation Bomb	AN-M41	Metal	RDX and TNT	RDX and TNT
500-lb Incendiary Bomb	AN-M76	Metal	Magnesium	Magnesium
1,000-lb GP Bomb	AN-M65A1	Metal	Amatol, TNT, Tritonal, Comp B	nitroglycerin
2,000-lb GP Bomb	AN-M166A2	Metal	Amatol, TNT, Tritonal, Comp B	nitroglycerin
HVAR 5-inch Rocket	Warheads: MK 6, Mod 1,4 MK 25, Mod 1,3 MK 29, Mod 0,2 Fuzes: MK 149,Mod 0,1(nose) MK 166,Mod 0,2(base) Motor: MK 10, Mod 3	Metal	TNT Comp B (TNT, RDX), Det Cord Explosive D Lead azide primer mixture - tetryl Mercury fulminate primer mixture – tetryl, lead azide Ballistite, igniter composition	Lead, magnesium, mercury, nitroglycerin, RDX, strontium, TNT, tetryl, potassium, antimony, calcium, barium
100-lb Practice Bomb with Spotting Charge	M38A2 M1A1	Metal Black powder	Sand, wet sand, or water; spotting charge contains black powder	Iron, potassium
11.75-inch Practice 'Tiny Tim' Rocket	Mk1 Mod 0	Metal	Mk 19 propellant, TNT, black powder	TNT, potassium, iron
2-lb Incendiary Bomb	AN-M52	Metal	Magnesium	Magnesium
4-lb Incendiary Bomb	AN-M50	Metal	Magnesium	Magnesium
6-lb Incendiary Bomb	AN-M69	Metal	Jellied Oil	Magnesium
10-lb Incendiary Bomb	AN-M67	Metal	Magnesium	Magnesium
20-lb Fragmentation Bomb	AN-M41	Metal	RDX and TNT	RDX and TNT

4.1.1.5 As shown in Appendix E, the SVT noted 55 discrete field observations throughout the course of the SI, including detail on topography, soil color, drainage, the presence of any barriers, and indications of surface MD. Pertinent field observations are summarized in Table 4.2. Appendix D includes related field forms.

Table 4.2
Summary of Qualitative Reconnaissance Observations,
Former Pinecastle Jeep Range

MRS	MEC	MD	Munitions-Related Features
Chemical Demonstration Range (MRS 01)	None	None	None
Air-to-Ground Rocket Range (MRS 02)	None	None	None
Range Complex No. 1 (MRS 03	None	.50 cal	Rifle range firing points area and small arms debris found near the jeep track
Range Complex No. 2 (MRS 04)	UXO[1], three practice fragmentation bombs, one 6 lb incendiary bomblet	.50 cal	Oval concrete jeep track, concrete blocks for possible observation tower, bomb craters, possible burial pit areas

1) UXO reported post-SI by landowner. Emergency response conducted by Patrick Air Force Base EOD Team.

4.1.2 Data Quality Objectives

4.1.2.1 Introduction

4.1.2.1.1 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. The DQOs were developed in accordance with the process presented in Chapter 3, paragraph 3.1.2 of the PWP as well as EM 200-1-2 (USACE, 1998).

4.1.2.1.2 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 discussed the former Pinecastle Jeep Range DQOs at the TPP meeting in April 12, 2006. Appendix B of this SI Report presents the TPP documentation, including the DQO worksheets.

4.1.2.1.3 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 effective and rapid initiation of an RI/FS; and 4) complete the MRSPP.

4.1.2.1.4 DQOs cover four project objectives that SI data must satisfy: 1) evaluate potential presence of MEC; 2) evaluate potential presence of MC; 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 at three of the four MRSs in the former Pinecastle Jeep Range. The SVT searched for visual evidence of MEC and MD at three of the four MRSs during the QR.

4.1.2.3 Munitions Constituents Data Quality Objective

The MC DQO was achieved by evaluating potential presence of MC at the three of the four MRS's located at the former Pinecastle Jeep Range. The Parsons SI Project Chemist evaluated the composition of the munitions (and fillers) used on the bombing range and developed the list of compounds/analytes for sample analysis. The complete list of munitions potentially used at the former Pinecastle Jeep Range site and their chemical composition is provided in Table 4.1. Section 5 presents the MC results for MC contamination in the soil samples collected at the former Pinecastle Jeep Range.

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. The scoring sheets for the MRSPP are included in Appendix K. The MRSPP scoring previously conducted as part of the CWM Scoping and Security Study for MRS 01 is also included, for reference.

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, ASR, and ASR Supplement documents, as well as the MC sampling results reported in Chapter 5 and information from local and state agencies regarding population, groundwater well users, and drinking water well use. The HRS score sheets are included in Appendix K.

4.2 CHEMICAL DEMONSTRATION RANGE (MRS 01)

4.2.1 Historical Munitions and Explosives of Concern

The ASR team found no MD on the Chemical Demonstration Range (MRS 01) during the site visit in 1997. The ASR notes that there is no indication that any live agent chemical warfare materials were used on this range. Documentation in the ASR indicated that simulants were used to include water and molasses residuum. It also noted that M1 Chemical ID Sets and blasting caps may have been used on this range, and noted a RAC score of "1" for this MRS.

4.2.2 Inspection Activities

No SI activities were conducted at the range during the field site investigation other than a visual of the area.

4.3 AIR-TO-GROUND ROCKET RANGE (MRS 02)

4.3.1 Historical Munitions and Explosives of Concern

The ASR team found no MD on the Pinecastle Jeep Range during the site visit in 1997. The ASR notes that training conducted on the ranges included strafing, practice bombing, air-to-ground rocket firing, and some high explosive bombing. The ASR Supplement indicated that

small arms, AN-M41 Fragmentation Bomb, 20-lbs; AN-M76 Incendiary Bomb, 500-lbs; M48, Practice Bomb, 20-lbs; M38A2, Practice Bomb, 100-lbs; and 5-inch HVAR Rockets, were used there, and noted a RAC score of "2" for this MRS.

4.3.2 Inspection Activities

To assess the presence of MEC contamination at the site, the SVT conducted QR over a 34.08-mile combined site path, which included portions of this MRS. No MEC or MD was observed on the surface in this MRS during the QR Field SI.

4.4 RANGE COMPLEX NO. 1 (MRS 03)

4.4.1 Historical Munitions and Explosives of Concern

The ASR team found no MD on the former Pinecastle Jeep Range during the site visit in 1997. The ASR notes that Range Complex No. 1 consisted of six small arms ranges located along the western boundary. These ranges included a Turret Gunnery Range, a CQ Range, two rifle ranges, a pistol range, and one combination range. The ASR Supplement states that small arms with .50 caliber munitions were used there and noted a RAC score of "5" for this MRS.

4.4.2 Inspection Activities

To assess the presence of MEC contamination at the site, the SVT conducted QR over a 34.08-mile combined site path, which included portions of this MRS. A small pile of .50 caliber casings was observed in this MRS near the southeast corner of the concrete jeep track. No other evidence of small arms was found in the surrounding area. Due to the overlapping of the MRSs, the .50 caliber casings are also part of the Range Complex No. 2 MRS, as well as the Air-to-Ground Rocket Range; however, based on the type, it is likely that the MD originated from use of Range Complex No. 1. The casings were found near the firing points of the old Turret Gunnery Range and the CQ-3 Range, both of which are included in Range Complex No. 1.

4.5 RANGE COMPLEX NO. 2 (MRS 04)

4.5.1 Historical Munitions and Explosives of Concern

The ASR team found no MD on the former Pinecastle Jeep Range during the site visit in 1997. The ASR notes that demonstrations conducted included strafing, practice bombing, and some high explosive bombing. The ASR Supplement notes that Range Complex No. 2 also known as the Demonstration Range consisted of a series of at least ten targets scattered throughout the Pinecastle Jeep Range. The ASR Supplement indicated that small arms, AN-M41, GP Bomb 100-lbs; AN-M41, Fragmentation Bomb, 20-lbs; AN-M50, Incendiary Bomb, 4-lbs; AN-M52, Incendiary Bomb, 2-lbs; AN-M54 Incendiary Bomb, 4-lbs; AN-M67, Incendiary Bomb, 10-lbs; AN-M69 Incendiary Bomb, 6-lbs; AN-M76, Incendiary Bomb, 500-lbs; M48, Practice Bomb, 20-lbs, M38A2, Practice Bomb 100-lbs; M1A1, Spotting Charge; 5-inch, Rocket, HVAR; 5-inch, Rocket, HVAR, Practice;11.75-inch, Rocket, Practice. The only difference in the munitions list is in the ASR, but not listed in the ASR Supplement is the AN-M65A1, GP Bomb, 1000 lbs and the AN-M166A2, GP Bomb, 2000-lbs. Due to the type of ordnance that was used there, the ASR Supplement noted a RAC score of "1" for this MRS.

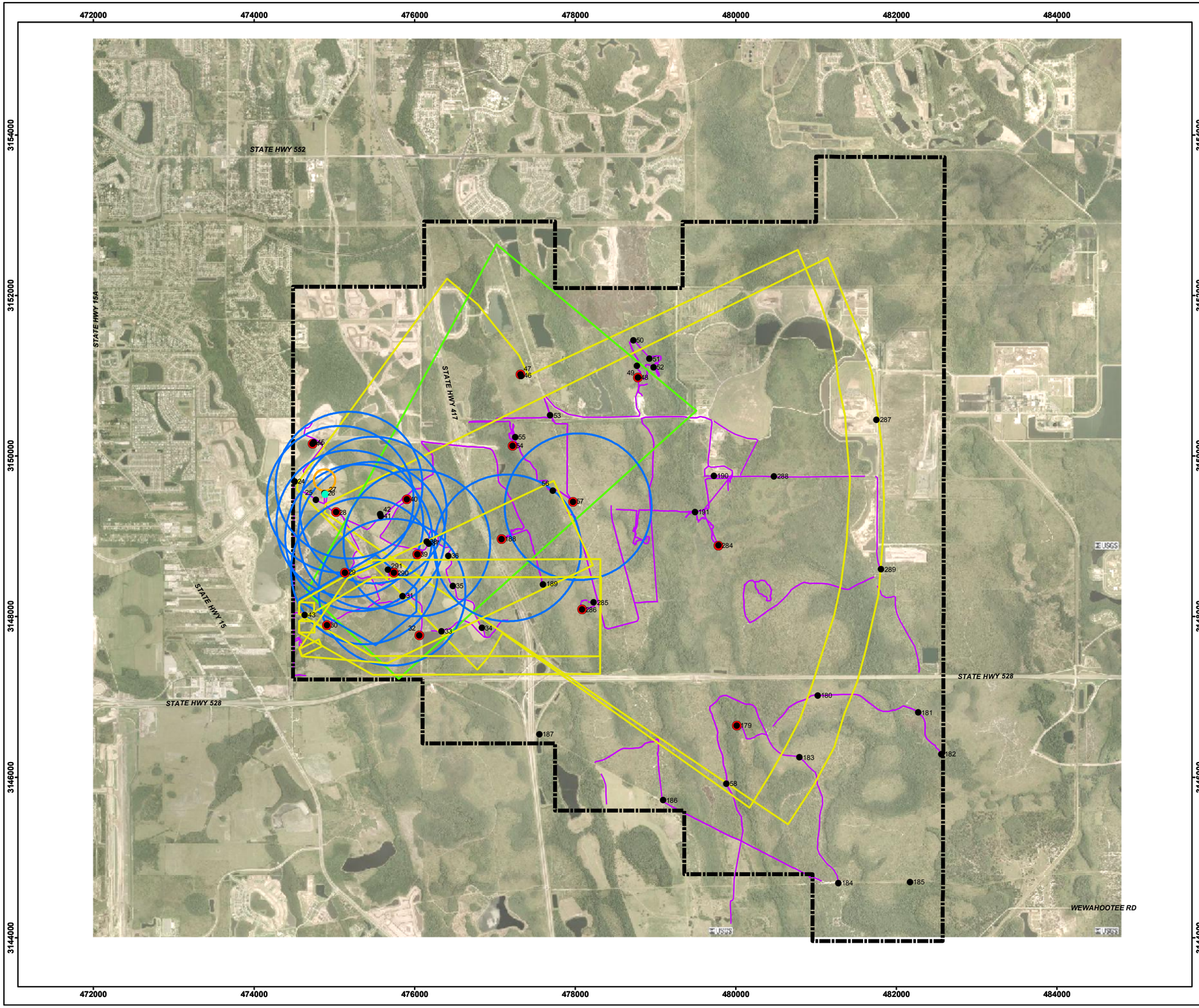
4.5.2 Inspection Activities

To assess the presence of MEC contamination at the site, the SVT conducted QR over a 34.08-mile combined site path, which included portions of this MRS. No MEC or MD was observed at this MRS; however, multiple large craters and three areas observed that appeared to look like burial pits were noted as site observations in portions of this area. Subsequent to the Si field activities, a landowner reported possible MEC on this land located within this MRS. An emergency response was conducted and EOD from Patrick Air Force Base confirmed UXO, including three practice fragmentation bombs and one 6-lb incendiary bomblet were disposed of onsite.

Figure 4.1

Qualitative Reconnaissance and Field Observation Locations Pinecastle Jeep Range

Orlando, Florida
Orange County



Legend

- 27 Small Arm (.50 Cal) Location
- 25 Other Field Observation Location
- Soil Sample Location
- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- Qualitative Reconnaissance Track
- FUDS Boundary

Site Location in Florida

N

Image Source: 2002 Orthophotos
Projection: UTM Zone 17 NAD83, Map Units in Meters

Feet
4,000 2,000 0 4,000

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	Qualitative Reconnaissance and Field Observation Locations		
DRAWN BY: BT			
CHECKED BY: JU	SCALE: As Shown	PROJECT NUMBER: 744647.03000	
SUBMITTED BY: DS	DATE: August 2007	PAGE NUMBER: 4 - 7	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig4_1.mxd		

CHAPTER 5

MIGRATION/EXPOSURE PATHWAYS AND TARGETS

5.1 Chapter 5 evaluates the potential for adverse impact on human health and the environment based on site-specific conditions, providing the information used in Chapter 6 to evaluate risks posed to potential receptors under current and future land use scenarios. This Chapter evaluates exposure pathways for groundwater, surface water, soil, and air. The CSEM for the former Pinecastle Jeep Range (Appendix J) summarizes which potential receptor exposure pathways are (or may be) complete and which are (and are likely to remain) incomplete. In order for an exposure pathway to be complete all four of the following must be true. An example regarding a hypothetical groundwater pathway is provided.

- *A source and mechanism for contaminant release*: e.g., a site has known MEC from which MC have leached and contaminated pertinent media.
- *An environmental transport and/or exposure medium*: e.g., the MC in soil is mobile and can contaminate groundwater.
- *A point of exposure at which the contaminant can interact with a receptor*: e.g., a drinking water well drawing from the contaminated aquifer is located at the site.
- *A receptor and a likely route of exposure at the exposure point*: e.g., the resident lives onsite and drinks water from the well.

5.2 In the hypothetical resident example, all four factors are true; therefore, the groundwater exposure pathway is complete. If any single factor were not present (e.g., the MC was immobile in soil, the resident uses water from another source for drinking water), the pathway would be incomplete.

5.1 GENERAL INFORMATION

General information regarding the geology, hydrogeology, and hydrology of the former Pinecastle Jeep Range is presented below, followed by a discussion of MRS-specific characteristics and sampling results for each of the MRSs investigated as part of the SI.

5.1.1 Regional Geologic and Hydrogeologic Setting

5.1.1.1 Pinecastle Jeep Range is located in the central Floridian Section of the Coastal Plain physiographic province. This peninsular area of Florida falls entirely within the Central or Mid-peninsular Zone, which is characterized by a series of ridges and valleys that parallel both the Atlantic coastline and the longitudinal axis of the

peninsula. Southwest of, and parallel to, the Peninsular arch is the Ocala Uplift, which affects only rocks of middle Eocene age and younger. It is a gentle anticlinal flexure about 230 miles long and 70 miles wide exposed near the surface in west-central Florida.

5.1.1.2 The parent material of the site soils consists of beds of sandy and clayey materials that were transported by the sea, which often covered the area during the Pleistocene Epoch. Soils are nearly level to gently sloping, very poorly drained to moderately well-drained in the urban areas. The majority of the site has upper subsoil to a depth of 22" that is black, fine sand and the lower subsoil to 27" is dark brown fine sand.

5.1.2 Regional Groundwater Use

5.1.2.1 One hundred and twelve water wells are known to exist within a 4-mile buffer zone from the site, as shown in the Water Well Report included in Appendix L and shown in Figure 5.2 and listed in Table 5.1 (Banks Information Solutions, 2007). Sixty two domestic/public wells are within a 4-mile buffer zone around the site. Only three domestic/public wells are located within a 1-mile buffer zone from the MRSs. The majority of the 62 domestic/public wells are located either to the northwest or to the southeast of the MRS boundaries, which on average is located approximately at the 2 mile boundary northwest or southeast of the site. These water wells include public supply wells for the OCU Water Service, City of Cocoa, FL and water supply wells for Valencia Community College, Orange County Landfill, and multiple golf country clubs.

5.1.2.2 Wells within 4 miles of the boundary of the site generally range in depth from 140 to 1450 feet deep. The shallowest well (140 feet deep) is located approximately 3.5-miles from the site to the southeast. A number of public supply wells for the City of Cocoa are located between 2 and 4 miles from the ranges to the southeast, the public supply wells for the Orange County Utilities Water Service are located between 0.5 and 3 miles to the west and northwest from the ranges. The wells used for drinking water supply are cased to a depth of 169 feet below ground surface (bgs), or deeper.

5.1.2.4 Information regarding the specific number of individuals using each drinking water well was not available. It is unknown how many of these individuals are actually on city supplied water source verses independent community water sources. The Orange County Landfill property has six wells in the Floridian Aquifer ranging in depth from 290 to 444 feet bgs, the actual use of these wells is unknown. A number of local golf courses located to the north use the area ponds for irrigation purposes, but a few have wells ranging from 140 to 600 feet bgs.

5.1.2.5 Additional research regarding the number of individuals using drinking water wells was not conducted due to no water samples collected during the SI, based on the findings of DoD-related contamination found during the SI in soil. The principal uses of groundwater in Orange County are reported as agricultural, public supply, industrial, and thermoelectric power, domestic, and commercial uses (USGS, 1996).

Table 5.1
Groundwater Wells in the Vicinity of the Former Pinecastle Jeep Range

Distance from MRS	Domestic/Public Wells	Proposed	Irrigation Wells	Landfill or Other Wells	Total
On site	0	1 (landfill)	2	6 (landfill)	9
0 to ¼ mile	2	0	2	0	4
¼ to ½ mile	3	0	0	0	3
½ to 1 mile	3	5	0	0	8
1 to 2 miles	15	3	0	2	20
2 to 3 miles	30	2	3	2 3 (removed) 1 (capped 4 (inactive)	45
3 to 4 miles	9	0	3	8 2 (inactive) 1 (removed)	23
Site to 4 miles	62	11	10	29	112

Detailed well information is included in Appendix L

Table 5.2
Population Information in the Vicinity of the Former Pinecastle Jeep Range

Range	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
Entire Site	8091	3161	9002	18505	39754	55985	134498

Source: U.S. Census 2000 data. Note that the population of two people within the site is considered to be an artifact of the conservative approach that was used to calculate the population of an area by including the total number of people (2 persons per square mile) for the census tract that includes the site and the MRS. No residences were observed within the site boundary by the SVT during SI field activities. One residence is located just west of the site boundary, along Mendel Road.

5.1.3 Regional Hydrologic Setting

5.1.3.1 The Little Econlockhatchee River flows from south to north through the west part of the area and the Econlockhatchee River flows from south to north along the east boundary. The Little Econlockhatchee River, a tributary of the Econlockhatchee River drains about two thirds of the site's surface runoff and the balance drains toward the Econlockhatchee River. There are two stream gages on the Econlockhatchee River. The first is located at Magnolia Ranch near Bithlo, FL, about nine miles upstream from the range and the second located near Chuluota, FL, about twelve miles downstream from the range. The Bithlo gage recorded a drainage area of 32.9 square miles and an average discharge of 23.9 feet per second (fps), the Chuluota gage recorded a drainage area of 241.0 square miles and an average discharge of 264 fps.

5.1.3.2 The thickness of the surficial aquifer, or water table aquifer, is highly variable due to large variations in the thickness of sands. Recharge to the water-table

aquifer is almost entirely from local rainfall, except in those areas where it is hydraulically connected to the Floridan aquifer. The Floridan aquifer is the principal aquifer supplying most of the water used in the region. The top of the Floridan aquifer is defined as the first consistent limestone below which no clay confining beds occur. The regional direction of ground-water movement in the Floridan Aquifer is from east to west.

5.1.4 Regional Sensitive Ecological Resources

5.1.4.1 The state of Florida supports 112 federally-listed Threatened and Endangered (T&E) species consisting of 57 animals and 55 plants. Sixteen of these federally-listed species are known to exist in Orange County. These species include two reptiles, four birds, and 10 plants. Fifteen of the federally–listed species are also state–listed species. Listed species are shown on Table 5.3.

5.1.4.2 The USFWS Wetlands Online Mapper, through the NWI, was used to identify wetlands within the Pinecastle Jeep Range. Wetlands data for the entire site was available. Wetlands cover nearly the entire site. These wetlands appear to remain wet or flooded at all times. There are three main types of wetlands onsite. The main wetland types onsite are:

- PFO3C – Palustrine, forested, broad-leaved evergreen, seasonally flooded
- PSS1F – Palustrine, scrub/shrub, broad-leaved deciduous, semi-permanently flooded
- PEM1F – Palustrine, emergent, persistent, semi-permanently flooded

5.1.5 Sample Locations/Methods

5.1.5.1 Soil samples were collected from 16 locations within the former Pinecastle Jeep Range (Table 5.4). All 16 samples were collected within the site boundary, and were selected to represent areas with the highest likelihood for the presence of MEC or MC contamination, per the SS-WP (Parsons, 2006). No ambient samples were collected at the site, as per the TPP memo. Soil samples were collected from 0 to 2 inches bgs, and each of the sampling locations was recorded with a global positioning system (GPS) unit for later reference.

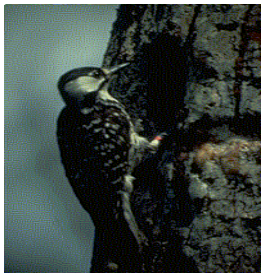
5.1.5.2 Sample locations were guided by the preliminary sample locations identified before the SI team arrived on site and were approved by the UXO technician prior to final location selection and sample collection. For safety reasons, the UXO technician used a Schonstedt magnetometer prior to final location selection and collection of the samples. Per the PWP, the Schonstedt underwent QC and battery checks each day of use to confirm that it was working appropriately. Samples were collected from 0 to 2 inches bgs, and GPS coordinates for the center point of each sample location were recorded and updated in the geographic information system (GIS) database.

5.1.5.3 No groundwater, surface water, or air samples were collected from the former Pinecastle Jeep Range.

TABLE 5.3
FEDERALLY AND STATE LISTED THREATENED AND ENDANGERED SPECIES IN ORANGE COUNTY, FLORIDA

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Bald eagle	*Haliaeetus leucocephalus*	Threatened	Threatened	Breeding habitat most commonly includes areas close to (within 4km) coastal areas, bays, rivers, lakes, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, and seabirds. Preferentially roosts in conifers or other sheltered sites in winter in some areas; typically selects the larger, more accessible trees. Perching in deciduous and coniferous trees is equally common in other areas. Avoids areas with nearby human activity (boat traffic, pedestrians) and development (buildings).	Not known, but observations of Bald Eagles occurred during the SI visit.

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Florida Scrub-jay	*Aphelocoma coerulescens*	Threatened	Threatened	The Florida scrub-jay lives only in the scrub and scrubby flatwoods habitats of Florida, dominated by low stature (<2 meters in height) oak trees and sparse groundcover. Patches of bare ground are important for foraging and acorn caching. If large trees are present, they are widely spaced.	Yes

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Red-cockaded woodpecker 	*Picoides borealis*	Endangered	Special Concern	The species Inhabits open, mature pine woodlands, rarely deciduous or mixed pine-hardwoods located near pine woodlands. Optimal habitat is characterized as a broad savanna with a scattered overstory of large pines and a dense groundcover containing a diversity of grass, forb, and shrub species. Midstory vegetation is sparse or absent. The preferred habitat is maintained by frequent, low intensity growing season fires. Nesting and roosting occur in tree cavities. Active cavity trees are almost exclusively old, living, flat-topped pine trees.	No

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Wood stork	*Mycteria americana*	Endangered	Endangered	Hydric pine flatwoods, Wet prairie, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove, Saltmarsh, Seagrass	No
Eastern indigo snake	*Dymarchon corais couperi*	Threatened	Threatened	High pine, Tropical hardwood hammock, Scrubby high pine, Beach dune/Coastal strand, Maritime hammock, Mesic temperate hammock, Pine rockland, Scrubby flatwoods, Mesic pine flatwoods, Hydric pine flatwoods, Dry prairie, Cutthroat grass, Freshwater marsh, Seepage swamp, Flowing water swamp, Pond swamp, Mangrove	No

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Sand Skink	*Neoseps reynoldsi*	Threatened	Threatened	This species occurs only on Florida's central ridges, at elevations of 27 m or more, in St. Lucie fine and Lakeland yellow sands. It inhabits loose sands of sand pine-rosemary scrub, less often longleaf pine-turkey oak (sandhill) or turkey oak "barrens" adjacent to scrub, especially high pine-scrub ecotones. Sometimes this lizard occurs in areas with dense undergrowth and extensive canopy closure. It is basically fossorial (usually within 8 cm of surface) but sometimes can be found under logs, leaf litter, and other surface debris. Well-drained sands in open glades free of rooted plants are optimal, whereas dry, porous sands are unfavorable; moisture under leaf litter is important in regulation of body temperature and for successful egg incubation. Eggs are laid in the sand or under logs or other cover.	No

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Florida Bonamia	*Bonamia grandiflora*	Threatened	Endangered	Florida bonamia grows in natural clearings of bare ground and invades disturbed areas of open sand. Although not common, it is often locally abundant where there is little or no shade from trees or shrubs. Fire exclusion allows increases in woody plants, especially shrubs, closing natural openings.	Not known
Beautiful Pawpaw	*Deeringothamnus pulchellus*	Endangered	Endangered	Grassy pine flatwoods with saw palmetto and wiregrass on Immokalee sand and Punta fine sand soils. Can be relatively abundant on road edges and partly developed subdivision lots that were occasionally mowed or lightly disturbed.	No

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Scrub Buckwheat	*Erogonum longifolium var. gnaphalifolium*	Threatened	Endangered	Scrub buckwheat occurs in habitats intermediate between scrub and sandhills (high pine) and in turkey oak barrens. Other plants that occur in the same areas include *Polygala lewtonii*, *Chionanthus pygmaeus*, and *Prunus geniculata*.	Not known
Scrub Lupine	*Lupinus aridorum*	Endangered	Endangered	This plant is a sand pine (*Pinus clausa)* scrub species that grows primarily in well-drained sandy soils of the Lakewood or St. Lucie series, or what is generally to have been sand pine and rosemary (*Ceratiola ericoides*). The tree layer may be a mixture of sand pine, *Pinus elliotii* (slash pine), and *Quercus laevis* (turkey oak). The scrub layer is usually sparse, possibly as a result of disturbance at many of the sites where the lupine occurs.	No

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Britton's Beargrass	*Nolina brittoniana*	Endangered	Endangered	*Nolina brittoniana* occurs in scrub, high pine, and even occasionally in hammocks and sandhill. This species is a generalist for xeric soils and therefore has relatively unfragmented distribution of presettlement habitat.	Not known
Paper-like Nailwort	*Paronychia chartacea ssp. chartacea*	Threatened	Endangered	The species is endemic to scrub habitats of Florida. The species will decline when successional canopy closure occurs	Not known

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Lewton's Polygala	*Polygala lewtonii*	Endangered	Endangered	The species occurs in sandhills characterized by longleaf pine and low scrub oaks, including low turkey oak woods, and transitional sandhill/scrub habitats. This species occasionally inhabits power line clearings or new roadsides.	Not known
Small's Jointweed	*Polygonella myriophylla*	Endangered	Endangered	The species is endemic to central Florida scrub. May decline due to loss of scrub habitat to residential, commercial, and agricultural development.	Not known

Common Name	Scientific Name	Federal Status	State Status	Preferred Habitat	Habitat potentially present on site?
Scrub Plum	*Prunus geniculata*	Endangered	Endangered	This plant is found in longleaf pine-turkey oak vegetation in Lake County, and in sand pine (*Pinus clausa* - evergreen oak scrub vegetation -locally referred to as scrub) in Polk and Highlands Counties	No
Clasping Wareae	*Warea amplexifolia*	Endangered	Endangered	Wide-leaf warea is found on the Lake Wales Ridge, an elongated area of raised and usually dry soils, with elevations up to about 100 meters (300 feet), extending from central Highlands County northward and gradually disappearing in southern Marion County. *Warea amplexifolia* is restricted to longleaf pine (*Pinus palustris*) and scrubby oak forests.	No

Table 5.4

Pinecastle Jeep Range

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR PINECASTLE JEEP RANGE SOIL SAMPLES COLLECTED IN JANUARY 2007

Orange County, Florida

SAMPLE ID:		PJR-TR-SS-02-01	PJR-TR-SS-02-02	PJR-TR-SS-02-20*	PJR-TR-SS-02-03	PJR-TR-SS-02-05	PJR-TR-SS-02-06	PJR-TR-SS-02-07	PJR-TR-SS-02-08	PJR-TR-SS-02-10	PJR-TR-SS-02-11	PJR-TR-SS-02-12	PJR-TR-SS-02-13	PJR-TR-SS-02-14	PJR-TR-SS-02-04	PJR-TR-SS-02-21*	PJR-TR-SS-02-09	PJR-TR-SS-02-15	PJR-TR-SS-02-16
DATE SAMPLED:		01/14/07	01/13/07	01/13/07	01/13/07	01/16/07	01/13/07	01/13/07	01/13/07	01/15/07	01/14/07	01/14/07	01/14/07	01/14/07	01/13/07	01/13/07	01/16/07	01/16/07	01/15/07
LAB SAMPLE ID:		D7A160210009	D7A160210001	D7A160210007	D7A160210002	D7A170169003	D7A160210006	D7A160210005	D7A160210004	D7A160210015	D7A160210013	D7A160210012	D7A160210010	D7A160210011	D7A160210003	D7A160210008	D7A170169002	D7A170169001	D7A160210014
Munitions Response Sites		**Range Complex No. 2 (Bombing Range)**										**Air to Ground Rocket Range**			**Range Complex No. 1 (Small Arms Range)**				
Explosives - SW8321A	**Units**																		
1,3,5-Trinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
1,3-Dinitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4,6-Trinitrotoluene (TNT)	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,4-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-Amino-4, 6-dinitrotouene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
2-Nitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
3-Nitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-Amino-2,6-Dinitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
4-Nitrotoluene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	ug/kg	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U	180 U
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	ug/kg	300 U	300 U	300 U	1200 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U	300 U
Nitrobenzene	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Nitroglycerin	ug/kg	**44000** J	500 U	500 U	**56** J	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	**220** J	**190** J	500 U	500 U	500 U
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	ug/kg	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U	120 U
Pentaerythritol Tetranitrate (PETN)	ug/kg	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Total Metals - SW6010B/6020/7471A																			
Aluminum	mg/kg	**2600**	**230** J	**210**	**3000**	**5800**	**350**	**620**	**73**	**190**	**110**	**1500**	**1500**	**410**	**480** J	**470**	**1600**	**2800**	**200**
Antimony	mg/kg	**0.21** J	0.29 U	0.29 U	1.2 U	0.28 U	0.28 U	0.27 U	0.27 U	0.27 U	0.26 U	0.32 U	0.35 U	0.34 U	**0.13** J	**0.16** J	0.83 U	0.72 U	0.35 U
Arsenic	mg/kg	**0.60** J	**0.072** J	**0.046** J	**1.2** J	**0.21** J	**0.06** J	**0.065** J	**0.026** J	**0.073** J	**0.036** J	**0.76**	**0.73** J	**0.19** J	**0.26** J	**0.23** J	**0.39** J	**0.55** J	**0.14** J
Barium	mg/kg	**4.8**	**6.2**	**5.2**	**17**	**7.3**	**4.8**	**2.5**	**1.1**	**2.0**	**1.3**	**0.97**	**5.2**	**7.8**	**7.7**	**7.3**	**17**	**2.4**	**5.1**
Beryllium	mg/kg	**0.069** J	0.11 U	0.11 U	0.48 U	**0.047** J	0.11 U	0.11 U	0.11 U	0.11 U	0.10 U	**0.050** J	**0.084** J	0.14 U	**0.037** J	**0.036** J	**0.077** J	**0.12** J	0.14 U
Cadmium	mg/kg	**0.045** J	**0.057** J	**0.039** J	**0.039** J	**0.015** J	**0.041** J	**0.017** J	**0.010** J	0.11 U	0.10 U	**0.010** J	**0.020** J	**0.017** J	**0.11** J	**0.098** J	**0.050** J	**0.084** J	**0.012** J
Calcium	mg/kg	**770**	**470**	**430**	**1600**	**110** J	**430**	**96** J	**130** J	**180**	**210**	**22** J	**610**	**250**	**2000**	**1900**	**150** J	**460**	**500**
Chromium	mg/kg	**3.3**	**1.4**	**1.0**	**3.8**	**3.9**	**0.75** J	**1.1**	**0.19** J	**0.29** J	**0.30** J	**1.9**	**2.1**	**0.68** J	**1.5**	**1.1**	**2.0** J	**3.7**	**0.53** J
Cobalt	mg/kg	**0.40**	**0.028** J	**0.021** J	**0.78**	**0.12**	**0.023** J	**0.018** J	**0.013** J	**0.015** J	**0.011** J	**0.030** J	**0.10** J	**0.082** J	**0.20**	**0.18**	**0.21** J	**0.16** J	**0.048** J
Copper	mg/kg	**6.3**	**5.2**	**3.7**	**10**	**0.37**	**5.8**	**0.38**	**0.43**	**3.7**	**0.47**	**0.37** J	**1.5**	**0.63**	**3.6**	**3.4**	**3.7**	**4.2**	**0.45**
Iron	mg/kg	**520**	**160**	**160**	**920**	**370**	**120**	**52** J	**49** J	**120**	**39** J	**650**	**560**	**540**	**870** J	**880**	**520**	**280** J	**270**
Lead	mg/kg	**15**	**3.5**	**2.4**	**15**	**6.3**	**3.9**	**6.9**	**2.1**	**1.7**	**2.2**	**3.3**	**3.4**	**6.2**	**13**	**11**	**15**	**18**	**3.2**
Magnesium	mg/kg	**230**	**6.7** J	40 U	**770**	**90**	**78**	**19** J	**19** J	**42**	**16** J	**12** J	**120**	**120**	**200**	**190**	**140**	**130**	**110**
Manganese	mg/kg	**4.2**	**0.64** J	**0.41** J	**2.8** J	**2.8**	**1.9**	**0.84** J	**0.28** J	**0.27** J	**3.8**	**0.55** J	**2.4**	**0.75** J	**11** J	**10**	**2.6** J	**1.4** J	**1.1** J

Table 5.4

Pinecastle Jeep Range

SUMMARY OF VALIDATED ANALYTICAL RESULTS FOR PINECASTLE JEEP RANGE SOIL SAMPLES COLLECTED IN JANUARY 2007

Orange County, Florida

SAMPLE ID:		PJR-TR-SS-02-01	PJR-TR-SS-02-02	PJR-TR-SS-02-20*	PJR-TR-SS-02-03	PJR-TR-SS-02-05	PJR-TR-SS-02-06	PJR-TR-SS-02-07	PJR-TR-SS-02-08	PJR-TR-SS-02-10	PJR-TR-SS-02-11	PJR-TR-SS-02-12	PJR-TR-SS-02-13	PJR-TR-SS-02-14	PJR-TR-SS-02-04	PJR-TR-SS-02-21*	PJR-TR-SS-02-09	PJR-TR-SS-02-15	PJR-TR-SS-02-16
DATE SAMPLED:		01/14/07	01/13/07	01/13/07	01/13/07	01/16/07	01/13/07	01/13/07	01/13/07	01/15/07	01/14/07	01/14/07	01/14/07	01/14/07	01/13/07	01/13/07	01/16/07	01/16/07	01/15/07
LAB SAMPLE ID:		D7A160210009	D7A160210001	D7A160210007	D7A160210002	D7A170169003	D7A160210006	D7A160210005	D7A160210004	D7A160210015	D7A160210013	D7A160210012	D7A160210010	D7A160210011	D7A160210003	D7A160210008	D7A170169002	D7A170169001	D7A160210014
Mercury	mg/kg	**0.15**	**0.011** J	**0.010** J	**0.20**	**0.037**	**0.021** J	**0.039**	0.035 U	0.036 U	0.035 U	**0.022** J	**0.014** J	**0.038** J	**0.022** J	**0.027** J	**0.068** J	**0.024** J	**0.021** J
Molybdenum	mg/kg	**0.43** J	**0.13** J	**0.087** J	**0.98**	**0.065** J	**0.15** J	**0.071** J	**0.054** J	**0.047** J	**0.043** J	**0.068** J	**0.090** J	**0.11** J	**0.10** J	**0.094** J	**0.21** J	**0.28** J	**0.10** J
Nickel	mg/kg	**1.8**	**0.36** J	**0.24** J	**2.2**	**1.7**	**0.27** J	**0.23** J	**0.11** J	**0.15** J	**0.12** J	**0.31** J	**0.51**	**0.62**	**1.2**	**0.96**	**1.8**	**1.9**	**0.36** J
Potassium	mg/kg	**260** J	340 U	340 U	**340** J	340 U	330 U	330 U	320 U	330 U	310 U	380 U	410 U	410 U	**130** J	**100** J	990 U	**120** J	**58** J
Selenium	mg/kg	**0.64** J	0.57 U	0.57 U	**0.72** J	**0.35** J	0.55 U	**0.12** J	0.53 U	0.55 U	0.52 U	**0.33** J	**0.28** J	**0.14** J	**0.23** J	**0.20** J	**0.55** J	**0.97** J	**0.15** J
Silver	mg/kg	0.28 U	**0.044** J	**0.028** J	0.48 U	0.11 U	**0.36**	0.11 U	0.11 U	0.11 U	0.10 U	0.13 U	0.14 U	0.14 U	**0.029** J	**0.024** J	0.33 U	0.29 U	0.14 U
Sodium	mg/kg	**210** J	650 U	650 U	2700 U	640 U	630 U	620 U	610 U	620 U	600 U	720 U	790 U	780 U	**92** J	710 U	1900 U	1600 U	790 U
Strontium	mg/kg	**25**	**5.6**	**5.3**	**23**	**20**	**2.1**	**4.1**	**1.3** J	**3.3**	**1.3** J	**1.0** J	**4.7**	**5.5**	**12**	**11**	**4.2** J	**6.1**	**5.0**
Thallium	mg/kg	0.28 U	0.11 U	0.11 U	0.48 U	**0.0059** J	**0.0051** J	**0.0064** J	**0.017** J	0.11 U	0.10 U	**0.0045** J	0.14 U	**0.0064** J	0.13 U	0.12 U	0.33 U	0.29 U	0.14 U
Titanium	mg/kg	**28**	**17**	**18**	**46**	**51**	**22**	**36**	**9.5**	**10**	**17**	**25**	**25**	**32**	**19** J	**15**	**54**	**59**	**16**
Vanadium	mg/kg	**5.3**	**0.64**	**0.40** J	**8.7**	**2.2**	**0.31** J	**0.68**	**0.22** J	**0.45** J	**0.26** J	**1.9**	**1.9**	**1.2**	**1.5**	**1.3**	**4.1**	**6.2**	**0.92**
Zinc	mg/kg	**5.5** J	**2.2** J	**2.2** J	**7.1** J	**2.3** J	**7.5**	**2.7**	**1.8** J	**1.6** J	**2.5** J	**1.6** J	**8.5**	**2.6** J	**19** J	**16**	**4.9** J	**4.4** J	**3.0** J

QA NOTES AND DATA QUALIFIERS:

(NO CODE) - Confirmed identification.
U - Analyte was analyzed for but not detected above the adjusted practical quantitation limit (PQL).
J - Analyte detected, estimated concentration.
* - Field duplicate of sample on left.
Detections are bolded.

5.1.6 Background Concentrations

Soil samples were analyzed for explosives (Method SW8321A), and select metals (EPA SW-846 Methods 6010B or 6020, and for Mercury 7470A and 7471A) by TestAmerica, Inc. in Arvada, Colorado. The detected concentrations of metals were compared to selected background concentrations. At this site, no site-specific background samples were collected and, therefore, the selected background concentration was the USGS background for metals in Orange County, when available (USGS, 2007). The USGS background concentrations selected approximates the 95 percent upper confidence limit on the mean and were calculated based on the mean plus two standard deviations, as provided by the USGS database. Table 5.5 shows the USGS soil background concentration.

Table 5.5
Pinecastle Jeep Range
Soil Background Screening Levels
Orange County, Florida

Analyte	Units	Orange County USGS Background Conc. [a]
Metals		
Aluminum	mg/kg	11360
Antimony	mg/kg	NA
Arsenic	mg/kg	2.879
Barium	mg/kg	NA
Beryllium	mg/kg	NA
Cadmium	mg/kg	NA
Calcium	mg/kg	7850
Chromium	mg/kg	NA
Cobalt	mg/kg	NA
Copper	mg/kg	104.906
Iron	mg/kg	5460
Lead	mg/kg	37.16
Magnesium	mg/kg	360
Manganese	mg/kg	229.479
Mercury	mg/kg	0.055
Molybdenum	mg/kg	NA
Nickel	mg/kg	NA
Potassium	mg/kg	NA
Selenium	mg/kg	0.298
Silver	mg/kg	NA
Sodium	mg/kg	240
Strontium	mg/kg	NA
Thallium	mg/kg	NA
Titanium	mg/kg	6610
Vanadium	mg/kg	NA
Zinc	mg/kg	87.962

a - USGS derived background concentration for Orange County, Florida. Value equals the mean + 2xSD (http://tin.er.usgs.gov/geochem/county.php?place=f12095&el=As&rf=southeastern)
NA - Background concentration not available.

5.1.7 Source Evaluation

5.1.8.1 As explained earlier in this chapter, an exposure pathway is not considered to be complete unless there is a source of contamination present. To make this determination, analytical results for MCs are screened against several criteria to evaluate whether or not a source of MC contamination is present. In order for a chemical to be considered as a source of contamination that is potentially related to a release from munitions-related activities at the site, it is necessary for the following conditions to be true:

- The chemical is detected in the sample medium, AND
- The chemical is present above the established background concentration (see Subchapter 5.1.7), AND
- The chemical is a potential constituent of the munitions formerly used at the range (Table 4.1), AND
- The chemical is CERCLA hazardous (per 40 CFR Part 302).

5.1.8.2 Each of the MCs analyzed at the range were evaluated against these criteria to determine whether or not a source of MC contamination was present at the MRS. Only detections of metals that meet the conditions above are evaluated further in the screening level risk assessments in Chapter 6. Any detection of explosives at the range is considered to be a source of MC contamination and is evaluated in the screening level risk assessment.

5.1.8.3 Analytical data and a determination regarding the presence of a source of contamination at each MRS are provided in Subchapters 5.2 through 5.5 below.

5.2 CHEMICAL DEMONSTRATION RANGE (MRS 01)

The Chemical Demonstration Range is in the northern end of the Pinecastle Jeep Range. No historical MC-related groundwater, surface water, soil or air sampling has been documented at this MRS or within the former Pinecastle Jeep Range.

Subchapter 5.1 summarized information on the regional setting, migration/exposure pathways, exposure targets, and historical MC information for the former Pinecastle Jeep Range. There is no information to indicate that the Chemical Demonstration Range was ever used, and no samples were collected within MRS 01. Therefore, no pathways are complete. The Chemical Demonstration Range (MRS 01) will not be included in the pathway analyses or in the screening level risk assessment.

5.3 AIR-TO-GROUND ROCKET RANGE (MRS 02)

5.3.1 Historical Munitions Constituent Information

The Air-to-Ground Rocket Range (MRS 02) is in the west central portion of the Pinecastle Jeep Range. No historical MC-related groundwater, surface water, soil or air sampling has been documented at this MRS or within the former Pinecastle Jeep Range.

Subchapter 5.1 summarized information on the regional setting, migration/exposure pathways, exposure targets, and historical MC information for the former Pinecastle Jeep Range. This section provides additional details specific to the Air-to-Ground Rocket Range (MRS 02).

5.3.2 Groundwater Migration Pathway

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

As agreed during the TPP Meeting, groundwater is not considered to represent a complete pathway at Pinecastle Jeep Range. There are no drinking wells on range, therefore, no groundwater samples were collected.

5.3.2.1 Geologic and Hydrogeologic Setting

There are no known differences between the geologic and hydrogeologic setting at the Air-to-Ground Rocket Range (MRS 02) and the setting described for the overall range in Subchapter 5.1.

5.3.2.2 Releases and Potential Releases to Groundwater

There are no known releases of MC to groundwater at the former Pinecastle Jeep Range, including at the Air-to-Ground Rocket Range (MRS 02).

5.3.2.3 Groundwater Migration Pathway Receptors

Although there are sixty-two domestic/public wells are within a 4-mile buffer zone around the range, only three domestic/public wells are located within a 1-mile buffer zone from the MRSs. The shallowest well is 140 feet deep and located approximately 3.5- miles southwest of the range. There are no drinking wells located on-range. Based on this and the information presented in Subchapter 5.1.3, it is not anticipated that human health is likely to be threatened. Therefore, there are no receptors for exposure to groundwater.

5.3.2.4 Groundwater Sample Locations/Methods

Groundwater sampling was not performed during the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere at Pinecastle Jeep Range.

5.3.2.5 Groundwater Migration Pathway Analytical Results

Groundwater sampling was not performed during the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere at Pinecastle Jeep Range.

5.3.2.6 Groundwater Migration Pathway Conclusions

The groundwater migration pathways are incomplete because there are no receptors for groundwater exposure. Groundwater sampling was not performed at the Air-to-Ground Rocket Range (MRS 02) or elsewhere at Pinecastle Jeep Range. Therefore, a screening level risk assessment was not performed.

5.3.3 Surface Water/Sediment Migration Pathway

Surface water can potentially serve as a contaminant transport mechanism that may impact surface water bodies, sediment, drinking water supplies, vegetation, and sensitive environments such as wetlands. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil at the ground surface that can be transported to the surface water through runoff. A large portion of the range, including portions of the Air-to-Rocket Range (MRS 02) contains wetlands.

5.3.3.1 Hydrologic Setting

Subchapter 5.1.3, discusses the hydrologic setting.

5.3.3.2 Releases and Potential Releases to Surface Water

The primary releases of MC during munitions activities would be to surface soil in the Air-to-Rocket Range (MRS 02). MC could then be transported to surface water through runoff. Subchapter 5.4.4 indicates that there has been a release of MC to surface soil, indicating a potential release to surface water.

5.3.3.3 Surface Water Migration Pathway Analytical Receptors

Human and ecological receptors may come into contact with surface water at the range. Human receptors are likely to be current and future residents, site workers, and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in surface water through direct contact, including incidental ingestion and dermal contact.

5.3.3.4 Sample Locations/Methods

Surface water sampling was not performed during the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere on the Pinecastle Jeep Range.

5.3.3.5 Surface Water Migration Pathway Analytical Results

Surface water sampling was not performed during the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere on the Pinecastle Jeep Range.

5.3.3.6 Surface Water Migration Pathway Conclusions

The surface water migration pathways are complete, because there is a source of MC contamination in soil and there are potential receptors present at the range. However, surface water sampling was not performed during the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere on the Pinecastle Jeep Range. Therefore, conclusions regarding the presence or absence of surface water contamination cannot be made.

5.3.4 Soil Exposure Pathway

Potential soil exposure pathways include incidental ingestion, dermal contact, and inhalation of re-suspended particulates by both human and ecological receptors, as well as leaching to groundwater and runoff to surface water. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil exposed at the ground surface, site-specific geology, climate, and the expected future land use.

5.3.4.1 Physical Source Access Conditions

Access to the range is not controlled and can be achieved either by paved and unpaved roads or by foot.

5.3.4.2 Actual or Potential Contamination Areas

There are no known MC contamination areas within the Air-to-Ground Rocket Range (MRS 02).

5.3.4.3 Soil Exposure Receptors

Human and ecological receptors may come into contact with surface soil at the range. With the scattered residential and commercial properties located within (MRS 02), human receptors are likely to be current and future residents, site workers and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in surface soil through direct contact, including incidental ingestion, dermal contact, and inhalation of fugitive dust.

5.3.4.4 Sample Locations/Methods

As specified in the SS-WP (Parsons, 2006a), the soil sample locations were screened for potential subsurface anomalies and approved by the UXO technician using a Schonstedt magnetometer prior to final location selection and sample collection. The GPS coordinates for each sample location were recorded and updated in the GIS database.

At the Air-to-Ground Rocket Range (MRS 02), three soil samples, PJR-TR-SS-02-12, PJR-TR-SS-02-13, and PJR-TR-SS-02-14 were collected. The SI team did not find any evidence of a visible target during the QR, so the samples were collected in the approximate locations described in the work plan.

5.3.4.5 Soil Migration Pathway Analytical Results

As shown in Table 5.4, laboratory analysis of the samples detected several metals in the samples. The maximum detected concentration of each metal was compared to the USGS background concentrations for Orange County, the MC list in Table 4.1 and the CERCLA hazardous substance list. Table 5.6 compares maximum detected concentrations of each analyte to the three SLRA requirements as stated in Subchapter 5.1.7. In cases where a background concentration was not available, it was assumed that the detected metal concentration exceeded background. As seen in Table 5.6, barium was the only metal retained for consideration in the SLRA. No explosives were detected in the samples; therefore, none were retained for consideration in the SLRA. It should be

noted; however, that MC was detected just outside the boundary of the MRS near the firing point.

5.3.4.6 Soil Exposure Conclusions

An exposure pathway for soil is complete at the Air-to-Ground Rocket Range (MRS 02). As seen in Table 5.6 only one analyte, barium, met the criteria for consideration in a SLRA. Therefore, a SLRA has been conducted to evaluate the potential risk associated with exposure to barium at the Air-to-Ground Rocket Range (MRS 02) and is included in Chapter 6.

Table 5.6
Air-to-Ground Rocket Range (MRS 02)
Soil Source Evaluation
Pinecastle Jeep Range, Orange County, Florida

Analyte	Units	Maximum Detected Site Concentration	Background Concentration [a]	Exceeds Background Concentration?	Potential MC? [b]	CERCLA Hazardous? [c]	SLRA Required?	Primary reason for exclusion from SLRA
Metals								
Aluminum	mg/kg	1500	11360	No	No	No	No	Not detected above background
Antimony	mg/kg	< 0.35	NA	No	Yes	Yes	No	Not detected at MRS
Arsenic	mg/kg	0.76	2.879	No	No	Yes	No	Not detected above background
Barium	mg/kg	7.8	NA	Yes	Yes	Yes	Yes	--
Beryllium	mg/kg	0.084	NA	Yes	No	Yes	No	Not a potential MC
Cadmium	mg/kg	0.02	NA	Yes	No	Yes	No	Not a potential MC
Calcium	mg/kg	610	7850	No	Yes	No	No	Not detected above background
Chromium	mg/kg	2.1	NA	Yes	No	Yes	No	Not a potential MC
Cobalt	mg/kg	0.1	NA	Yes	No	Yes	No	Not a potential MC
Copper	mg/kg	1.5	104.906	No	No	Yes	No	Not detected above background
Iron	mg/kg	650	5460	No	Yes	No	No	Not detected above background
Lead	mg/kg	6.2	37.16	No	Yes	Yes	No	Not detected above background
Magnesium	mg/kg	120	360	No	Yes	No	No	Not detected above background
Manganese	mg/kg	2.4	229.479	No	No	No	No	Not detected above background
Mercury	mg/kg	0.038	0.055	No	Yes	Yes	No	Not detected above background
Molybdenum	mg/kg	0.11	NA	Yes	Yes	No	No	Not CERCLA hazardous
Nickel	mg/kg	0.62	NA	Yes	No	Yes	No	Not a potential MC
Potassium	mg/kg	< 410	NA	No	Yes	No	No	Not detected at MRS
Selenium	mg/kg	0.33	0.298	Yes	No	Yes	No	Not a potential MC
Silver	mg/kg	< 0.14	NA	No	No	Yes	No	Not detected at MRS
Sodium	mg/kg	< 790	240	No	No	No	No	Not detected at MRS
Strontium	mg/kg	5.5	NA	Yes	Yes	No	No	Not CERCLA hazardous

Table 5.6
Air-to-Ground Rocket Range (MRS 02)
Soil Source Evaluation
Pinecastle Jeep Range, Orange County, Florida

Analyte	Units	Maximum Detected Site Concentration	Background Concentration [a]	Exceeds Background Concentration?	Potential MC? [b]	CERCLA Hazardous? [c]	SLRA Required?	Primary reason for exclusion from SLRA
Metals								
Thallium	mg/kg	0.0064	NA	Yes	No	Yes	No	Not a potential MC
Titanium	mg/kg	32	6610	No	No	No	No	Not detected above background
Vanadium	mg/kg	1.9	NA	Yes	No	No	No	Not a potential MC
Zinc	mg/kg	8.5	87.962	No	No	Yes	No	Not detected above background

a - Background Screening Level as established in Table 5.2

b - Potential MCs as listed in Table 4.1

c - Source: 40 CFR Part 302, Table 302.4--List of Hazardous Substances

NA - Background concentration not available.

5.3.5 Air Migration Pathway

The air migration pathway accounts for hazardous substance migration in gaseous or particulate form through the air. Inhalation of contaminants can be a potential threat to human and ecological receptors.

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 releases to air at the Air-to-Ground Rocket Range (MRS 02) or elsewhere at the Pinecastle Jeep Range.

5.3.5.3 Air Migration Pathway Receptors

Receptor populations potentially impacted by the air pathway consist of people who reside, work, or go to school within the target distance limit of 4 miles around the range. Human receptors are likely to be current and future residents, site workers, and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in air through inhalation of fugitive dust. Because this exposure is the result of direct contact with soil through inhalation, it is addressed in the soil exposure pathway.

5.3.5.4 Sample/Monitoring Locations/Methods

There is no historical record of air sampling at the Pinecastle Jeep Range. Air sampling was not performed as part of the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere at Pinecastle Jeep Range.

5.3.5.5 Air Migration Pathway Analytical Results

There is no historical record of air sampling at the Pinecastle Jeep Range. Air sampling was not performed as part of the SI at the Air-to-Ground Rocket Range (MRS 02) or elsewhere at Pinecastle Jeep Range.

5.3.5.6 Air Migration Pathway Conclusions

The air migration exposure pathway at the Air-to-Ground Rocket Range (MRS 02) is complete, since there is a source of MC contamination in soil (see Subchapter 5.3.4). However, inhalation of fugitive dust is addressed as a soil exposure pathway in the SLRA in Chapter 6. Barium was the only MC contaminant detected in soil and will be the only MC contaminant for which inhalation of fugitive dust will be evaluated.

5.4 RANGE COMPLEX NO. 1 (SMALL ARMS RANGE) (MRS 03)

5.4.1 Historical MC Information

The Range Complex No. 1 (MRS 03) is in the east portion of the Pinecastle Jeep Range. No historical MC-related groundwater, surface water, soil or air sampling has been documented at MRS 03 or within the former Pinecastle Jeep Range.

Subchapter 5.1 summarized information on the regional setting, migration/exposure pathways, exposure targets, and historical MC information for the former Pinecastle Jeep Range. This section provides additional details specific to the Range Complex No. 1 (MRS 03).

5.4.2 Groundwater Migration Pathway

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

As agreed during the TPP Meeting, groundwater is not considered to represent a complete pathway at Pinecastle Jeep Range. There are no drinking wells on range.

5.4.2.1 Geologic and Hydrogeologic Setting

There are no known differences between the geologic and hydrogeologic setting at the Range Complex No. 1 (MRS 03) and the setting described for the overall range in Subchapter 5.1.

5.4.2.2 Releases and Potential Releases to Groundwater

There are no known releases of MC to groundwater at the former Pinecastle Jeep Range, including at the Range Complex No. 1 (MRS 03).

5.4.2.3 Groundwater Migration Pathway Receptors

Although there are sixty-two domestic/public wells are within a 4-mile buffer zone around the range, only three domestic/public wells are located within a 1-mile buffer zone from the MRSs. The shallowest well is 140 feet deep and located approximately 3.5- miles southwest of the range. There are no drinking wells located on-site. Based on this and the information presented in Subchapter 5.1.3, it is not anticipated that human health is likely to be threatened. Therefore, there are no receptors for exposure to groundwater.

5.4.2.4 Groundwater Sample Locations/Methods

Groundwater sampling was not performed during the SI at the Range Complex No. 1 (MRS 03) or elsewhere at Pinecastle Jeep Range.

5.4.2.5 Groundwater Migration Pathway Analytical Results

Groundwater sampling was not performed during the SI at the Range Complex No. 1 (MRS 03) or elsewhere at Pinecastle Jeep Range.

5.4.2.6 Groundwater Migration Pathway Conclusions

The groundwater migration pathways are incomplete because there are no receptors for groundwater exposure. Groundwater sampling was not performed at the Range Complex No. 1 (MRS 03) or elsewhere at Pinecastle Jeep Range. Therefore, a screening level risk assessment was not performed.

5.4.3 Surface Water/Sediment Migration Pathway

Surface water can potentially serve as a contaminant transport mechanism that may impact surface water bodies, sediment, drinking water supplies, vegetation, and sensitive environments such as wetlands. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil at the ground surface that can be transported to the surface water through runoff. A large portion of the range, including portions of the Range Complex No. 1 (MRS 03) contains wetlands.

5.4.3.1 Hydrologic Setting

Subchapter 5.1.3, discusses the hydrologic setting.

5.4.3.2 Releases and Potential Releases to Surface Water

The primary releases of MC during munitions activities would be to surface soil in the Range Complex No. 1 (MRS 03). MC could then be transported to surface water through runoff. Subchapter 5.4.4 indicates that there has been a release of MC to surface soil, indicating a potential release to surface water.

5.4.3.3 Surface Water Migration Pathway Analytical Receptors

Human and ecological receptors may come into contact with surface water at the range. Human receptors are likely to be current and future site workers and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in surface water through direct contact, including incidental ingestion and dermal contact.

5.4.3.4 Sample Locations/Methods

Surface water sampling was not performed during the SI at the Range Complex No. 1 (MRS 03) or elsewhere on the Pinecastle Jeep Range.

5.4.3.5 Surface Water Migration Pathway Analytical Results

Surface water sampling was not performed during the SI at the Range Complex No. 1 (MRS 03) or elsewhere on the Pinecastle Jeep Range.

5.4.3.6 Surface Water Migration Pathway Conclusions

The surface water migration pathways are complete, because there is a source of MC contamination in soil and there are potential receptors present at the range. However, surface water sampling was not performed during the SI at the Range Complex No. 1 (MRS 03) or elsewhere on the Pinecastle Jeep Range. Therefore, conclusions regarding the presence or absence of surface water contamination cannot be made.

5.4.4 Soil Exposure Pathway

Potential soil exposure pathways include incidental ingestion, dermal contact, and inhalation of re-suspended particulates by both human and ecological receptors, as well as leaching to groundwater and runoff to surface water. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil exposed at the ground surface, site-specific geology, climate, and the expected future land use.

5.4.4.1 Physical Source Access Conditions

Access to the range is not controlled and can be achieved either by paved and unpaved roads or by foot.

5.4.4.2 Actual or Potential Contamination Areas

There are no known MC contamination areas within the Range Complex No. 1 (MRS 03).

5.4.4.3 Soil Exposure Receptors

Human and ecological receptors may come into contact with surface soil at the range. Human receptors are likely to be current and future site workers and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in surface soil through direct contact, including incidental ingestion, dermal contact, and inhalation of fugitive dust.

5.4.4.4 Sample Locations/Methods

As specified in the SS-WP (Parsons, 2006a), the soil sample locations were screened for potential subsurface anomalies and approved by the UXO technician using a Schonstedt magnetometer prior to final location selection and sample collection. The GPS coordinates for each sample location were recorded and updated in the GIS database.

Four soil samples, PJR-TR-SS-02-04, PJR-TR-SS-02-09, PJR-TR-SS-02-15, and PJR-TR-SS-02-16, were collected at the Range Complex No. 1 (MRS 03).

5.4.4.5 Soil Migration Pathway Analytical Results

As shown in Table 5.4, laboratory analysis of the samples detected nitroglycerin and several metals. The maximum detected concentration of each metal was compared to USGS background concentrations for Orange County, Florida, the MC list in Table 4.1, and the CERCLA hazardous substance list. Table 5.7 compares maximum detected

concentrations of each analyte to the three SLRA requirements as stated in Subchapter 5.1.7. In cases where a background concentration was not available, it was assumed that the detected metal concentration exceeded background. As seen in Table 5.7, three metals, antimony, barium, mercury are retained for consideration in the SLRA. In addition, the one explosive compound detected, nitroglycerin, was also retained for consideration in the SLRA.

5.4.4.6 Soil Exposure Conclusions

An exposure pathway for soil is complete at the Range Complex No. 1 (MRS 03). As seen in Table 5.7, three metals, antimony, barium, mercury, meet the criteria for consideration in a SLRA. In addition, one explosive, nitroglycerin, met the criteria for consideration in a SLRA. Therefore a SLRA has been conducted to evaluate the potential risk associated with exposure to antimony, barium, mercury, and nitroglycerin in soil at the Range Complex No. 1 (MRS 03) and is included in Chapter 6.

Table 5.7
Range Complex No. 1 (Small Arms Range) MRS 03
Soil Source Evaluation
Pinecastle Jeep Range, Orange County, Florida

Analyte	Units	Maximum Detected Site Concentration	Background Concentration [a]	Exceeds Background Concentration?	Potential MC? [b]	CERCLA Hazardous? [c]	SLRA Required?	Primary reason for exclusion from SLRA
Metals								
Aluminum	mg/kg	2800	11360	No	No	No	No	Not detected above background
Antimony	mg/kg	0.16	NA	Yes	Yes	Yes	Yes	--
Arsenic	mg/kg	0.55	2.879	No	No	Yes	No	Not detected above background
Barium	mg/kg	17	NA	Yes	No	Yes	No	Not a potential MC
Beryllium	mg/kg	0.12	NA	Yes	No	Yes	No	Not a potential MC
Cadmium	mg/kg	0.11	NA	Yes	No	Yes	No	Not a potential MC
Calcium	mg/kg	2000	7850	No	Yes	No	No	Not detected above background
Chromium	mg/kg	3.7	NA	Yes	No	Yes	No	Not a potential MC
Cobalt	mg/kg	0.21	NA	Yes	No	Yes	No	Not a potential MC
Copper	mg/kg	4.2	104.906	No	No	Yes	No	Not detected above background
Iron	mg/kg	880	5460	No	Yes	No	No	Not detected above background
Lead	mg/kg	18	37.16	No	Yes	Yes	No	Not detected above background
Magnesium	mg/kg	200	360	No	Yes	No	No	Not detected above background
Manganese	mg/kg	11	229.479	No	No	No	No	Not detected above background
Mercury	mg/kg	0.068	0.055	Yes	No	Yes	No	Not a potential MC
Molybdenum	mg/kg	0.28	NA	Yes	Yes	No	No	Not CERCLA hazardous
Nickel	mg/kg	1.9	NA	Yes	No	Yes	No	Not a potential MC
Potassium	mg/kg	130	NA	Yes	Yes	No	No	Not CERCLA hazardous
Selenium	mg/kg	0.97	0.298	Yes	No	Yes	No	Not a potential MC
Silver	mg/kg	0.029	NA	Yes	No	Yes	No	Not a potential MC
Sodium	mg/kg	92	240	No	No	No	No	Not detected above background

Table 5.7
Range Complex No. 1 (Small Arms Range) MRS 03
Soil Source Evaluation
Pinecastle Jeep Range, Orange County, Florida

Analyte	Units	Maximum Detected Site Concentration	Background Concentration [a]	Exceeds Background Concentration?	Potential MC? [b]	CERCLA Hazardous? [c]	SLRA Required?	Primary reason for exclusion from SLRA
Strontium	mg/kg	12	NA	Yes	Yes	No	No	Not CERCLA hazardous
Thallium	mg/kg	< 0.33	NA	No	No	Yes	No	Not detected at MRS
Titanium	mg/kg	59	6610	No	No	No	No	Not detected above background
Vanadium	mg/kg	6.2	NA	Yes	No	No	No	Not a potential MC
Zinc	mg/kg	19	87.962	No	No	Yes	No	Not detected above background

a - Background Screening Level as established in Table 5.5
b - Potential MCs as listed in Table 4.1
c - Source: 40 CFR Part 302, Table 302.4--List of Hazardous Substances
NA - Background concentration not available.

5.4.5 Air Migration Pathway

The air migration pathway accounts for hazardous substance migration in gaseous or particulate form through the air. Inhalation of contaminants can be a potential threat to human and ecological receptors.

5.4.5.1 Climate

Subchapter 2.2.3 discusses climate.

5.4.5.2 Releases and Potential Releases to Air

There are no known releases to air at the Range Complex No. 1 (MRS 03) or elsewhere at the Pinecastle Jeep Range.

5.4.5.3 Air Migration Pathway Receptors

Receptor populations potentially impacted by the air pathway consist of people who reside, work, or go to school within the target distance limit of 4 miles around the range. Human receptors are likely to be current and future site workers and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in air through inhalation of fugitive dust. Because this exposure is the result of direct contact with soil through inhalation, it is addressed in the soil exposure pathway.

5.4.5.4 Sample/Monitoring Locations/Methods

There is no historical record of air sampling at the Pinecastle Jeep Range. Air sampling was not performed as part of the SI at the Range Complex No. 1 (MRS 03) or elsewhere at Pinecastle Jeep Range.

5.4.5.5 Air Migration Pathway Analytical Results

There is no historical record of air sampling at the Pinecastle Jeep Range. Air sampling was not performed as part of the SI at the Range Complex No. 1 (MRS 03) or elsewhere at Pinecastle Jeep Range.

5.4.5.6 Air Migration Pathway Conclusions

The air migration exposure pathway at the Range Complex No. 1 (MRS 03) is complete, since there is a source of MC contamination in soil (see Subchapter 5.4.4). However, inhalation of fugitive dust is addressed as a soil exposure pathway in the SLRA in Chapter 6. Antimony, barium, mercury, and nitroglycerin are the MC for which inhalation of fugitive dust will be evaluated.

5.5 RANGE COMPLEX NO. 2 (BOMBING RANGE) (MRS 04)

5.5.1 Historical MC Information

The Range Complex No. 2 (MRS 04) is in the southwestern portion of the Pinecastle Jeep Range. No historical MC-related groundwater, surface water, soil or air sampling has been documented at this MRS 04 or within the former Pinecastle Jeep Range.

Subchapter 5.1 summarized information on the regional setting, migration/exposure pathways, exposure targets, and historical MC information for the former Pinecastle Jeep Range. This section provides additional details specific to the Range Complex No. 2 (MRS 04).

5.5.2 Groundwater Migration Pathway

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

As agreed during the TPP Meeting, groundwater is not considered to represent a complete pathway at Pinecastle Jeep Range. There are no drinking wells on range.

5.5.2.1 Geologic and Hydrogeologic Setting

There are no known differences between the geologic and hydrogeologic setting at the Range Complex No. 2 (MRS 04) and the setting described for the overall range in Subchapter 5.1.

5.5.2.2 Releases and Potential Releases to Groundwater

There are no known releases of MC to groundwater at the former Pinecastle Jeep Range, including at the Range Complex No. 2 (MRS 04).

5.5.2.3 Groundwater Migration Pathway Receptors

Although there are sixty-two domestic/public wells are within a 4-mile buffer zone around the range, only three domestic/public wells are located within a 1-mile buffer zone from the MRSs. The shallowest well is 140 feet deep and located approximately 3.5-miles southwest of the range. There are no drinking wells located on-site. Based on this and the information presented in Subchapter 5.1.3, it is not anticipated that human health is likely to be threatened. Therefore, there are no receptors for exposure to groundwater.

5.5.2.4 Groundwater Sample Locations/Methods

Groundwater sampling was not performed during the SI at the Range Complex No. 2 (MRS 04) or elsewhere at Pinecastle Jeep Range.

5.5.2.5 Groundwater Migration Pathway Analytical Results

Groundwater sampling was not performed during the SI at the Range Complex No. 2 (MRS 04) or elsewhere at Pinecastle Jeep Range.

5.5.2.6 Groundwater Migration Pathway Conclusions

The groundwater migration pathways are incomplete because there are no receptors for groundwater exposure. Groundwater sampling was not performed at the Range Complex No. 2 (MRS 04) or elsewhere at Pinecastle Jeep Range. Therefore, a screening level risk assessment was not performed.

5.5.3 Surface Water/Sediment Migration Pathway

Surface water can potentially serve as a contaminant transport mechanism that may impact surface water bodies, sediment, drinking water supplies, vegetation, and sensitive environments such as wetlands. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil at the ground surface that can be transported to the surface water through runoff. A large portion of the range, including portions of the Range Complex No. 2 (MRS 04) contains wetlands.

5.5.3.1 Hydrologic Setting

Subchapter 5.1.3 discusses the hydrologic setting.

5.5.3.2 Releases and Potential Releases to Surface Water

The primary releases of chemicals would be to surface soil in the Range Complex No. 2 (MRS 04), and therefore, there are no known releases of MC to surface water at the Pinecastle Jeep Range.

5.5.3.3 Surface Water Migration Pathway Analytical Receptors

Human and ecological receptors may come into contact with surface water at the range. Human receptors are likely to be current and future residents, site workers and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in surface water through direct contact, including incidental ingestion and dermal contact.

5.5.3.4 Sample Locations/Methods

Surface water sampling was not performed during the SI at the Range Complex No. 2 (MRS 04) or elsewhere on the Pinecastle Jeep Range.

5.5.3.5 Surface Water Migration Pathway Analytical Results

Surface water sampling was not performed during the SI at the Range Complex No. 2 (MRS 04) or elsewhere on the Pinecastle Jeep Range.

5.5.3.6 Surface Water Migration Pathway Conclusions

The surface water migration pathways are complete, because there is a source of MC contamination in soil and there are potential receptors present at the range. However, surface water sampling was not performed during the SI at the Range Complex No. 2 (MRS 04) or elsewhere on the Pinecastle Jeep Range. Therefore, conclusions regarding the presence or absence of surface water contamination cannot be made.

5.5.4 Soil Exposure Pathway

Potential soil exposure pathways include incidental ingestion, dermal contact, and inhalation of re-suspended particulates by both human and ecological receptors, as well as leaching to groundwater and runoff to surface water. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil exposed at the ground surface, site-specific geology, climate, and the expected future land use.

5.5.4.1 Physical Source Access Conditions

Access to the range is not controlled and can be achieved either by paved and unpaved roads or by foot.

5.5.4.2 Actual or Potential Contamination Areas

There are no known MC contamination areas within the Range Complex No. 2 (MRS 04).

5.5.4.3 Soil Exposure Receptors

With the scattered residential and commercial properties located within MRS 04, human receptors are likely to be current and future residents, site workers and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in surface soil through direct contact, including incidental ingestion, dermal contact, and inhalation of fugitive dust.

5.5.4.4 Sample Locations/Methods

As specified in the SS-WP (Parsons, 2006a), the soil sample locations were screened for potential subsurface anomalies and approved by the UXO technician using a Schonstedt magnetometer prior to final location selection and sample collection. The GPS coordinates for each sample location were recorded and updated in the GIS database.

Nine soil samples (Figure 5.1), PJR-TR-SS-02-01, PJR-TR-SS-02-02, PJR-TR-SS-02-03, PJR-TR-SS-02-05, PJR-TR-SS-02-06, PJR-TR-SS-02-07, PJR-TR-SS-02-08, PJR-TR-SS-02-10, and PJR-TR-SS-02-11, were collected at Range Complex No. 2 (MRS 04).

5.5.4.5 Soil Migration Pathway Analytical Results

As shown in Table 5.4, laboratory analysis of the samples detected nitroglycerin and several metals. The maximum detected concentration of each metal was compared to USGS background concentrations for Orange County, Florida, the MC list in Table 4.1,

and the CERCLA hazardous substance list. Table 5.8 compares maximum detected concentrations of each analyte to the three SLRA requirements as stated in Subchapter 5.1.7. In cases where a background concentration was not available, it was assumed that the detected metal concentration exceeded background. As seen in Table 5.8, three metals, antimony, barium, mercury are retained for consideration in the SLRA. In addition, the one explosive compound detected, nitroglycerin, was also retained for consideration in the SLRA.

5.5.4.6 Soil Exposure Conclusions

An exposure pathway for soil is potentially complete at the Range Complex No. 2 (MRS 04). As seen in Table 5.8, three metals analytes, antimony, barium and mercury, meet the criteria for consideration in a SLRA. In addition, one explosive compound, nitroglycerin, met the criteria for consideration in a SLRA. Therefore, a SLRA has been conducted to evaluate the potential risk associated with exposure to antimony, barium, mercury, and nitroglycerin in soil at the Range Complex No. 2 (MRS 04) and is included in Chapter 6.

Table 5.8
Range Complex No. 2 (Bombing Range) MRS 04
Soil Source Evaluation
Pinecastle Jeep Range, Orange County, Florida

Analyte	Units	Maximum Detected Site Concentration	Background Concentration [a]	Exceeds Background Concentration?	Potential MC? [b]	CERCLA Hazardous? [c]	SLRA Required ?	Primary reason for exclusion from SLRA
Metals								
Aluminum	mg/kg	5800	11360	No	No	No	No	Not detected above background
Antimony	mg/kg	0.21	NA	Yes	Yes	Yes	Yes	--
Arsenic	mg/kg	1.2	2.879	No	No	Yes	No	Not detected above background
Barium	mg/kg	17	NA	Yes	Yes	Yes	Yes	--
Beryllium	mg/kg	0.069	NA	Yes	No	Yes	No	Not a potential MC
Cadmium	mg/kg	0.11	NA	Yes	No	Yes	No	Not a potential MC
Calcium	mg/kg	1600	7850	No	Yes	No	No	Not detected above background
Chromium	mg/kg	3.9	NA	Yes	No	Yes	No	Not a potential MC
Cobalt	mg/kg	0.78	NA	Yes	No	Yes	No	Not a potential MC
Copper	mg/kg	10	104.906	No	No	Yes	No	Not detected above background
Iron	mg/kg	920	5460	No	Yes	No	No	Not detected above background
Lead	mg/kg	15	37.16	No	Yes	Yes	No	Not detected above background
Magnesium	mg/kg	770	360	Yes	Yes	No	No	Not CERCLA hazardous
Manganese	mg/kg	4.2	229.479	No	No	No	No	Not detected above background
Mercury	mg/kg	0.2	0.055	Yes	Yes	Yes	Yes	--
Molybdenum	mg/kg	0.98	NA	Yes	Yes	No	No	Not CERCLA hazardous
Nickel	mg/kg	2.2	NA	Yes	No	Yes	No	Not a potential MC
Potassium	mg/kg	340	NA	Yes	Yes	No	No	Not CERCLA hazardous
Selenium	mg/kg	0.72	0.298	Yes	No	Yes	No	Not a potential MC

Table 5.8
Range Complex No. 2 (Bombing Range) MRS 04
Soil Source Evaluation
Pinecastle Jeep Range, Orange County, Florida

Analyte	Units	Maximum Detected Site Concentration	Background Concentration [a]	Exceeds Background Concentration?	Potential MC? [b]	CERCLA Hazardous? [c]	SLRA Required ?	Primary reason for exclusion from SLRA
Silver	mg/kg	0.36	NA	Yes	No	Yes	No	Not a potential MC
Sodium	mg/kg	210	240	No	No	No	No	Not detected above background
Strontium	mg/kg	25	NA	Yes	Yes	No	No	Not CERCLA hazardous
Thallium	mg/kg	0.017	NA	Yes	No	Yes	No	Not a potential MC
Titanium	mg/kg	51	6610	No	No	No	No	Not detected above background
Vanadium	mg/kg	8.7	NA	Yes	No	No	No	Not a potential MC
Zinc	mg/kg	7.5	87.962	No	No	Yes	No	Not detected above background

a - Background Screening Level as established in Table 5.5
b - Potential MCs as listed in Table 4.1
c - Source: 40 CFR Part 302, Table 302.4--List of Hazardous Substances
NA - Background concentration not available.

5.5.5 Air Migration Pathway

The air migration pathway accounts for hazardous substance migration in gaseous or particulate form through the air. Inhalation of contaminants can be a potential threat to human and ecological receptors.

5.5.5.1 Climate

Subchapter 2.2.3 discusses climate.

5.5.5.2 Releases and Potential Releases to Air

There are no known releases to air at the Air Range Complex No. 2 (MRS 04) or elsewhere at the Pinecastle Jeep Range.

5.5.5.3 Air Migration Pathway Receptors

Receptor populations potentially impacted by the air pathway consist of people who reside, work, or go to school within the target distance limit of 4 miles around the range. Human receptors are likely to be current and future residents, site workers, and site visitors (for example, recreational users of the site). These receptors could be exposed to MC in air through inhalation of fugitive dust. Because this exposure is the result of direct contact with soil through inhalation, it is addressed in the soil exposure pathway.

5.5.5.4 Sample/Monitoring Locations/Methods

There is no historical record of air sampling at the Pinecastle Jeep Range. Air sampling was not performed as part of the SI at the Range Complex No. 2 (MRS 04) or elsewhere at Pinecastle Jeep Range.

5.5.5.5 Air Migration Pathway Analytical Results

There is no historical record of air sampling at the Pinecastle Jeep Range. Air sampling was not performed as part of the SI at the Range Complex No. 2 (MRS 04) or elsewhere at Pinecastle Jeep Range.

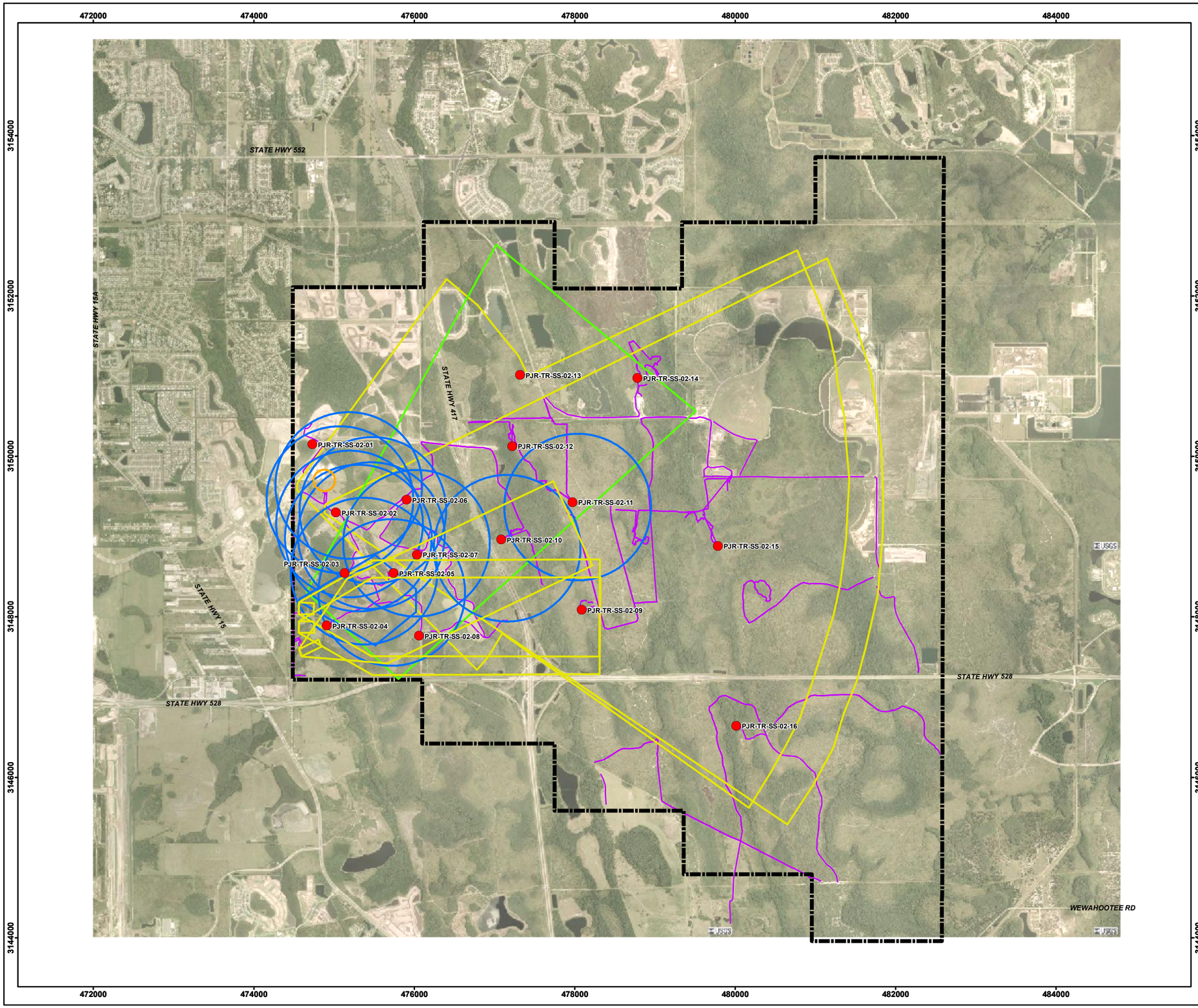
5.5.5.6 Air Migration Pathway Conclusions

The air migration exposure pathway at the Range Complex No. 2 (MRS 04) is complete because there is a source of MC contamination in soil (see Subchapter 5.5.4). However, inhalation of fugitive dust is addressed as a soil exposure pathway in the SLRA in Chapter 6. Antimony, barium, mercury, and nitroglycerin are the MC for which inhalation of fugitive dust will be evaluated.

Figure 5.1

Sample Locations
Pinecastle Jeep Range

Orlando, Florida
Orange County



Legend

- Soil Sample Location
- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- Qualitative Reconnaissance Track
- FUDS Boundary

N

Image Source: 2002 Orthophotos
Projection: UTM Zone 17 NAD83, Map Units in Meters

4,000 2,000 0 4,000 Feet

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**Sample Locations**		
DRAWN BY: BT			
CHECKED BY: JU	SCALE: As Shown	PROJECT NUMBER: 744647.03000	
SUBMITTED BY: DS	DATE: August 2007	PAGE NUMBER: 5-40	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig5_1.mxd		

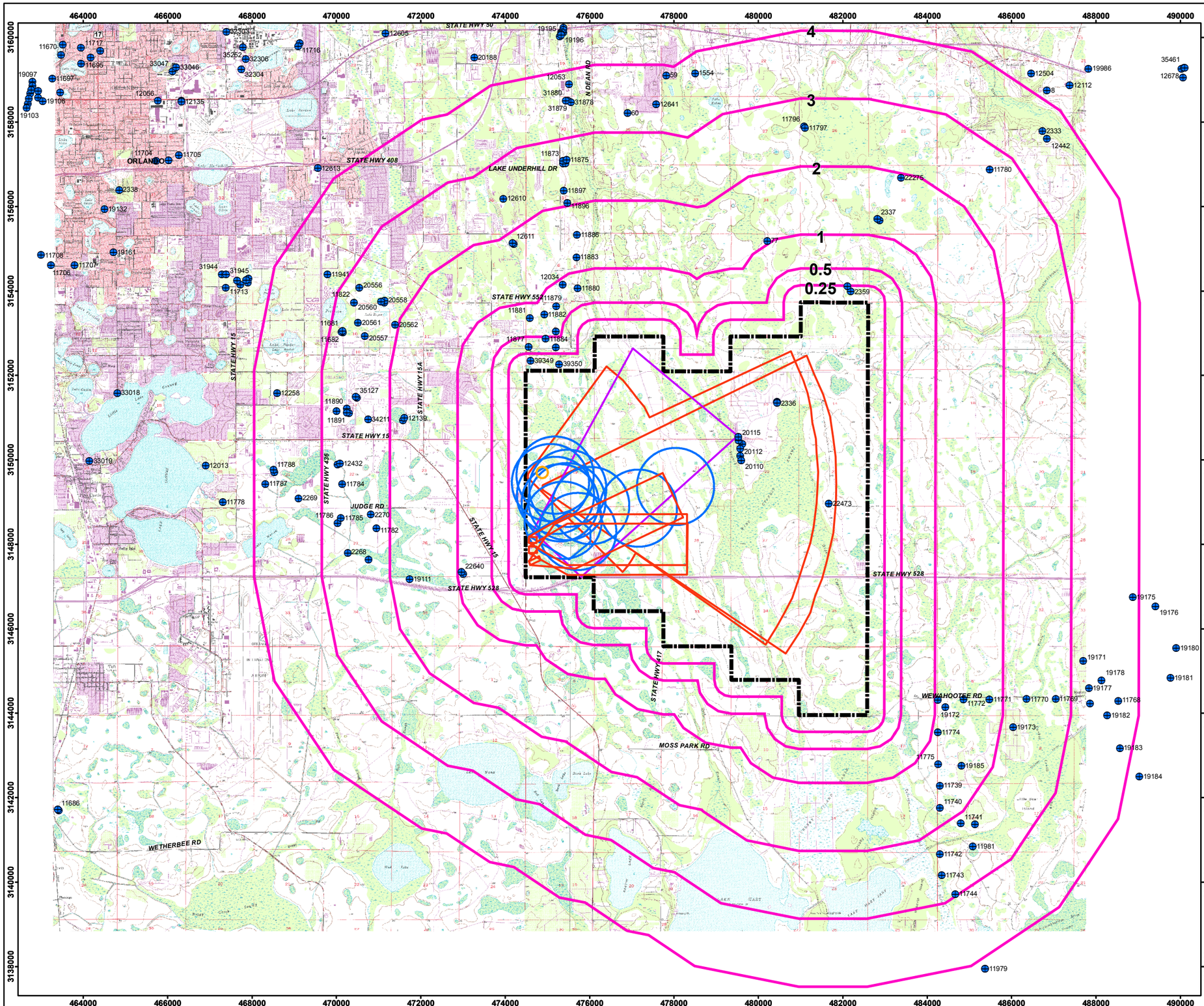


Figure 5.2

Water Wells within 4-Mile Buffer Pinecastle Jeep Range

Orlando, Florida
Orange County

Legend

- Water Well Location
- MRS 01 - Chemical Demonstration Range
- MRS 02 - Air-to-Ground Rocket Range
- MRS 03 - Range Complex No.1
- MRS 04 - Range Complex No.2
- FUDS Boundary
- Buffer (Mile)

Site Location in Florida

N

Image Source: USGS 7.5' Topo Quadrangles, 1980
Projection: UTM Zone 17 NAD83, Map Units in Meters

1 0.5 0 1 Miles

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	Water Wells within 4-Mile Buffer		
DRAWN BY: BT			
CHECKED BY: JU	SCALE: As Shown	PROJECT NUMBER: 744647.03000	
SUBMITTED BY: DS	DATE: August 2007	PAGE NUMBER: 5-41	
	FILE: X:\GIS\Site_inspections_ne\Maps\Pinecastle_FL\Fig5_2.mxd		

CHAPTER 6

SCREENING-LEVEL RISK ASSESSMENT

6.1 MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING-LEVEL RISK ASSESSMENT

6.1.1 A qualitative risk evaluation was conducted to assess potential explosive safety risk to the public at the former Pinecastle Jeep Range and to qualitatively communicate the magnitude of the potential risk at the site and the primary causes of that potential risk. The risk evaluation presented below was developed using the Interim Guidance for OE Risk Impact Assessment (USACE, 2001) and historical information presented in prior studies noted in Chapter 2 and on the QR observations for the MRSs.

6.1.2 An explosive safety risk is the likelihood for MEC to detonate as a result of human activities and potentially cause harm. An explosive safety risk exists if a person can come near or into contact with MEC and act on that item to cause a detonation. The potential for an explosive safety risk depends on the presence of three critical elements: a source (presence of MEC), a receptor or person, and interaction between the source and receptor (such as picking up the item or disturbing the item). There is no risk if any one element is missing. Each of the three elements provides a basis for implementing effective risk-management response actions.

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

Munitions and Explosives of Concern Conceptual Site Model

6.1.4 CSMs can help identify risks to human health and the environment by identifying complete exposure pathways between physical media affected by site-related contamination (*e.g.*, soil, water, air) and potential human or ecological receptors. Appendix J includes the MEC CSM for the former Pinecastle Jeep Range.

Definition of Risk Evaluation Factors, Categories, and Subcategories

6.1.5 The potential risk posed by MEC was characterized qualitatively by evaluating three primary risk factors: 1) presence of MEC sources, 2) site characteristics that affect the accessibility or pathway between the source and human receptor, and 3) human factors that define the receptors and types of activities that may result in direct contact between receptors and MEC sources. By performing a qualitative assessment of these

three factors, an overall assessment of the safety risk posed by MEC may be evaluated. The following sections describe the components of each primary risk factor.

Presence of Munitions and Explosives of Concern

6.1.6 Four categories can be used to evaluate the risk from the presence of MEC: MEC type, MEC sensitivity, MEC density, and MEC depth distribution. At the SI stage, MEC density and MEC depth are generally unknown; they are evaluated during the RI/FS stage.

6.1.7 **MEC type** affects the likelihood of injury and the severity of exposure. If multiple MEC are identified in an area, the item posing the greatest risk to public health is selected for risk evaluation. Table 6.1 shows the four subcategories of MEC type, presented in order of severity from highest to lowest risk.

Table 6.1
MEC Type Subcategories
Former Pinecastle Jeep Range

Subcategory	MEC Type Description
Most severe	MEC that may be lethal if detonated by an individual's activities
Moderately severe	MEC that may cause major injury to an individual if detonated by an individual's activities
Least severe	MEC that may cause minor injury to an individual if detonated by an individual's activities
No injury	Munitions debris (inert) that will cause no injury

6.1.8 **MEC sensitivity** affects the likelihood of detonation and the severity of exposure. Factors considered in evaluating sensitivity include fuzing and environmental factors such as weathering. The category of sensitivity is based on the results of the SI field QR as well as the results of archival studies. When multiple subcategories of MEC types are discovered in an area, the highest risk subcategory is used in the risk evaluation. Table 6.2 defines the four subcategories of sensitivity, presented in order from highest to lowest.

Table 6.2
MEC Sensitivity Subcategories
Former Pinecastle Jeep Range

Subcategory	MEC Sensitivity
Very sensitive	MEC that is very sensitive, *i.e.*, electronic fuzing, land mines, booby traps
Less sensitive	MEC that has standard fuzing
Insensitive	MEC that may have functioned correctly or is unfuzed but has a residual risk
Inert	Munitions debris (inert) that will cause no injury

6.1.9 **MEC density** directly affects the likelihood that an individual will be exposed to and negatively impacted by MEC. The more munitions per acre, the greater the likelihood of exposure to MEC and thereby the greater opportunity to create an incident. Given the absence of reliable and confirmed subsurface data at the SI stage, MEC density is not evaluated during the SI.

6.1.10 **MEC depth distribution** refers to the vertical location of MEC in the subsurface. There exists an inverse relationship between the depth of MEC and the likelihood of exposure to the MEC: the greater the depth where the MEC are found, the lower the risk of exposure. The two subcategories within the MEC depth distribution category are surface and subsurface MEC. The surface subcategory includes those items recovered on the ground surface, protruding from the ground surface, or beneath the leaf litter. Given the absence of reliable and confirmed subsurface data at the SI stage, the MEC depth distribution category is not evaluated during the SI.

Site Characteristics

6.1.11 The two categories evaluated in the site characteristics risk factor are site accessibility and site stability.

6.1.12 **Site accessibility** affects the likelihood of encountering MEC. Natural or physical barriers can limit the accessibility. Natural barriers can include the terrain or topography of the site as well as the vegetation. Physical barriers can include walls and fences that limit the public's accessibility to the sector. Both the physical and natural barriers found at a sector are considered when evaluating this category. Site accessibility has three subcategories, presented in Table 6.3.

Table 6.3
Site Accessibility Subcategories
Former Pinecastle Jeep Range

Subcategory	Accessibility Description
No restriction to site access	No man-made barriers, gently sloping terrain, no vegetation that restricts access, no water that restricts access
Limited restriction to access	Man-made barriers, vegetation, water, snow or ice cover, and/or terrain restrict access
Complete restriction to access	All points of entry are controlled

6.1.13 **Site stability** relates to the probability of exposure to MEC by natural processes, including recurring natural events (*e.g.*, erosion and frost heave) or extreme natural events (*e.g.*, severe wind and flash floods). The local soil type, topography, climate, and vegetation affect stability of the site. The soil type and climate primarily affect the depth of penetration of the MEC. Over time, the soil type and climate will also affect the degree of erosion that takes place at a site. Topography and vegetation in the area will also affect the rate of erosion that takes place in an area. Site stability has three subcategories, described in Table 6.4.

Table 6.4
Site Stability Subcategories
Former Pinecastle Jeep Range

Subcategory	Accessibility Description
Stable site	MEC should not be exposed by natural events
Moderately stable site	MEC may be exposed by natural events
Unstable site	MEC most likely will be exposed by natural events

Human Factors

6.1.14 The human risk factor evaluates site activities and population.

6.1.15 **Types of activities** conducted at a site affect the likelihood of encountering MEC. Activities may be generally classified as recreational and occupational. This category examines whether the impact from an activity on MEC is significant, moderate, or low. To assign such a score, the general guidelines presented in Table 6.5 are considered. First, the type of activity is identified. Second, the depth of the activity is considered. For example, at a site where MEC is at the surface, all activities that can impact MEC at the surface are considered activities that have significant impact or contact level. Conversely, if all MEC is located at depths greater than 1 foot and only surface impact activities are being performed, then the activities are considered as

moderate or low impact. Third, a score of significant, moderate, or low may be assigned. Given the absence of reliable and confirmed subsurface data at the SI stage, the subsurface category cannot be evaluated during the SI.

Table 6.5
MEC Contact Probability Levels
Former Pinecastle Jeep Range

Examples of Activities	Actual Depth of MEC	Contact Level
Child play, picnic, short cuts, hunting, hiking, jogging, surveying, off-road driving	Surface Below surface to 12 inches >12 inches	Significant Low Low
Camping, campfires, metal detecting	Surface Below surface to 12 inches >12 inches	Significant Moderate Low
Intrusive work	Surface Below surface to 12 inches >12 inches	Significant Significant Moderate

6.1.16 **Population** refers to the number of people that potentially access the MRS on a daily basis. A direct relationship exists between the number of people and the risk of exposure. An estimate of the number of people accessing the MEC on a daily basis was made using best professional judgment based on knowledge of the type of site, land use, and site accessibility.

Application of Risk Evaluation Factors, Categories, and Subcategories

6.1.17 An evaluation of MEC risk was performed for each identified MRS at the former Pinecastle Jeep Range.

Presence of Munitions and Explosives of Concern

6.1.18 The munitions debris identified during the QR at the former Pinecastle Jeep Range consisted of small arms casings. Based on Table 6.1 and the munitions debris (or lack thereof) observed at each MRS during the SI, an MEC type subcategory was assigned to each MRSs at the former Pinecastle Jeep Range, as shown in Table 6.6. Munitions debris (small arms) was observed at only one MRS identified within Range Complex No. 2; but due to advancement of residential development and the type of past DoD training that was reported in the ASR, the MEC type subcategory of "moderate severity".

6.1.19 In accordance with Table 6.2, an MEC sensitivity subcategory of "less sensitive" was assigned to all of the MRSs where practice or HE-bomb munitions debris were used in the past based on the assumed use of standard fuzing. Table 6.6 indicates which MRSs were assigned MEC sensitivity.

Table 6.6
Site Inspection MEC Risk Evaluation
Former Pinecastle Jeep Range

MRS	Presence of MEC Factors					Site Characteristics Factors		Human Factors	
	Type		Sensitivity	MEC Density	MEC Depth Distribution	Accessibility	Stability	Contact Level / Activities	Population (Daily)
Chemical Demonstration Range (MRS 01)	Not evaluated in SI	No injury	Insensitive	Not evaluated in SI	Not evaluated in SI	Limited restriction	Moderately stable	Significant	>5
Air-to-Ground Rocket Range (MRS 02)	Small Arms, General; 50 Cal. Machine Gun; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M38A2 100-lb Practice Bomb; HVAR 5-inch Rocket (reported in ASR)	Moderately severe	Less sensitive	Not evaluated in SI	Not evaluated in SI	Limited restriction	Moderately stable	Significant	>5
Range Complex No. 1 (MRS 03)	Small Arms, General; 50 Cal. Machine Gun (reported in ASR)	No injury	Insensitive	Not evaluated in SI	Not evaluated in SI	Limited restriction	Moderately stable	Significant	>5
Range Complex No. 2 (MRS 04)	Small Arms, General; AN-M30 100-lb General Purpose Bomb; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; AN-M67 10-lb Incendiary Bomb; AN-M50 4-lb Incendiary Bomb; AN-M69 6-lb Incendiary Bomb; M48 20-lb Practice Bomb; M1A1 Spotting Charge; M38A2 100-lb Practice Bomb (reported in ASR)	Most severe	Less sensitive	Not evaluated in SI	Not evaluated in SI	Limited restriction	Moderately stable	Significant	>5

6.1.20 MEC density is not evaluated during the SI. Given the absence of reliable and confirmed subsurface data at the SI stage, the MEC depth subcategory likewise is not evaluated during the SI.

Site Characteristics

6.1.21 The southwest portion of the former Pinecastle Jeep Range is still pasture for cattle grazing, but the northwest portion is rapidly being encroached by residential development. The remainder of the range east of State Highway 417 and north of State Highway 428 is currently owned by Orange County Landfill. The northern portion has all been mostly cleared with the exception of certain section scattered amongst the landfill, the southern portion is still wooded, but is slowly being cleared to make more for more room to accommodate the landfill growth. All of the MRSs are within easy walking distance of a paved road, and accessing many of them only requires the crossing of a locked fence. Housing developments border all of the west and north FUDS boundaries, making access easy for most if it were not for the no trespassing signs and locked gates. Barbed wire fences are present throughout much of the site are used primarily for cattle control by the only rancher who owns the area. Per Table 6.3, each of the former Pinecastle Jeep Range MRSs were assigned a site accessibility subcategory of "limited restriction" due to the locked gates, difficult access onto landfill property, minimal cause for visitors, and fences in many areas.

6.1.22 The former Pinecastle Jeep Range is a typical swampy site that remains warm year-round. Vegetation is thick with underbrush and palmettos across the site due to the humid climate, and therefore erosion of soil is likely due to the rainy and hurricane seasons. The constant rising and reseeding of the swamplands may from time to time throughout the site, indicating that water does flow from time to time. Due to the relative warmth of the area, frost heaving is not expected to be of concern at this site. Therefore, per Table 6.4, all of the MRSs were assigned a site stability subcategory of "moderately stable" based on the potential for MEC to be exposed by erosion.

Human Factors

6.1.23 Given the current and future use of the site as growing commercial and residential development, the MRSs were assigned a site activity subcategory based on the lack of, but moderate probability of finding munitions debris during the SI. All MRSs other than Chemical Demonstration Range (MRS 01) and Range Complex No. 1 (MRS 03) were assigned a contact level of "significant" based on the possibility of finding munitions debris due to the rapid development in these MRSs.

6.1.24 Based on the known uses of the former Pinecastle Jeep Range, the number of people potentially exposed to MEC at Air-to-Ground Rocket Range (MRS 02) and Range Complex No. 2 (MRS 04) on a daily basis is estimated to be less than five and for Chemical Demonstration Range (MRS 01) and Range Complex No. 1 (MRS 03) to be greater than five. Potential access is moderate due to the factors outlined in Subchapter 6.1.5.

Hazards Assessment

6.1.25 Each of the primary risk factors identified above was evaluated using the data collected during the SI field investigation and the historical data available from other

studies. Table 6.6 summarizes the MEC risk evaluation for the former Pinecastle Jeep Range.

Munitions and Explosives of Concern Risk Summary

6.1.26 MD (small arms casings) was observed during the SI site visit. Subsequent to the SI field activities, the presence of MEC has been confirmed through responses to a report from a landowner by a Patrick Air Force Base EOD team in July 2007. Based on confirmation of MEC, along with observations during the SI to include MD (small arms), cratering, and possible DoD-related burial pits, additional MEC may exist and the MEC exposure pathway may potentially be complete at the following ranges (shown on Figure 4.1):

- Air-to-Ground Rocket Range (MRS 02)
- Range Complex No. 1 (MRS 03)
- Range Complex No. 2 (MRS 04, inclusive of the Chemical Demonstration Range MRS 01)

6.1.27 Further, based on the ***discovery of UXO*** and the current development occurring in the area and proximity of the Odyssey Middle School, it is recommended that a TCRA be conducted in the immediate vicinity of the UXO findings, with a follow-on RI/FS for the remainder of the MRS land.

6.2 MUNITIONS CONSTITUENT HUMAN HEALTH SCREENING LEVEL RISK ASSESSMENT

6.2.1 Conceptual Site Model

Potential human receptors for Pinecastle Jeep Range include current and future residents, current and future construction workers, and current and future site workers and visitors. The site consists of approximately 12,483 acres in east-central Florida, approximately three miles east-northeast of Orlando International Airport. The site is primarily owned by Orange County and the City of Orlando (zoned for institutional use or reserved for wetlands) with parcels also privately owned. Access to the site is not controlled and can be achieved either by paved and unpaved roads or by foot. The MC CSEM identifies impacted media, transport mechanism, exposure routes, and potential receptors. A CSEM has been developed for each MRS and is included in Appendix J.

6.2.2 Affected Media

Direct release of MC from munitions activities at the site would have been to surface soil. Migration of MC to groundwater and surface water is possible. Based on decisions made at the TPP meeting, 16 soil samples were collected during the SI at Pinecastle Jeep Range. Surface soil is expected to act as an indicator of potential contamination. Since activities at the site would be expected to release MC directly to surface soil and result in the highest concentrations in the surface soil, the potential absence of MC in surface soil would be indicative of the absence of contamination in other media. No other media (groundwater, surface water, sediment, or air) were sampled at the site.

6.2.3 Screening Values

The soil screening values consist of the most conservative value between Florida Administrative Code 66-777 Human Health Screening Values Soil and Florida Administrative Code 66-777 Leachability to Groundwater Screening Values.

6.2.4 Risk Characterization for Soil

To complete the risk characterization for this site, the maximum detected concentration of each analyte retained for consideration in the SLRA in Chapter 5 was compared to the screening levels selected during the TPP process, in this case the Florida Administrative Code 62-777 Human Health Screening Values Soil and Florida Administrative Code 62-777 Leachability to Groundwater Screening Values.

6.2.4.1 Chemical Demonstration Range (MRS 01)

No soil samples were collected at the Chemical Demonstration Range (MRS 01). Unacceptable human health risk from MC is not expected due to exposure to soil at the Chemical Demonstration Range (MRS 01).

6.2.4.2 Air-to-Ground Rocket Range (MRS 0 2)

Three soil samples were collected from the Air-to-Ground Rocket Range (MRS 02). As described in Subchapter 5.3.4.5, one metal, barium, was retained for consideration in the SLRA. The maximum detected barium concentration (7.8 mg/kg) did not exceed the Florida Administrative Code screening value (120 mg/kg). Based on these results, unacceptable human health risk from MC is not expected due to exposure to soil at the Air-to-Ground Rocket Range (MRS 02).

6.2.4.3 Range Complex No. 1 (MRS 03)

Three soil samples (and one field duplicate sample) were collected from Range Complex No. 1 (MRS 03). As described in Subchapter 5.4.4.5, four analytes, antimony, barium, mercury, and nitroglycerin, were retained for risk characterization. As shown in Table 6.7, the maximum detected concentrations of the three metals (antimony, barium, mercury) do not exceed the Florida Administrative Code Screening Value. One explosive compound, nitroglycerin, was detected at the Range Complex No. 1 (MRS 03). The maximum detected concentration of nitroglycerin exceeds the Florida Administrative Code Screening Value. Based on these results, exposure to the metals in the soil is not expected to pose unacceptable human health risk at this range complex. However, exposure to the nitroglycerin in the soil at Range Complex No. 1 (MRS 03) may pose an unacceptable human health risk.

Table 6.7
Range Complex No. 1 (Small Arms Range) (MRS 03)
Soil Human Health Screening Risk Assessment
Former Pinecastle Jeep Range

Analyte	Units	Maximum Detected Site Concentrations	Direct Contact (Residential) Soil Screening Value or Leachability to Groundwater Value		Exceeds Screening Level?
Metals					
Antimony	mg/kg	0.16	5.4	[a]	No
Barium	mg/kg	17	120	[a]	No
Mercury	mg/kg	0.068	2.1	[a]	No
Explosives	**Units**				
Nitroglycerin	µg/kg	220	30	[a]	**Yes**

[a/] Lowest value of either Florida Administrative Code 62-777 Direct Contact (Residential) soil screening values or Florida Administrative Code 62-77 Leachability to Groundwater value
ND - Analyte was not detected in any samples
NA - No screening value available

6.2.4.4 Range Complex No. 2 (MRS 04)

Nine soils samples (and one field duplicate sample) were collected from Range Complex No. 2 (MRS 04). As described in Subchapter 5.5.4.5, four analytes, antimony, barium, mercury, and nitroglycerin, were retained for risk characterization. As shown by Table 6.8, the maximum detected concentrations of the three metals (antimony, barium, mercury) do not exceed the Florida Administrative Code Screening Value. The one explosive compound, nitroglycerin, was detected at the Range Complex No. 2 (MRS 04). The maximum detected concentration of nitroglycerin exceeds the Florida Administrative Code Screening Value. Based on these results, exposure to the metals in the soil is not expected to pose unacceptable human health risk at this range complex. However, exposure to the nitroglycerin in the soil at Range Complex No. 2 (MRS 04) may pose unacceptable human health risk.

Table 6.8
Range Complex No. 2 (Bombing Range) (MRS 04)
Soil Human Health Screening Risk Assessment
Former Pinecastle Jeep Range

Analyte	Units	Maximum Detected Site Concentrations	Direct Contact (Residential) Soil Screening Value or Leachability to Groundwater Value		Exceeds Screening Level?
Metals					
Antimony	mg/kg	0.21	5.4	[a]	No
Barium	mg/kg	17	120	[a]	No
Mercury	mg/kg	0.2	2.1	[a]	No
Explosives	**Units**				
Nitroglycerin	µg/kg	44000	30	[a]	**Yes**

[a/] Lowest value of either Florida Administrative Code 62-777 Direct Contact (Residential) soil screening values or Florida Administrative Code 62-77 Leachability to Groundwater value

6.2.5 Discussion

In summary, the concentration of nitroglycerin in soil exceeded risk-based screening levels. Therefore, there may be an unacceptable human health risk due to exposure to the nitroglycerin in the soil.

One metal, barium, at the Air-to-Ground Rocket Range (MRS 02) and three metals, antimony, barium, and mercury at the Range Complex No. 1 (MRS 03) and Range Complex No. 2 (MRS 04) were retained for consideration in the SLRA in soil, however, the maximum detected concentrations of these analytes in either Range Complex did not exceed their respective risk-based screening levels. Therefore, exposure to metals in the soil is not expected to pose an unacceptable human health risk at the Pinecastle Jeep Range.

6.3 MUNITIONS CONSTITUENT ECOLOGICAL SCREENING LEVEL RISK ASSESSMENT

The Pinecastle Jeep Range is a site over 12,000 acres in size, and contains wetlands throughout the entire area. According to the USFWS, there is the potential for several federally and state listed threatened and endangered species to occur within Orange County, and may also occur on the Pinecastle Jeep Range, although none have been specifically documented at the site. In addition, during the site visit for the SI sampling, field personnel observed several bald eagles in the area. Because protected species and habitats, including wetlands, likely present the site is considered an important ecological place and a Screening Level Ecological Risk Assessment (SLERA) is required.

6.3.1 Conceptual Site Model

Due to observations of federally listed threatened bald eagles and the presence of wetlands on the Pinecastle Jeep Range, there are potential ecological receptors located at the site. Exposure of wildlife to MC could occur through direct exposure to contaminated soil, surface water, and sediment, as well as through ingestion of wild foods. The MC CSEM identified impacted media, transport mechanisms, exposure routes, and potential receptors. A CSEM has been developed for each of the MRSs and they are included in Appendix J.

6.3.2 Management Goals

6.3.1.1 Management goals are defined as general statements about the desired condition of ecological values of concern. The goals will vary based on the objectives of the property owner, current and reasonable future land use, regulatory requirements, the ecosystem, and the environmental needs of the community or other stakeholders (USACE, 2006). The Army has an over-arching management goal for Ecological Risk Assessments (ERA):

> *Protect valuable biological resources from unreasonable adverse effects due to the release of hazardous substances associated with Army operations, including past Department of Defense operations for FUDS (BTAG, 2005).*

All site specific management goals should be consistent with this over-arching goal.

6.3.1.2 As discussed above, protected species and habitats may be present within the Pinecastle Jeep Range. Based on these ecological resources, the primary ERA management goal that can be identified is to sustain the populations of any listed species that occurs at the site.

6.3.3 Affected Media

Direct release of MC from munitions activities at the site would have been to soil. Migration of MC to groundwater through leaching is also possible. Based on decisions made at the TPP meeting, soil was the only media that was sampled during the SI at the Pinecastle Jeep Range. Surface soil is expected to act as an indicator of potential contamination. Since activities at the site would be expected to release MC directly to surface soil and result in the highest concentrations in the surface soil, the potential absence of MC in surface soil would be indicative of the absence of contamination in other media.

6.3.4 Screening Values

The ESVs used to screen the soil are taken from the USEPA Region 4 values; if a value for an analyte is not available, the USEPA Region 5 value will be used.

6.3.5 Ecological Risk Characterization for Soil

Subchapter 5.1.7 describes how the soil data for each of the MRSs were screened to determine whether analytes were both MCs and present above ambient levels. Only those soil analytes that exceeded background concentrations, are potential MC, and are CERCLA hazardous substances were retained for risk characterization in this chapter.

To complete the ecological risk characterization for this site, the maximum detected concentration of each selected analyte was evaluated against the agreed screening levels (Subchapter 6.3.4). This comparison resulted in the calculation of a HQ for each analyte. The HQ was calculated by determining the ratio of the maximum detected site concentration to the screening value (in this case, the lowest value of either the USEPA Region 4 or USEPA Region 5 ecological soil screening levels). If the HQ was equal to or less than one, the potential for ecological risk for that receptor group was considered to be negligible. If the HQ was greater than one then there would be reason to believe that ecological risks are possible.

6.3.5.1 Chemical Demonstration Site (MRS 01)

No soil samples were collected at the Chemical Demonstration Site (MRS 01). There is no potential ecological risk resulting for exposure to explosive compounds or metals at the Chemical Demonstration Site (MRS 01).

6.3.5.2 Air-to-Ground Rocket Range (MRS 02)

Three soil samples were collected at the Air-to-Ground Rocket Range (MRS 02). As determined in Subchapter 5.3.4.5, no explosives were detected in soil and one metal, barium, met the criteria for retention in the SLERA. As shown by Table 6.9, the HQ value for barium was less than 1. Therefore, there is no potential ecological risk resulting from exposure to explosive compounds or metals at the Air-to-Ground Rocket Range (MRS 02).

Table 6.9
Air to Ground Rocket Range (MRS 02)
Soil Ecological Screening Risk Assessment
Former Pinecastle Jeep Range

				Ecological Receptors
Analyte	**Units**	**Maximum Detected Site Concentrations**	**USEPA Region 4 ESV**	**HQ**
Metals				
Barium	mg/kg	7.8	165	≤1

ND- Analyte not detected.
NA - Not applicable because screening value was not available or analyte not detected.
-- Screening value not available.

6.3.5.3 Range Complex No. 1 (MRS 03)

Four samples (and one field duplicate sample) were collected at Range Complex No. 1 (MRS 03). As determined in Subchapter 5.4.4.5, one explosive compound, nitroglycerin, and three metals, antimony, barium, mercury, were detected in soil and met the criteria for retention in the SLERA. As shown by Table 6.10, the HQ values for antimony, barium, and mercury were less than 1. Based on these results, there is no potential ecological risk resulting from exposure to metals in the soil at Range Complex No. 1 (MRS 03). There is no ecological soil screening value for nitroglycerin, and therefore, conclusions cannot be made regarding the potential ecological risk associated with exposure of ecological receptors to nitroglycerin.

Table 6.10
Range Complex No. 1 (Small Arms Range) (MRS 03)
Soil Ecological Screening Risk Assessment
Former Pinecastle Jeep Range

				Ecological Receptors
Analyte	**Units**	**Maximum Detected Site Concentrations**	**USEPA Region 4 ESV**	**HQ**
Metals				
Antimony	mg/kg	0.16	3.5	≤1
Barium	mg/kg	17	165	≤1
Mercury	mg/kg	0.068	0.1	≤1
Explosives	**Units**			
Nitroglycerin	µg/kg	220	--	NA

ND- Analyte not detected.
NA - Not applicable because screening value was not available.
-- Screening value not available.

6.3.5.4 Range Complex No. 2 (MRS 04)

Nine samples (and one field duplicate sample) were collected at Range Complex No. 2 (MRS 04). As determined in Subchapter 5.5.4.5, one explosive compound, nitroglycerin, and three metals, antimony, barium, mercury, were detected in soil and met the criteria for retention in the SLERA. As shown by Table 6.11, the HQ values for antimony and barium were less than 1. The HQ value for mercury was 2. Based on these results, there is a potential ecological risk resulting from exposure to mercury in the soil at Range Complex No. 2 (MRS 04). There is no ecological soil screening value for nitroglycerin,

and therefore, conclusions cannot be made regarding the potential ecological risk associated with exposure of ecological receptors to nitroglycerin.

Table 6.11
Range Complex No. 2 (Bombing Range) (MRS 04)
Soil Ecological Screening Risk Assessment
Former Pinecastle Jeep Range

				Ecological Receptors
Analyte	**Units**	**Maximum Detected Site Concentrations**	**USEPA Region 4 ESV**	**HQ**
Metals				
Antimony	mg/kg	0.21	3.5	≤1
Barium	mg/kg	17	165	≤1
Mercury	mg/kg	0.2	0.1	2.0
Explosives	**Units**			
Nitroglycerin	µg/kg	44000	--	NA

ND- Analyte not detected.
NA - Not applicable because screening value was not available.
-- Screening value not available.

CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 SUMMARY

7.1.1 An SI was conducted to evaluate the MRSs at the former Pinecastle Jeep Range in Orange County, Florida, to determine their potential to cause significant contamination to the environment or to adversely affect human and ecological receptors. The Pinecastle Jeep Range operated as a gunnery and demonstration range for testing and troop instruction in methods of tactical bombing and strafing. The reported munitions included Small Arms (.50 caliber), General; AN-M30 100-lb General Purpose Bomb; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; AN-M67 10-lb Incendiary Bomb; AN-M50 4-lb Incendiary Bomb; AN-M69 6-lb Incendiary Bomb; M48 20-lb Practice Bomb; M1A1 Spotting Charge; M38A2 100-lb Practice Bomb, HVAR 5-inch Rocket, 11.75-inch Practice Tiny Tim Rocket.

7.1.2 The site is owned by several local government agencies and private individuals. Currently, there are multiple residential communities with additional residential development underway, schools, and community recreation areas. There are two major highways that currently cut through the former ranges, along with other well traveled paved roads throughout the areas. Other portions of the range are still undeveloped pasture lands. On average, it is estimated that more than five people visit the site per day. There are multiple ponds onsite, but no drinking water wells. The Pinecastle Jeep Range is potentially an ecologically important site as several federally listed T&E species are possibly present, and because there are wetlands throughout the site. Sixteen soil samples were collected during the SI to assess the potential presence of MC.

7.1.3 The results indicate that there are potential human health risks and ecological risks due to the presence of nitroglycerin at Range Complex No. 1 and Range Complex No. 2 and an ecological risk due to the presence of mercury in Range Complex No. 2.

7.2 CONCLUSIONS REGARDING POTENTIAL MUNITIONS AND EXPLOSIVES OF CONCERN EXPOSURE PATHWAYS

During the SI, MD were identified near soil sample location PJR-TR-SS-02-02. Based on the MD observed during this investigation, as well as the MEC identified subsequent to the SI field activities, it is possible that additional MEC exist on or around undeveloped portions of the site. The evaluation of potential MEC exposure (Subchapter 6.1) concluded that, based on the limited scope of the SI, the MEC exposure pathway was potentially complete for all MRSs within the former Pinecastle Jeep Range. Due to the fact that there is a continued potential presence of MEC, further study of the site is

warranted, with immediate action (TCRA) recommended in the proximity of the UXO findings in MRS 04 (inclusive of MRS 01).

7.3 CONCLUSIONS REGARDING POTENTIAL MUNITIONS CONSTITUENTS EXPOSURE PATHWAYS

Soil is the primary exposure pathway at the former Pinecastle Jeep Range. Based on sample analyses results, nitroglycerin exceeds the human health screening level and the ecological screening value established for the site in Range Complex No. 1 (MRS 01) and Range Complex No. 2 (MRS 02). This is a possible an indication that there is a munitions-related source for this compound. Additionally, one metal (mercury) exceeded the ecological screening level in Range Complex No. 2 (MRS 02). As a result, the soil exposure pathway, with regards to nitroglycerin and mercury, may be complete at Range Complex No. 2. The anticipated RI/FS needs to involve additional sampling to better characterize the soil for these constituents.

CHAPTER 8

RECOMMENDATIONS

8.1 Due to the confirmed presence of UXO in Range Complex No. 2, along with the current residential development, an immediate response action, TCRA, is warranted in the immediate area of the findings. Based on the MD observed during the SI, past MEC used at this site, the overlapping range configurations, plus the rapid development of residential and commercial properties on the majority of the MRSs, it is recommended that all of the four MRSs at the former Pinecastle Jeep Range proceed to RI/FS (Table 8.1). It is recommended that the Chemical Demonstration Range (MRS 01) be included with the future investigations of Range Complex No. 2 (MRS 04). Further evaluation of MC is recommended at this site due to the detection of nitroglycerin and mercury exceeding human health and/or ecological screening levels. The supporting evidence for these recommendations is as follows:

- Historical documentation indicates that practice and HE bombs and rockets were used at this site from late 1943 to 1946.
- Chemical Demonstration Range (MRS 01), has little supporting information and no SI reconnaissance data collected from the Chemical Demonstration Range (MRS 01) due to being listed as a CWM site, it should be considered as part of Range Complex No. 2 (MRS 04) since both ranges overlap.
- No munitions debris was observed at the former Pinecastle Jeep Range during the 1994 INPR site visit and the 1997 ASR site visit.
- One explosive compound (Nitroglycerin) was detected in three of the sixteen soil samples collected from worst-case locations during the SI, and one metal concentration was detected above the site-specific screening values agreed to by the TPP Team.
- Subsurface magnetic anomalies were detected by each of the possible DoD-related burial pit areas during the SI field activities, but none were detected in areas with the possible bomb craters.
- The semi-remote portions of the site, and the presence of threatened and endangered species and sensitive environments, multiple swamps or surface water, possible use of groundwater as a drinking water source, and the rapid development of commercial and residential properties in the areas of the three MRSs pose a high potential for human and environmental exposure.

Table 8.1
Recommendations
Former Pinecastle Jeep Range, Florida

MRS	MEC/MD Found	MC Contamination	Recommendation
Chemical Demonstration Range (MRS 01)	No	No	NDAI for original DoD usage; however, this MRS is entirely within MRS 04. MRS 01 should be included in any future response actions conducted for MRS 04.
Air-to-Ground Rocket Range (MRS 02)	No	No, although MC detected just outside boundary of MRS 02 near the firing point.	RI/FS
Range Complex No. 1 (MRS 03)	Yes	Yes	RI/FS
Range Complex No. 2 (MRS 04)	Yes[1]	Yes	TCRA, followed by RI/FS

1) UXO reported in July 2007 (post-SI) by landowner. Emergency response conducted by Patrick Air Force Base EOD Team.

CHAPTER 9

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USFWS, 2006b. *Wetlands Online Mapper*, National Wetlands Inventory. http://wetlandsfws.er.usgs.gov/wtlnds/launch.html> Last modified September 27, 2005. Accessed, March 30, 2006.

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USGS, 2006. The National Geochemical Survey - Database and Documentation, U.S. Geological Survey Open-File Report 2004-1001, Version 3.0, updated October 13, 2006. http://tin.er.usgs.gov/mrds. Accessed January 24, 2007.

USGS derived background concentration for Orange County. Value equals the mean + 2xSD (http://tin.er.usgs.gov/geochem/doc/averages/countydata.htm)

APPENDIX A

Performance Work Statement
Electronic Only

SECTION C - DESCRIPTIONS AND SPECIFICATIONS

PERFORMANCE WORK STATEMENT
FOR
Formerly Used Defense Sites (FUDS)
Military Munitions Response Program (MMRP)
Site Inspections (SI)
at Multiple Sites
(CONUS and OCONUS)
24 May 2005

Revison #1: 8 July 2005
Revision #2: 27 July, 2006
Revision #3: 28 September, 2006
This is a firm fixed price Task Order

Revision #2 (27 July, 2006): This revision adds Perchlorate Sampling and Analysis and MRSPP Coordination to the requirements of this Task Order.

Revision #3 (28 September, 2006): This revision clarifies requirements for the MRSPP Coordination and specifies the Period of Performance.

1.0 OBJECTIVE:

The objective of the MMRP SI is to determine whether the individual project sites within the FUDS program warrants further response action or no Department of Defense action indicated (NDAI).

2.0 BACKGROUND AND GENERAL STATEMENT OF WORK:

2.1 Regulatory Guidelines. The work required under this Scope of Work (SOW) falls under the Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP-FUDS). Munitions and Explosives of Concern (MEC) exist on property formerly owned or leased by the Department of Army. USACE is conducting environmental response activities at FUDS in accordance with Engineer Regulation (ER) 200-3-1 and the DoD Management Guidance for the Defense Environmental Response Program (DERP). USACE is conducting these activities in accordance with CERCLA.

2.1.1 MEC is a safety hazard and may constitute an imminent and substantial endangerment to the local populace and site personnel. The work associated with this Site Investigation(s) shall

be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104, and the National Contingency Plan (NCP), Sections 300.120(d) and 300.400(e), Executive Orders 12580 and 13016.

2.1.2 All activities involving work in areas potentially containing unexploded ordnance hazards shall be conducted in full compliance with Department of Defense (DoD), Department of Army, US Army Corps of Engineers (USACE), state, local and federal requirements regarding safety, personnel, equipment, and procedures. 29 CFR 1910.120 shall apply to all actions taken at this site.

2.1.3 The project sites are not suspected to contain Recovered Chemical Warfare Materiel (RCWM); however, if the contractor identifies or suspects CWM, the contractor shall immediately withdraw upwind from the work area and notify the USAESCH Chemical Warfare Design Center and the USAESCH Ordnance and Explosives (OE) Safety Office for assistance and guidance. The contractor shall secure the area and locate two Unexploded Ordnance (UXO) Technicians at level II or above upwind of the suspect CWM to secure the site until relieved by the Technical Escort Unit (TEU) or Explosive Ordnance Disposal (EOD) personnel.

3.0 Performance Work Statement:

The following performance work statement will apply to all tasks/projects in this PWS.

The contractor shall perform the activities necessary to meet the objective in paragraph 1.0 of this PWS for munitions and explosives of concern (MEC) and munitions constituents (MC). MEC intrusive activities shall **not** be performed during this SI. Work shall be in accordance with (IAW) with ER 200-3-1, the DoD Management Guidance for the Defense Environmental Response Program (DERP), and Engineering Pamphlet (EP) 75-1-2.

The contractor shall collect the minimum amount of information necessary to (i) eliminate from further consideration those releases that pose no significant threat to public health or the environment; (ii) determine the potential need for a time critical removal action; (iii) collect or develop additional data, as appropriate, for Hazard Ranking System (HRS) scoring by

Environmental Protection Agency (EPA); and (iv) collect data, as appropriate, to characterize the release for effective and rapid initiation of the Remedial Investigation and Feasibility Study (RI/FS). The contractor shall also collect the appropriate data to complete the Munitions Response Site Prioritization Protocol (MRSPP).

Methods to be used to achieve the specified objectives shall be determined by the Contractor.

Quality Control. The Contractor shall implement an accepted Quality Control (QC) Program. The Quality Control Program shall include QC procedures for all aspects and types of work. The Contractor shall ensure that QC documentation is maintained, and provided in the Final Reports. If any Government QA review identifies a process failure or a work product failure, the contractor will be issued a Corrective Action Request (CAR). The Contractor shall provide full documentation detailing the cause of the failure, why it was not detected in the Contractor's QC Program, and how the problem was corrected. Failure can be defined as workmanship or work products not complying with the WP or not meeting project needs defined during TPP or other accepted industry practices or defined as not complying with basic safety concepts and other industry safety practices.

Kick Off Meeting: The Contractor(s) shall plan to attend a kick off meeting, after award, in Huntsville, Alabama for 1 day.

Work Plan: The contractor shall prepare and submit a programmatic SI Work Plan (WP) which will also address any contractor-specific programmatic information supplemental to the Programmatic Sampling and Analysis Plan provided by the government. The WP shall be prepared following the general format described in data item description (DID) MR-001. Deviations from this format will be accepted if they are for the purpose of consolidating topics into a single chapter or sub-chapter or for removing duplications. For each site, a site-specific Work Plan and SAP annex shall be prepared.

Geographic Information System (GIS). The Contractor shall create a GIS in accordance with DID MR-005-07. The coordinate system for these tasks/projects shall be UTM Coordinates. All

geo-referenced data shall be submitted in UTM Coordinates.

Munitions Constituents Sampling and Analysis: MC sampling and analysis shall be performed IAW Final Programmatic SAP and applicable Site-Specific SAP. Any exceptions to the Programmatic SAP must be clearly indicated in the Site-Specific SAP. Contractor shall determine in consultation with their subcontractor laboratory appropriate analytical methodology to meet or exceed the data quality objectives provided in Table 1 of the Programmatic SAP. If these DQOs cannot be met with standard analytical methodology, provide recommendation for best value approach. Technical proposal shall provide laboratory's proposed reporting limits along with their method detection limits. It shall also describe laboratory's procedures for subsampling and sample preparation for explosives and any method variations to address analytes not addressed by routine methods, such as PETN and nitroglycerine. For aqueous samples, solid phase extraction rather than salting out extraction shall be used.

The contractor shall address MC sampling and analysis requirements and deliverables IAW with DID MR-005-10, with the following exceptions:

- The USACE validation process has been replaced. The contractor shall use a laboratory that meets the requirements of the HTRW Chemical Data Quality Management (CDQM) Policy for Environmental Laboratory Testing (USACE, 2004), to include NELAP accreditation and self declaration of compliance with the DoD Quality Systems Manual (DoD QSM) (latest version). All laboratory requirements of DID MR 005-10 not related to the validation process continue to apply.
- Section 1.4 of DID MR-005-10 shall be modified as follows:

  Electronic Data Deliverable; G.

  All laboratory data for samples analyzed by commercial laboratories shall be submitted in the Staged Electronic Data Deliverable (SEDD) format. Details on the SEDD format are provided in SEDD Version 5.0 (or most recent version) specification located at http://www.epa.gov/superfund/programs/clp/sedd.htm. EDDs shall be provided to applicable Design Center and MM CX on a site-by-site basis IAW schedule provided in Contractor's proposal. SEDD Stage 2a is a mandatory submittal. SEDD Stage 2b should be provided if the laboratory is capable.

- Section 2.8 of DID MR-005-10 shall be modified as follows:

  2.8 ELECTRONIC DATA DELIVERABLE

  Chemical data shall also be provided electronically by the Contractor in the SEDD format and as part of the Geographic Information System. The SEDD formatted deliverable will require data parsing for use in the Automated Data Review (ADR) software (most current version). Use of the ADR software will also require that the contractor develop a comprehensive library file for all of the methods to be analyzed under this PWS. The library file will accurately reflect all of the analytical quality requirements as documented in the Final Programmatic SAP (or site-specific SAP, if deviations from the Programmatic SAP are approved) and will be provided to the appropriate Design Center, MM CX, and the sub-contract lab for use in screening EDD submittals. All electronic data submitted by the contract laboratory is required to be error-free, and in complete agreement with the hardcopy data. Data files are to be delivered both by e-mail and on high density CD accompanying the hardcopy data reports. The disk must be submitted with a transmittal letter from the laboratory that certifies that the file is in agreement with hardcopy data reports and has been found to be free of errors using the latest version of the ADR evaluation software provided to the laboratory. The contract laboratory, at their cost, will correct any errors identified by USACE. The Contractor is responsible for the successful electronic transmission of field and laboratory data under this PWS. The Contractor's laboratory is responsible for archiving the electronic raw data and sufficient associated hardcopy data (e.g., sample login sheets and sample preparation log sheets) to completely reconstruct the analyses that were performed for a period of ten years after completion of this contract.
- The following software is available upon request to support this task as government furnished software: ADR, Environmental Data Management System (EDMS), and Forms II Lite. Use of the ADR software is mandatory, use of EDMS and Forms II Lite are optional.
- Information required for completion of main SI Report need not be duplicated in SI Report Appendix containing **CHEMICAL DATA FINAL REPORT**

<u>Perchlorate Sampling and Analysis.</u> Sampling and analysis for perchlorate shall be conducted IAW OSD Policy on DoD Required Actions Related to Perchlorate, DoD Perchlorate Handbook, and Interim Army Guidance on Perchlorate for Restoration/Cleanup Activities (or most recent version). Where potential for a DoD-related perchlorate source exists, the contractor shall include consideration of the need for perchlorate sampling and analysis in the project TPP. Analysis must be performed by Liquid Chromatography/Mass Spectrometry or Ion Chromatography/Mass Spectrometry. Either tandem or single mass spectrometry is acceptable. If the laboratory identified in the Contractor's initial proposal is unable to perform perchlorate analysis by one of these methods, Contractor may propose a supplemental laboratory for perchlorate analysis. If a supplemental laboratory is proposed, it must meet all PWS requirements and all documentation for new laboratory that was required for initial proposal must be provided.

<u>SI Reports:</u> The Contractor shall prepare a final report using DID MR-030 as a guideline for general document format. The report content outline is attached as Appendix A. Each report shall identify the specific members and title of the Contractor's staff and subcontractors that had significant and specific input into the reports' preparation or review. The contractor shall also include a cover letter signed by an authorized person (preferably the person who signed the Task Order) of the company certifying, on behalf of the company, that the requirements of this Task Order have been met.

MRSPP Coordination: The Contractor shall coordinate stakeholder participation for the MRSPP IAW 32 CFR Part 179, specifically:

- **Notify stakeholders of the opportunity to participate in the Protocol application *at a meeting to be held immediately after (on the same day or the next day) the second TPP meeting. This is to be a meeting for the regulators and stakeholders only and will not include the public unless the specifically requested by the District.***
- **Publish announcements to request involvement in the application of the Protocol and information pertinent to prioritization or sequencing. *An ad in a local newspaper must run for 2 days, once during the week and once on Sunday.***
- **Include a copy of all notices and announcements in the project file**

- **Incorporate stakeholders' input in prioritization**
- **Include information influencing the priority in the project file**

Schedule: The Contractor shall submit a proposed programmatic project schedule in the proposal. Seven (7) days after Award the contractor shall submit and electronic copy (preferably by email) of the schedule. The schedule shall be adjusted and refined during the Technical Project Planning (TPP) process. The contractor shall update the schedule in accordance with DID MR-085, Project Status Report. A task/project specific schedule shall be submitted a minimum of 14 days after the completion of the TPP process. All schedules shall be in a format compatible with Primavera software.

Teleconferences: The Contractor shall participate in monthly MMRP teleconferences with HQ, MM CX, Technical PM, District PM, and other contractors to discuss project status and any issues that have arisen during the SI phase of work. The Contractor will be prepared to present issue resolution alternatives as part of these discussions.

In Progress Review Meetings: The Contractor shall attend Quarterly In-Progress Review (IPR) meetings on the MMRP SI with USACE representatives and other contractors at various CONUS locations. In addition, the Contractor will be expected to plan, coordinate, and host one IPR meeting each year.

Reports/Minutes, Record of Meetings. The Contractor shall prepare and submit a report/minutes of all meetings attended in accordance with DID MR-045.

Telephone Conversations/Correspondence Records. The Contractor shall keep a record of each phone conversation and written correspondence concerning this Task Order in accordance with DID MR-055. A copy of this record shall be attached to the Project Status Report.

Project Status Reports. The Contractor shall prepare and submit project status reports in accordance with DID MR-085 and include any other items required in the PWS.

Specific Tasks/Projects:

The specific Tasks/Projects below are shown in the table below. Along with the project, the responsible Geographic FUDS USACE District is shown as well as the USACE design center that will provide technical management and execute the project. The 4 (four) design centers are the Huntsville Center MM Design Center (HNC), Omaha District MM Design Center (NWO), South Pacific Division Range Support Center (SPD), Baltimore District MM Design Center (NAB).

An additional list of project sites is attached as Appendix B. This list will be used for optional future SI Projects based on funding and priority from DoD.

Task #	District	FUDS ID	FUDS Name	MM DC	Perchlorate Sampling
1.1	SAW	I04NC107101	Corolla Naval Target	HNC	YES
1.2	SAS	I04GA004503	Camp Toccoa Mil Res	HNC	YES
1.3	SAJ	I04 FL 0405	Pinecastle Jeep Range	HNC	YES
1.4	POH	H09HI024901	Kane Puu	HNC	YES
1.5	LRL	G04KY0028	Camp Breckinridge	HNC	YES
1.6	SAM	I04AL06700	Fort McClellan	HNC	YES
1.7	POA	F10AK0291	Burma Road	HNC	YES
1.8	SAC	I04SC0040	Lake Murray Bombing & Gunnery Range	HNC	NO
1.9	SAW	I04NC080303	Charlotte Naval Ammo Depot	HNC	NO
1.10	SAS	I04GA106401	Arabia Mountain State Park	HNC	NO
1.11	SAJ	I04 FL 0856	Chaffee Road Bomb Target	HNC	NO
1.12	SAC	I04SC0023	Sand Hills Bombing & Gunnery Range	HNC	YES
1.13	POH	H09HI047601	Big Island Target – Mahukona Range	HNC	NO
1.14	LRL	G04KY016506	Kentucky Ordnance Works	HNC	NO
1.15	SAW	I04NC1085	Southern Shores	HNC	YES
1.16	SAC	I04SC0042	Lk Isaqueena Bom Rng	HNC	NO
1.17	SAJ			HNC	YES
2.1	NAB	C03MD0930	Assateague Island	NAB	NO
2.2	NAE	D01ME003200	Seal Island Gunnery Range	NAB	NO
2.3	NAN	C02NJ0004	Fort Hancock	NAB	YES
2.4	NAO	C03VA000901	NAAS Creeds	NAB	YES
2.5	NAB	CO3DE0526	Fort Delaware	NAB	NO
2.6	NAE	D01MA023204	Hingham NAD	NAB	YES
2.7	NAN	C02NJ0792	Millville Bomb & Gunnery Range	NAB	YES

Task #	District	FUDS ID	FUDS Name	MM DC	Perchlorate Sampling
2.8	NAO	C03VA020201	Plum Tree Island	NAB	YES
2.9	NAB	C03PA0048	Susquehanna Ordnance Sub-Depot	NAB	NO
2.10	NAO	C03VA0162	Virginia Ordnance Works	NAB	NO
2.11	NAB	C03DE0528	Governor Bacon Health Center	NAB	NO
2.12	NAO	C03VA0103	Ft. Monroe/Ft. Wool	NAB	NO
2.13	NAO	C03VA1012	Camp Wallace	NAB	YES
2.14	NAO	C03VA0194	Chopawamic Troop Trng	NAB	YES
2.15	NAO	C03VA0027	Ft. Lee	NAB	NO
3.1	LRL	G05OH0007	Lockbourne, AFB	NWO	YES
3.2	NWK	B07MO014601	Jefferson Barracks Target Range	NWO	YES
3.3	NWO	B08WY042601	Casper Ground Gunnery Range	NWO	NO
3.4	NWS	F10OR004102	Camp Abbott	NWO	YES
3.5	LRL	E05MI003402	Camp Claybanks AAA Firing Range	NWO	YES
3.6	NWK	B07KS002904	Olathe Naval Air Station	NWO	NO
3.7	NWO	B08WY042901	Casper Precision Bombing Range No. 3	NWO	NO
3.8	NWS	F10OR002903	Camp Adair	NWO	YES
3.9	LRL	G05IN0010	Camp Atterbury	NWO	NO
3.10	LRL	G05OH002706	Erie Army Depot	NWO	YES
3.11	LRL	G05IN001904	Kingsbury Ordnance Plant	NWO	NO
3.12	LRL	E05MI001303	Ft Custer Rec Area	NWO	YES
3.13	LRL	E05MI000501	Camp Lucas/Camp Brady Target Range	NWO	NO
3.14	LRL	E05IL009903	Green River Ordnance Plant	NWO	YES
3.15	LRL	E05IL010203	Sangamon Ordnance Plant	NWO	NO
4.1	SPA	K06NM042401	Fort Sumner	SPD	YES
4.2	SWF	K06TX1008	Matagorda Peninsula Bombing Range	SPD	YES
4.3	SPL	J09CA1110	Camp Matthews	SPD	YES
4.4	SWT	K06OK011001	Great Salt Plains Bombing Range	SPD	YES
4.5	SPL	J09AZ057601	Sahuarita AFR	SPD	YES
4.6	SWF	A06LA0008	Camp Livingston	SPD	YES
4.7	SPL	J09CA707802	Camp Lockett - Target Pit	SPD	YES
4.8	SWT	K06OK001301	Camp Gruber	SPD	YES
4.9	SPA	K06NM005206	Walker AFB	SPD	YES
4.10	SWF	K06TX0058	Matagorda Island AF Range	SPD	YES
4.11	SPL	J09CA711501	Naval Air Base - Ordnance Areas	SPD	YES
4.12	SPL	J09CA724201	Camp Vista Army - Green Oak Ranch Small	SPD	NO

Task #	District	FUDS ID	FUDS Name	MM DC	Perchlorate Sampling
			Arms Range		
4.13	SWF	K06TX0144	Pyote AAF Bomb Range #1	SPD	NO
4.14	SWF	K06TX0293	Childress AAF Bombing Range #1	SPD	NO
4.15	SWF			SPD	NO
4.16					
4.17					
4.18					

Design Center-Specific Requirements:

Huntsville Design Center Projects: Southeast and Pacific IMA Regions (Tasks 1.X)

The contractor that is awarded the tasks/projects assigned to the Huntsville MM Design Center shall plan for an onboard review of draft programmatic work plan and the internal draft SI report at USAESCH in Huntsville, AL. This onboard review shall take place after the contractor has received comments on the draft WP and after receiving comments on the internal draft SI Report. The contract shall be expected to provide a CD of the draft version at the conclusion of the onboard review.

Baltimore MM Design Center Projects: Northeast IMA Region (Tasks 2.X)

The contractor that is awarded the tasks/projects assigned to the Baltimore MM Design Center shall plan for an onboard review of the draft SI report at the District office in Baltimore, MD. This onboard review shall take place after the contractor has received comments on the internal draft version.

Omaha District Design Center Projects: Northwest IMA Region (Tasks 3.X)

The contractor that is awarded the tasks/projects assigned to the Omaha District MM Design Center shall plan for an onboard review of the draft SI report at the District office in Omaha, NE. This onboard review shall take place after the contractor has received comments on the internal draft version.

South Pacific Division Range Support Center Projects: Southwest IMA Region (Tasks 4.X)

The contractor that is awarded the tasks/projects assigned to the South Pacific Division Range Support Center shall plan for an onboard review of draft programmatic work plan and the internal draft SI report at the South Pacific Division USACE Headquarters, San Francisco, Ca. This onboard review shall take place after the contractor has received comments on the draft WP and after receiving comments on the internal draft SI Report. The contract shall be expected to provide a CD of the draft version at the conclusion of the onboard review.

4.0 SUBMITTALS AND CORRESPONDENCE:

Computer Files. All final text files generated by the Contractor under this task order shall be furnished to the Contract Officer in Microsoft Word 6.0 or higher software. Spreadsheets shall be provided in Microsoft EXCEL format. All final CADD drawings shall be in Microstation 95 or higher. All GIS data shall be in ESRI (Arcview/Arcinfo) format. All chemical sampling data submittals shall be IAW DID MR 005-10 except as noted above. These documents shall be submitted on CD or DVD.

PDF Deliverables. In addition to the paper and digital copies of submittals, the final version of any and all reports and/or plans shall be submitted, uncompressed, on CD or DVD in PDF format along with a linked table of contents, linked tables, linked photographs, linked graphs and linked figures, all of which shall be suitable for viewing on the Internet. PDF files shall be produced from source documents wherever possible.

Review Comments. Various reviewers will have the opportunity to review submittals made by the Contractor under this contract. The Contractor shall review all comments received through the Technical or Project Manager/Contracting Officer and evaluate their appropriateness based upon their merit and the requirements of the PWS. The Contractor shall issue to the Project Manager a formal, annotated response to each. The Contractor shall not non-concur with a comment without discussing with the PM and/or comment maker.

Public Affairs. The Contractor shall not publicly disclose any data generated or reviewed under this contract. The Contractor shall refer all requests for information concerning site conditions to the subject FUDS Geographic USACE Corps of Engineers District with a copy furnished to the

Technical Manager. Reports and data generated under this contract are the property of DoD and distribution to any other source by the Contractor, unless authorized by the Contracting Officer, is prohibited.

Submittals: The contractor shall furnish copies of the plans, maps, and reports as identified in table below, or as specified in this PWS, to each addressee listed below in the quantities indicated.

Document Distribution: For the purposes of determining when documents get submitted to specific organizations, the attached document distribution table is provided.

Document Description	HTRW CX		MM Design Center		District PM		MM CX		HQ USACE
	Hard Copy	CD	Hard Copy	CD	Hard Copy	CD	Hard Copy	CD	CD
CSM:									
Draft	2		3		6		2		
Working Final	2		3		6		2		1
TPP Memorandum:									
Draft	1	2	1	3	1	6	1	2	1
Final Memorandum	1	2	1	3	1	6	1	2	1
SI Work Plan:									
Draft	1	2	1	3	1	6	1	2	1
Final	1	2	1	3	1	6	1	2	1
SI Report:									
Draft	1	2	1	3	1	6	1	2	
Draft Final	1	2	1	3	1	6	1	2	1
Final	1	2	1	3	1	6	1	2	1

Notes:

1. The number of final copies distributed may vary from that shown above

Period of Performance: *All projects are to be completed within 18 months of the award date.*

Milestones:

TPP Memorandum (accepted)

Work Plan (accepted)

Field Work Completed

Final SI Report (accepted)

Milestones will be considered met or completed when the appropriate QC documentation has been submitted and QA completed and the submittal and/or product is accepted.

Points of Contact:

Program Manager:

Betina Johnson

CEHNC-OE-CX

US Army Engineering and Support Center

P. O. Box 1600

4820 University Square

Huntsville, AL 35807

256-895-1238

Betina.V.Johnson@hnd01.usace.army.mil

Huntsville Center MMRP SI Regional Program Manager

Chris Cochrane

CEHNC-OE-DC

US Army Engineering and Support Center

P. O. Box 1600

4820 University Square

Huntsville, AL 35807

256-895-1696

Chris.Cochrane@hnd01.usace.army.mil

Omaha District MMRP SI Regional Program Manager

Robert Zaruba

CENWO-PM-HB (ZARUBA)

106 South 15th Street

Omaha, NE 68102-1618

(402) 221-7659

Robert.K.Zaruba@nwo02.usace.army.mil

SPD Range Support Center MMRP SI Regional Program Manager

Monique Ostermann

CESPA-EC-EG (Ostermann)

4101 Jeff Plaza NE

Albuquerque, NM 87109

(505) 342-3475 Monique.M.Ostermann@spa02.usace.army.mil

Baltimore District MMRP SI Regional Program Manager

Leland Reeser

CENAB-EN-HN (Reeser)

10 South Howard Street

Room 10040D

Baltimore, MD 21201

(410) 962-2186

Leland.H.Reeser@nab02.usace.army.mil

5.0 REFERENCES

5.1 Basic Contract

5.2 USACE, 2004 - HTRW Chemical Data Quality Management (CDQM) Policy for Environmental Laboratory Testing, September 30, 2004

5.3 DoD Quality Systems Manual (DoD QSM) (latest version).

5.4 USEPA, 1992 - Guidance for Performing Site Inspections under CERCLA; Interim Final, September 1992, PB92-963375, EPA 9345.1-05

5.5 EM 200-1-3, Requirements for the Preparation of Sampling and Analysis Plans

5.6 ER 1110-1-263, Chemical Data Quality Management for Hazardous, Toxic, Radioactive Waste Remedial Activities

5.7 DOD Memorandum on Definitions Related to Munitions Response Actions, 18 December 2003, http://www.epa.gov/fedfac/pdf/MRP_Definitions_12-18-03.pdf.

5.8 Military Munitions Center of Expertise Technical Update Munitions Constituent (MC) Sampling March 2005.

5.9 OASA(I&E) Memorandum on Munitions Response Terminology, April 21, 2005

5.10 DUSD (I&E) Policy on DoD Required Actions Related to Perchlorate, January 26, 2006

5.11 EPA OSWER Assessment Guidance for Perchlorate, January 26, 2006

5.12 DoD Perchlorate Handbook, March 2006

5.13 ACSIM Memorandum: Interim Army Guidance on Perchlorate for Restoration/Cleanup Activities, May 25, 2006

SAMPLE PUBLIC COMMENT NEWSPAPER AD

PUBLIC NOTICE

Name of site

Taking into consideration various factors relating to safety and environmental hazard potential, the U.S. Army Corps of Engineers designated ***name of site*** as a Munitions Response Site for applying the Department of Defense's Munitions Response Site Prioritization Protocol.

DoD conducted live-fire training and testing of weapon systems at active and former military installations throughout the United States to ensure force readiness and defend our nation. While DoD has made great progress in addressing the potential hazards associated with former munitions-related activities, much remains to be done. Through direction provided by Congress, DoD developed a model that assigns priorities to defense sites containing unexploded ordnance, discarded military munitions or munitions constituents.

One sentence that describes what took place at this site (i.e. chemical warfare training, live-fire, testing, etc.). The U.S. Army Corps of Engineers has recently completed a site inspection at ***name of site*** and evaluated it using the prioritization model. 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 at ***district Web site*** and ***name of information repository.***

If you have additional information about ***name of site*** please send it to: U.S. Army Corps of Engineers, ***name of district***, Public Affairs Office, ***address*** or email to ***email address for PAO***.

For more information, please contact the U.S. Army Corps of Engineers, ***name of district***, Public Affairs Office at ***phone number***.

SECTION G - CONTRACT ADMINISTRATION DATA

Accounting and Appropriation

Summary for the Payment Office

As a result of this modification, the total funded amount for this document was increased by $1,212,109.00 from $7,051,591.53 to $8,263,700.53.

CLIN 0008:

CS: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 9L4D96 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CS has been added.

CT: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 L4JD47 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CT has been added.

CU: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 92D9K0 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CU has been added.

CV: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 607BG5 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CV has been added.

CW: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 1FB51L was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CW has been added.

CX: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 9F300K was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CX has been added.

CY: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 72K0L4 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CY has been added.

CZ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 3D7KBB was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN CZ has been added.

DA: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 LDF20K was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DA has been added.

DB: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 4LHFFJ was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DB has been added.

DC: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 H8H6D7 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DC has been added.

DD: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 9GG8K9 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DD has been added.

DE: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 GLHL60 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DE has been added.

DF: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 0DB05F was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DF has been added.

DG: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 41DBDG was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DG has been added.

DH: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 7H12CD was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DH has been added.

DJ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 D93881 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DJ has been added.

DK: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 C2B331 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DK has been added.

DL: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 B1J839 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DL has been added.

DM: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 D5DD53 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DM has been added.

DN: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 H1203K was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DN has been added.

DP: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 KF76K9 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DP has been added.

DQ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 06BG23 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DQ has been added.

DR: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 C87G9L was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DR has been added.

DS: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 2139H4 was increased by $6,721.00 from $0.00 to $6,721.00

The contract ACRN DS has been added.

DT: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 J683GK was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DT has been added.

DU: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 6F055C was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DU has been added.

DV: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 8J2D8L was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DV has been added.

DW: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 46H2FL was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DW has been added.

DX: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 K1L26J was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DX has been added.

DY: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 12F88B was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DY has been added.

DZ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 32GJ3K was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN DZ has been added.

EA: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 J58C47 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EA has been added.

EB: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 31GLD6 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EB has been added.

EC: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 C64120 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EC has been added.

ED: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 8H80KH was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN ED has been added.

EE: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 7H33HK was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EE has been added.

EF: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 K73G68 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EF has been added.

EG: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 KB03L2 was increased by $6,721.00

from $0.00 to $6,721.00
The contract ACRN EG has been added.

EH: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 F7H91G was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EH has been added.

EJ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 G831CJ was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EJ has been added.

EK: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 9K5G1L was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EK has been added.

EL: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 3L2J39 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EL has been added.

EM: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 3B9K34 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EM has been added.

EN: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 GK27D1 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EN has been added.

EP: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 D51KF1 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EP has been added.

EQ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 03CF6G was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EQ has been added.

ER: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 9B1LK9 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN ER has been added.

ES: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 452B6D was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN ES has been added.

ET: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 75H962 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN ET has been added.

EU: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 JD0KD0 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EU has been added.

EV: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 18114K was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EV has been added.

EW: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 D9K38L was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EW has been added.

EX: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 081K5K was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EX has been added.

EY: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 J88B1F was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EY has been added.

EZ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 D4GJL5 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN EZ has been added.

FA: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 L7K3K4 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN FA has been added.

FB: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 9D6B16 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN FB has been added.

FC: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 6B1L69 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN FC has been added.

FD: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 325GD3 was increased by $6,721.00 from $0.00 to $6,721.00
The contract ACRN FD has been added.

FE: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 1K8FLG was increased by $163,350.00 from $0.00 to $163,350.00
The contract ACRN FE has been added.

FF: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 14B53C was increased by $150,346.50 from $0.00 to $150,346.50
The contract ACRN FF has been added.

FG: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 75C2KJ was increased by $150,346.50 from $0.00 to $150,346.50
The contract ACRN FG has been added.

FH: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 F015FC was increased by $154,035.00 from $0.00 to $154,035.00
The contract ACRN FH has been added.

FJ: 21 NA 2006 2020.0000 A0 2006 08 8130 49300821000 01110 3230 D52172 was increased by $190,771.00 from $0.00 to $190,771.00
The contract ACRN FJ has been added.

(End of Summary of Changes)

Appendix A
Site Inspection Report Outline
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TABLE OF ACRONYMS

GLOSSARY OF TERMS

Table of Contents (Government will provide example table of contents but allows for flexibility in the TOC)

EXECUTIVE SUMMARY

- Brief 1-2 page summary
- Include a table summarizing findings by MRA/MRS.
- Include small paragraph summarizing recommendations.

1.0 INTRODUCTION

- State that an SI was performed, the name of the agency performing it, and the authority under which it was conducted (authority language provided below):

  The Department of Defense (DoD) has 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 U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at formerly used defense sites (FUDS) for the Army, DoD's Executive Agent for the FUDS program.

  Pursuant to USACE's Engineer Regulation (ER) 200-3-1 (USACE, 10 May 2004) and the Management Guidance for the Defense Environmental Response Program (DERP) (Office of the Deputy Under Secretary of Defense (Installations and Environment), September 2001), USACE is conducting FUDS response activities in accordance with the DERP statute (10 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, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). As such, USACE is conducting remedial site inspections (SI), as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

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

- State the FUDS property name, FUDS property and project numbers, and location (street address, city, county, State, latitude/longitude coordinates). If necessary, provide brief directions to the property.
- State the purpose, scope, and objectives of the SI (standard language provided below):

  The primary objective of the MMRP SI is to determine whether a FUDS project warrants further response action under CERCLA or not. The SI collects the minimum amount of information necessary to make this determination, as well as it (i) determines the potential need for a removal action (ii) collects or develops additional data, as appropriate, for Hazard Ranking System (HRS) scoring by Environmental Protection Agency (EPA); and (iii) collects data, as appropriate, to characterize the release for effective and rapid initiation of the Remedial Investigation and Feasibility Study (RI/FS). An additional objective of the MMRP SI is to collect the additional data necessary to ~~(i)~~ complete the Munitions Response Site Prioritization Protocol (MRSPP).

Appendix A
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2.0 PROPERTY DESCRIPTION AND HISTORY

- Identify and describe historic military operations (e.g., munitions manufacturing plant, Air Force or Navy base, Army WWII training camp, etc.) at the FUDS property, as well as the individual MRAs (e.g., mortar range, artillery range, open burning/open detonation area, burial pit, etc.)/MRSs identified.
    - Identify former owners and operators, years of operation, types of MEC and MC used and thought to be present, any MEC or MC treatment or disposal practices, containment features, if present, and quantities of MEC or MC used and thought to be present, if known or possible to estimate. Identify current owners and operators and current land use.
    - Describe the area's physical setting (e.g., topography, climate, vegetation, and significant structures). Describe accessibility to MEC and MC and current institutional controls (e.g., fencing, signage, etc.). Briefly describe surrounding land uses and identify nearby populations.
- Include the appropriate portion of a USGS 7.5-minute topographic map locating the project and surrounding area. On the map, identify nearby surface water bodies and the nearest groundwater and drinking water wells, drinking water intake, residence, wetlands, and other sensitive environments, as applicable.
- If applicable, provide the dates, scopes, and general results of previous investigations for MEC and MC, including previous records reviews (Archives Search Reports (ASR) and results of subsequent range inventory (ASR supplement)) and any investigations conducted under USACE's hazardous, toxic, and radioactive waste (HTRW) program related to MC.
- If applicable, describe other land use that may have contributed to contamination, as well as regulatory history, if applicable, including RCRA status, permits, permit violations, and inspections by local, State, or Federal authorities.
- Discuss any occurrences of MEC found by citizens and any accidents, injuries, chemical exposures, or complaints.

3.0 SI TASKS

- Include a summary of agreements made in the first Technical Project Planning (TPP) session and contacts made with the State Historical Preservation Office, U.S. Fish and Wildlife Service, or other agencies coordinated with on cultural and natural resources considerations.
- Describe the results of any additional desk-top research or interviews conducted as part of the SI, by MRA, as applicable.

4.0 MEC Findings

- Summarize, by MRA, the investigative activities conducted for MEC and the results. Present data quality objectives (DQOs) of the SI and discuss whether they were satisfied.
    - Identify specific MEC items found, wherever possible, and list them in a table, describing the results of the qualitative reconnaissance, as well as any geophysical studies, spatial analysis, aerial surveys, and footprint analysis (i.e., identification of MRA boundaries), if conducted. Include a map of the results of the reconnaissance inspections.
    - Summarize previous MEC findings in a table. Include a map of MEC finds, and add locations to the CSM, or refer to a map in a previous report.

5.0 MIGRATION/EXPOSURE PATHWAYS AND TARGETS

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Site Inspection Report Outline
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GROUND WATER MIGRATION PATHWAY

- Describe the local geologic and hydrogeologic setting and features, (including the stratigraphy, geologic formations, aquifers, karst features, confining layers, and depth to each aquifer. Provide a description of the underlying unit with the lowest hydraulic conductivity, including its thickness. (Do not consider units within the first 10 feet below ground surface.)
- Discuss ground water use within a 4-mile radius of the MRAs. Identify the nearest private and municipal drinking water wells, including standby wells used at least once a year. Provide the number of wells, their locations, pumping rates, and the aquifer from which water is drawn. Identify wells in karst aquifers. Quantify drinking water populations served by wells within 4 miles, breaking out populations into the following distance categories: 0-1/4; >1/4-1/2; >1/2-1; >1-2; >2-3; and >3-4 miles, including residents, students, and workers. Identify any municipal wells that are part of a blended system (ground water mixed with surface water), and provide the relative amount the wells contribute to the system. [Note: Where more than one MRSs have been identified, measure the distance to ground water targets from them, as opposed to the MRA.]
- Indicate whether ground water within a 4-mile radius of the MRAs is used for any of the following purposes: irrigation (5-acre minimum) of commercial food or forage crops; watering of commercial livestock; ingredient in commercial food preparation; supply for commercial aquaculture; or supply for a major or designated water recreation area. If there are no drinking water wells, indicate whether aquifers are usable for drinking water purposes.
- Identify designated Wellhead Protection Areas (pursuant to Section 1428 of the Safe Drinking Water Act) and specify location.
- Note: Some of the information listed above may already have been collected during the preliminary assessment (PA), and if so, may be summarized from the PA. If not, the contractor may choose to utilize companies that specialize in providing or compiling environmental data to parties involved in real estate transactions.
- Discuss any previous ground water sampling results (analyzed for MC); provide dates of sampling events, well locations, and the depths and names of sampled aquifers. Summarize analytical results in a table and include sampling locations in the CSM in Appendix J or refer to a map in a previous report.
- List in a table each well or spring sampled during the SI, provide the depth from which it draws drinking water and the screened interval, quantify the population served by the well, if applicable, and identify its distance from the MRAs. Discuss SI ground water sampling results in terms of attribution of hazardous substances to DoD activities and comparison to background concentrations, as applicable. List in a table each sample and summarize analytical results. Include a map of sampling locations ~~or~~ Identify drinking water wells exposed to hazardous substances, if present, and quantify the populations served by those wells, as applicable. If no groundwater samples were taken, explain. For example, sampling may not be supported by the CSM (no complete exposure route exists or no receptors are present), or it was decided in the TPP session that soil/sediment/surface water, etc. would be the focus of the SI because the project was already identified as requiring an RI/FS, and groundwater contamination could more effectively be addressed at that phase.

SURFACE WATER MIGRATION PATHWAY

- Describe the local hydrologic setting, including MRA location with respect to the nearest surface water bodies and potentially affected floodplains. Include a figure depicting surface water features and targets (fisheries, wetlands, etc.) Describe the overland and in-water segments of the surface water migration path, starting at the perimeter of the MRA and ending 15 miles downstream of the probable point of entry (PPE) of MEC/MC into surface water. Identify all water bodies within the

in-water segment, and state the length of reach and flow or depth characteristics of each. Describe any tidal influence along the surface water migration path. Note: surface water includes perennially flowing man-made ditches as well as intermittently flowing ditches in areas with <20 inches of mean annual precipitation. For lakes, oceans, coastal tidal waters, and the Great Lakes, apply the 15-mile target distance limit as an arc. [Note: Where more than one MRSs have been identified, measure the distance to all surface water targets from them, not the MRAs.]

- Add the surface water migration path to the CSM in Appendix J. Describe upgradient drainage areas (including predominant soil type), onsite drainage (including storm drains, ditches, culverts, etc.), discharges into surface water, and pertinent historical events, including floods, fish kills, and fishery closures.
- Indicate whether surface water within the 15-mile target distance limit supplies drinking water. Identify the location and state the distance from the PPE to each drinking water intake. Quantify the population served by the intake; identify blended systems (where surface water is mixed with ground water) and provide the relative amount that surface water contributes.
- Indicate whether surface water within the target distance limit contains recreational, subsistence, or commercial fisheries. Identify and state the distance from the PPE to each fishery; briefly characterize each.
- Identify sensitive environments present within or adjacent to the in-water segment. Include all sensitive environments listed in Attachment 2 of the USACE guidance entitled "Screening Level Ecological Risk Assessments for MMRP SIs" (Army checklist for important ecological places). State the distance from the PPE to each sensitive environment. In addition, quantify the length of wetlands frontage along the surface water migration path within the following mileage categories downstream of the PPE: <0.1, 0.1-1, >1-2, >2-3, >3-4, >4-8, >8-12, >12-16, >16-20, >20 miles.
- Note: Some of the information listed above may already have been collected during the PA, and if so, may be summarized from the PA. If not, the contractor may choose to utilize companies that specialize in providing or compiling environmental data to parties involved in real estate transactions.
- Discuss any previous surface water and/or sediment sampling results (analyzed for MC), including dates, locations, and types of samples. Summarize analytical results in a table and include sampling locations in the CSM in Appendix J or refer to a map in a previous report.
- Discuss SI surface water and sediment sampling results. List in a table each sample and summarize analytical results. Identify surface water intakes, fisheries, and sensitive environments exposed to hazardous substances, if present at concentrations significantly above background; quantify the affected drinking water populations and fisheries (in pounds per year) and describe the exposed sensitive environments, including wetlands frontage, as applicable. If no surface water or sediment samples were collected, explain. For example, sampling may not be supported by the CSM (no complete exposure route exists or no receptors are present). Alternatively, surface water may not have been present to allow collection of a sample..

SOIL EXPOSURE PATHWAY

- Discuss any previous observations and sampling results of surface MEC or MC, including dates and locations. Summarize analytical results in a table and include sampling locations in the CSM in Appendix J or refer to a map in a previous report.
- Discuss SI surface soil samples. List each sample in a table and summarize analytical results. If soil samples were not collected, explain. For example, sampling may not be supported by the CSM (e.g., no surface soil sampling was planned for the FUDS because range activities were limited to the use of practice bombs with spotting charges. If field reconnaissance identified MEC debris associated with MEC other than practice bombs, the need for MC sampling was reassessed in the field).

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- State the number of workers, residents, and students present on and within 200 feet of areas of observed surface contamination (hazardous substances within top 2 feet of surface soil) and identify the locations of the pertinent workplaces, schools, day care facilities, and homes. If there are no workers, residents, or students on or within 200 feet of observed contamination, state the shortest travel distance within 1 mile to any residence or school (accounting for natural barriers to travel on foot).
- State the number of people who live or attend school within 1 mile travel distance of areas of observed contamination, within the following distance categories: >0-1/4, >1/4-1/2, >1/2-1 mile. (Do not include those counted on or within 200 feet of area of observed contamination, as above.)
- Indicate whether any of the following terrestrial sensitive environments exist in the area of observed contamination:
  - Terrestrial critical habitat for Federal designated endangered or threatened species; National Park; designated Federal Wilderness Area; National Monument
  - Terrestrial habitat known to be used by Federal designated or proposed endangered or threatened species; National Preserve (terrestrial); National or State Terrestrial Wildlife Refuge; Federal land designated for protection of natural ecosystems; administratively proposed Federal Wilderness Area; terrestrial areas utilized for breeding by large or dense aggregations of animals
  - Terrestrial habitat known to be used by State designated endangered or threatened species; terrestrial habitat known to be used by species under review as to its Federal status
  - State land designated for wildlife or game mgmt; State designated Natural Areas; particular areas, relatively small in size important to maintenance of unique biotic communities
- Describe how attractive/accessible the area of observed contamination is for public use, indicating whether the area is: designated for recreational use; area is regularly used for public recreation; accessible and uniquely used for recreation (e.g., vacant lots in urban areas); moderately accessible (e.g., some access improvements, such as gravel road) with some public recreation use; slightly accessible (e.g., rural area with no road improvement) with some public recreation use; accessible, with no public recreation use; physically inaccessible to the public, with no evidence of public recreation use.

AIR MIGRATION PATHWAY

- Identify for each MRA the potential for release of contaminated particulate to the air and conditions that may prevent release (area is covered by liquids, uncontaminated soil cover, or thick vegetation, or area is surrounded by windbreak, or source is totally enclosed in intact building or containers.) Describe the results of any air samples, if collected. If air samples were not collected, explain. For example, no air samples were collected because there are no known sources of air contamination associated with the historic DoD operations; Surface soil may present a source of particulate contamination; therefore surface soil samples were collected during the SI, as applicable). Discuss any previous observations of air releases or air sampling results, including dates, locations, sampling procedures, and meteorological conditions.
- Identify the location of and distance to the nearest resident, worker, or student within 1 mile of the source of particulate contamination.
- State the population within 4 miles of the sources of particulate contamination, including residents, students, and workers, broken out into the following distance categories: on a source; >0-1/4, >1/4-1/2, >1/2-1, >1-2, >2-3, >3-4 miles.
- Indicate all types of sensitive environments, using those listed in Attachment 2 of the USACE guidance entitled "Screening Level Ecological Risk Assessments for MMRP SIs" (Army checklist for important ecological places), within 4 miles of the source of particulate contamination, broken out into the same distance categories listed above for human populations.

- Indicate the total acres of wetlands within 4 miles of the source of particulate contamination, broken out into the same distance categories listed above for human populations

- For results of the MC investigation, summarize the number and type of samples collected in each MRA, including background samples, and identify specific hazardous substances, if detected. Describe observations made at each sampling location (presence of MEC, MEC scrap, MC bulk material, targets, craters, proximity of known or suspected MEC items, stressed vegetation, and nature of sample material if unusual characteristics are noted (e.g., high turbidity, discoloration, high organic matter content). List in a table each environmental sample collected and summarize analytical results. Include a map of sampling locations.

6.0 SCREENING-LEVEL RISK ASSESSMENT

- Provide discussion of risk from MEC. (i.e. likelihood of removing MEC from its original location, accessibility, detonation on contact, etc.). State whether or not it is believed that MEC may be present and why. Summarize the attributes of the potential MEC (type, how it functions, and potential hazard) Describe the potential receptors and how they may interact with the MEC. {Describe the potential hazards from potential MEC. Presence of MEC and any potential human receptors is normally sufficient to justify an RI/FS. More detailed explanation of hazards will be required to justify NDAI (if there is a potential MEC presence), TCRA, or NTCRA.}
- Provide sub-sections entitled "Screening Level Human Health Risk Assessment (HHRA)" and "Screening-Level Ecological Risk Assessment (ERA)." Discuss the conservative evaluation of the potential for adverse effects to human health and the environment due to MC contamination. This information is used to make recommendations for areas that do not pose a significant threat from MC, those that require further investigation, and those that may require a removal action. The HHRA will compare exposure point concentrations (highest detection or 95% upper confidence limit (UCL) if sufficient data exists) to health-based screening levels and will be consistent with USACE's Risk Assessment Handbook Vol. I: Human Health Evaluation (EM 200-1-4). The ERA shall be consistent with Steps 1 and 2 of the U.S. EPA guidance, Ecological Risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting Ecological Risk Assessments.
- All complete pathways shown in the CSM (Appendix J) shall be addressed in this section.
    - Human
    - Ecological
    - MEC

7.0 SUMMARY AND CONCLUSIONS

- Briefly summarize the major aspects of the FUDS property, the MRAs (and the MRSs), and their histories that relate to the release or threatened release of MEC or MC and the exposure of human and ecological target populations. Briefly summarize principal migration pathways and targets of concern. [Note: Where MRSs have been identified, provide a summary for each.]
- Summarize sampling results, including MEC and MC found and detected in the MRAs as well as within the migration pathways.

8.0 RECOMMENDATIONS

- Summarize recommendations for further remedial response (RI/FS), removal response, or No Department of Defense (DoD) Action Indicated. Provide recommendations and the basis for these recommendations (from MEC and MC results) in tabular format

Appendix A
Site Inspection Report Outline
21 November 2006

9.0 REFERENCES

- List, in bibliographic citation format, all references cited in the SI report.

APPENDICES

A. Performance Work Statement – Electronic Only
B. Technical Project Planning (TPP) Session Documentation/Meeting Minutes – Electronic Only
C. Interview Documentation (pertinent teleconferences regarding site history or conditions; coordination on cultural and natural resources considerations)
D. Field Notes and Field Forms
E. Photodocumentation Log (As an attachment, provide photographs taken during the SI depicting pertinent observations such as MEC and MC source areas, containment conditions, stained soil, stressed vegetation, drainage routes, sample locations, and any MEC or munitions debris findings. Describe each photograph in captions or accompanying text. Key each photo to its location on the site sketch or CSM)
F. Analytical Data – Electronic Only, should include SEDD files and laboratory reports in pdf. – for all versions (Draft, Draft-Final, and Final) of the report
G. Analytical Data QA/QC Report, to include all requirements from DID MR005-10 for Chemical Data Final Report that are not addressed elsewhere and the USACE-prepared Chemical Quality Assurance Report (CQAR)
H. Geographic Information Systems Data – Electronic Only
I. Geophysical Data, if applicable. (All raw and processed geophysical data and geophysical maps in their native format (Surfer, Geosoft Oasis montaj, Intergraph, or ESRI ArcView format) and/or as raster bit-map images such as BMP, JPEG, TIF, or GIF.) – Electronic Only; Maps hardcopy also.
J. Conceptual Site Model
K. Munitions Response Site Prioritization Protocol Evaluations (for each MRS)
    - The protocol is being applied at the MRS level, because individual MRSs are to be delineated. For purposes of applying the Protocol herein, usually the MRS equals one MRA. [Note: Where MRSs have been identified and there is more than one MRS in the MRA apply the Protocol to individual MRSs, ensuring the total acreage adds up to the MRA acreage.]
    - Directions section of the MRSPP sheets shall contain specific references and critical information used to develop the score for that particular table in the MRSPP.
    - Do not use bolding to show selection. Use boxes or circles to show selection.
    - Recommend printing the Table 20 rather than all the CWM tables for the printed copy. The other CWM tables provide no information if there's no known or suspected hazard.
    - Include site name, FUDS Project ID, MRS identifier, and Appendix Pg # to each page. If the site is in the Range Inventory (i.e., has a number in the ASR Supplement), the Range Inventory designation/name should be included. Similarly, if there is an ARC number (see http://deparc.egovservices.net/deparc/do/home), it should be included.
    - Need to provide guidance on what to do if no media sampled (no hazard or just leave blank)
    - Table 9 (cultural and eco) shouldn't just refer to the ASR, but also the SI report, which presumably acquired more current and complete information than the ASR.
    - Per the current draft (and all preceding drafts) of the Primer, "All contaminants of concern attributable to an MRS should be included. Naturally occurring compounds that are detected within established background concentration ranges are not included." Given that the contractor collected background (or "ambient") samples, it is unreasonable to include every detected metal in these worksheets.
L. Reference Copies: Attach copies of communication records and other references gathered for additional HRS and MRSPP data (e.g., records of teleconferences with local water or county health departments on groundwater use; references for locating sensitive environments and population densities). Any site specific documents/reports used to formulate your recommendation (include other pertinent reference materials generated during the SI that are not otherwise cited or included in the

Appendix A
Site Inspection Report Outline
21 November 2006

Appendices. (e.g. Copies of previously issued reports, ASRs, other investigation reports (i.e. ATSDR, CDC, DHHS), etc) in electronic copy only. Include hard copies only of things produced as part of the SI effort (contact records, etc.) and critical excerpts from reference documents.

APPENDIX B

TPP Session Documentation/Meeting Minutes
Electronic Only

US Army Corps of Engineers

PUBLIC NOTICE

Former Pinecastle Jeep Range

The Department of Defense (DoD) conducted live-fire training and testing of weapon systems at active and former military installations throughout the United States to ensure force readiness and defend our nation. As directed by the U.S. Congress, the U.S. Army Corps of Engineers manages the Military Munitions Response Program (MMRP) for the DoD. Under that program, the Corps assigns priorities to defense sites containing unexploded ordnance, discarded military munitions and/or munitions constituents, based on various factors relating to the potential for public safety and environmental hazards.

The Corps' Jacksonville District is in the process of investigating the former **Pinecastle Jeep Range**, located in Orlando, Orange County, Florida. This site was used as a demonstration and tactical bombing and strafing range by the U.S. Army Air Corps from 1943 to 1946.

The Corps recently completed a site inspection at the former Pinecastle Jeep Range. 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, will be available for public review at the Orange County,

Florida Public Library, 101 East Central Boulevard, Orlando, Florida after August 20, 2007.

As part of our ongoing investigation, we are seeking additional information from the public about the former Pinecastle Jeep Range (site bounded by S.R. 75 on the west, S.R. 552 on the north, Moss Park Rd on the south and the Orange County Landfill on the east). If you have information, please send it to: Charles Fales, Project Manager, U.S. Army Corps of Engineers, 701 San Marco Blvd., Jacksonville, FL 32207 or by email to: PublicMail.CESAJ-CC@saj02.usace.army.mil.

Stakeholders and members of the public are also welcome to attend a Military Munitions Response Site Prioritization Protocol coordination meeting, scheduled for Tues., July 24, 1:00 PM – 3:30 PM at Florida Department of Environmental Protection, Suite 232, 3319 Maguire Blvd, Orlando, FL 32803.

For further information, please contact the U.S. Army Corps of Engineers Corporate Communication Office at 904-232-1576.

Technical Project Planning Memo:

Subject: FUDS Military Munitions Response Program (MMRP) Documentation of Technical Project Planning Project Team Second TPP Meeting

Site: **Pinecastle Jeep Range, I04FL040501, Orlando, Florida**

Contract: Contract Number W912DY-04-D-0005, Delivery Order 0008

This document is intended to record the events that occurred during the second and final Technical Project Planning (TPP) Meeting for the ***Pinecastle Jeep Range Site, Orlando, FL***. The project team members listed below met for a presentation and project status discussions for the Draft Final Site Inspection (SI) Report held in the Florida Department of Environmental Protection (FDEP) Office, located in Orlando, Florida on July 24, 2007. The Draft Final SI document was provided for review in advance of the meeting and comments from the FDEP, Orange County Environmental Protection Division, and other stakeholders were addressed prior to finalization of the document.

Although representatives of all applicable branches of FDEP were unable to attend the meeting, concurrence with the recommendations provided in the Draft Final document was received prior to the meeting with several minor editorial comments.

Since there had been some turnover in the TPP Team personnel, introductions were made around the room. Key personnel changes since the initial TPP Meeting held in April 2006 included:

- Mr. Charlie Fales, USACE, Jacksonville District (CESAJ) Project Manager (PM) from Mr. Robert Bridgers;
- Mr. Wandell Carlton, CESAJ FUDS PM from Mr. Michael Ornella; and
- Mr. Doug Garretson, Military Munitions Design Center (MM DC) PM from Ms. Chris Cochrane.

Jeff Ulmer (Parsons) presented some introductory information regarding MMRP and background as to how we have gotten to where we are today. He presented the findings of the SI and provided details on the recommendations for each MRS. He indicated the MRSPP notification was successfully placed in the newspaper with coordination with CESAJ Corporate Communications. Laura Kelley (Parsons) presented information on the MRSPP background and scoring procedures. The TPP Team went through the

MRSPP scoring sheets for the MRSs. The Technical Presentation commenced and the following items were noted:

- No further comments were anticipated on the Draft Final document and the Final SI document is anticipated to be submitted no later than August 13, 2007.
- The TPP Team discussed in detail MRS 01 – the Chemical Demonstration Range and the fact that no chemical warfare materiel (CWM) was not used at the site. It was recommended that the Final SI Report more clearly state that simulants were used in place of actual CWM. It was noted that while the CWM Scoping and Security Study recommended Project Closeout for the MRS, that recommendation was for the CWM project only. MRS 01 falls entirely within Range Complex No. 2 (MRS 04) and the TPP Team concurred that any future actions conducted at MRS 04 should include the 5-acre MRS 01.
- The TPP Team discussed the recent report (post SI field activities) of unexploded ordnance by a private landowner within Range Complex No. 2. The incident report documented the detonation of 3 practice bombs and one 6-lb incendiary bomblet. Based on the residential development of the land in the area and the proximity of the Odyssey Middle School Complex, Parsons recommended a change in recommendations in the Draft Final SI Report from simply a Remedial Investigation/Feasibility Study (RI/FS) to a Time Critical Removal Action (TCRA) for the immediate area of the UXO findings, followed by RI/FS for the remaining MRS land. The TPP Team was in agreement with the change between Draft Final to Final.

Mr. Charlie Fales
CESAJ
Project Manager

Mr. Wandell Carlton
CESAJ
FUDS Program Manager

Ms. Chris Cochrane
MM DC
SI Program Manager
Mr. Doug Garretson
MM DC
SI Project Manager
Mr. Mike Gooding
MM DC
SI Technical Manager

Ms. Mary Ann Kraus
Central District
FDEP

Ms. Tracy Jewsbury
Central District
FDEP

Mr. Hamp Pridgen
Program Manager
Orange County Environmental Protection Division
Ms. Nancy Sticht
CESAJ
Jacksonville District
Ms. Amanda Ellison
CESAJ
Jacksonville District
Ms. Laura Kelley
Parsons
Deputy Project Manager

Mr. Jeff Ulmer
Parsons
Field Team Leader

TECHNICAL PROJECT PLANNING
ATTENDANCE SIGN-IN SHEET

Project: Pinecastle Jeep Range
Date: 24 July, 2007
Place: EPD Offices, 3319 Maguire Blvd., Ste.232, Orlando, FL 32803

PRINTED NAME	ORGANIZATION/ ADDRESS	PHONE NUMBER	Email Address
Laura Kelley DPM (PARSONS)	Parsons 5390 Triangle Parkway Suite 100 Norcross, GA 30092	678-969-2437 404-934-1266 (cell)	Laura.Kelley @Parsons.com
Jeff Ulmer (PARSONS)	Parsons 5390 Triangle Parkway Suite 100 Norcross, GA 30092	678-969-2398 770-634-8561 (cell)	Jeff.Ulmer @Parsons.com
Charles Fales PM (CESAJ)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207	904-232-1017	Charles.D.Fales @saj02.usace.army.mil
Wandell Carlton, FUDS Program Mgr (CESAJ)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207	904-232-1804	Wandell.E.Carlton @saj02.usace.army.mil
Ivan Acosta (CESAJ)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207		Ivan.Acosta @saj02.usace.army.mil
Robert Bridgers (SAJ Contractor)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207	904-232-1107	Robert.C.Bridgers @saj02.usace.army.mil
John Hess (CESAJ)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207		John.C.Hess @saj02.usace.army.mil
Nancy J. Sticht (CESAJ)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207	904-232-1667	Nancy.J.Sticht @saj02.usace.army.mil
Chris Cochrane PM (CEHNC)	USACE, Huntsville 4820 University Ave. Huntsville, AL 35816-1822	256-895-1696 256-990-0888 (cell)	Chris.Cochrane @hnd01.usace.army.mil
Mike Gooding TM (CEHNC)	USACE, Huntsville 4820 University Ave. Huntsville, AL 35816-1822	256-895-1635	Michael.R.Gooding @hnd01.usace.army. mil
Eric Nuzie (FDEP)	Florida Department of Environmental Protection 2600 Blair Stone Road Tallahassee, FL 32399	(850) 245-8978	Eric.Nuzie @dep.state.fl.us

TECHNICAL PROJECT PLANNING
ATTENDANCE SIGN-IN SHEET

Project: Pinecastle Jeep Range
Date: 24 July, 2007
Place: EPD Offices, 3319 Maguire Blvd., Ste.232, Orlando, FL 32803

PRINTED NAME	ORGANIZATION/ ADDRESS	PHONE NUMBER	Email Address
Jim Crane (FDEP)	Florida Department of Environmental Protection, 2600 Blair Stone Road Tallahassee, FL 32399	850-245-8983	Jim.Crane @dep.state.fl.us
Hamp Pridgen Hamp Pridgen	Orange County EPD 800 Mercy Dr. Suite 4 Orlando, FL 32808	407-836-1411	Hamp.Pridgen @ocfl.net
Lauren Buckner	Orange County EPD		Lauren.Buckner @ocfl.net
Alan Oyler PE	City of Orlando		Alan.Oyler @cityof Orlando.net
Debbie Owen OC	City of Orlando		Debbie.Owen @cityof Orlando.net
~~Bret LeRoux~~ (FDEP) Tracy Jewsbury			~~Bret.leroux~~ Tracy. @dep.state.fl.us Jewsbury
Mary Ann Kraus (FDEP) Mary Ann Kraus	Central District	407-893-3331	MARY.KRAUS@DEP.STATE.FL.US
Michael Ornella (CESAJ)	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207		
Amanda Ellison (CESAJ) Amanda Ellison	Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207	904-232-1576	Amanda.D.Ellison @sajoa.usace.army.mil
RICHARD SATKIN	MATRIX ENV. SVCS 2878 JOHNSON Ferry Rd Suite 100 MARIETTA, GA 30062	404-414-7054	richard_satkin@ matrixdesigngroup.com
DOUGLAS GARRISON	USACE HUNTSVILLE	256 895-1066	

APPENDIX C

Interview Documentation
Not Applicable

APPENDIX D

Field Notes and Field Forms

FINAL

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912DY-04-D-0005**	**DELIVERY ORDER NO.**	**0008**
JOB NO:	744647-03000	**DATE/DAY:**	13-Jan-07
SITE NAME:	Pinecastle Jeep Range, Florida	**REPORT NO:**	1
USACE DISTRICT:	CESAJ	**SHEET:**	1

WEATHER: Sunny, high of mid 70's, 3-5mph winds, light shower in the late afternoon.

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
0	***Miles Driven***	**0**
3/1700	***Number of Flights/Miles Flown***	**3 / 1700**
3	***Personnel:***	**3**

2. Reconnaissance Acreage

0	***QR data in miles***	**0**

Discussion - actual reading will be provided once it is downloaded.

3. MC Sampling Details

6	***Soil Samples***	**6**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

4. QC Activities

6	***Soil Samples***	**6**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

5. QA Activities

2	***Soil Samples***	**2**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

6. Safety Activities

Morning safety briefing conducted covering weather, terrain, biological elements, heat/cold stress, and personal awareness.

PARSONS WORKFORCE		On-site Yes/No	Tailgate Brief Yes/No
Parsons FTL - Jeff Ulmer	Cell Phone: 770-634-8561	Yes	Yes
Parsons UXO TechIII/SSHO - Neil Feist	Cell Phone: 256-990-2707	Yes	Yes
Parsons FTM - Tim Nowicki	Cell Phone: 770-634-3525	Yes	Yes
VISITORS			
Richard Satkin - Matrix		Yes	Yes
David Hiliar - Mockingbird Property owner representative		Yes	Yes
Allan Smith - Mockingbird Property owner representative		Yes	Yes

EQUIPMENT LIST:

Schonstedt, PDA, Blue Logger GPS, Rhino Garmin, Field Computer

ADDITIONAL INFORMATION:

All other site details recorded in PDA/Logbook

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

Continue sample collection and QR tracking

REQUEST FOR PROJECT ACTION:

ACCIDENTS REPORTED TODAY: 0

ACCIDENTS TO DATE: 0

Prepared By Field Team Leader: Jeff Ulmer

DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: W912DY-04-D-0005
Delivery Order Number: 0008
Project Name: MMRP FUDS SI
Project Number: 744647-03000
Site Location: Pinecastle Jeep Range, Florida
Date: 13-Jan-07

Activities Conducted:

Met with Richard Satkin from Matrix (environmental company representing several property owners) at 0700 this morning along with Allen Smith owner of the Mockingbird properties. The owner unlocked all gates to gain access to the Mockingbird property in the southwest corner of the former Pinecastle Jeep Range. Collected a total of six soil samples, six QC soil samples, and 2 QA split soil samples along with QR tracks throughout the area. All samples will be kept on ice until Parsons team is able to ship FEDEX to the labs. The reason for the weekend work was to accommodate the property owner request to conduct SI in and around the school while the students are out of session. The SI team found multiple 50. cal casing in the area of the old jeep track, no other ordnance related items were found but several areas were noted to contain large and small depressions that may be historic bomb craters. Three additional areas were noted as displaying characteristics of possible burial areas or demo pits. One observation point was taken in the vicinity of the 1950s landfill.

Work Planned:

Continue sample collection and QR.

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

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
PJR-TR-SS-02-02	SURFACE SOIL	0749	EXPLOSIVE; METALS	1/15/2006	STL	MS/MSD
PJR-TR-SS-02-02 / QA	SURFACE SOIL	0749	EXPLOSIVE; METALS	1/15/2006	GPL	QA Split Sample
PJR-TR-SS-02-03	SURFACE SOIL	0833	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-04	SURFACE SOIL	0907	EXPLOSIVE; METALS	1/15/2006	STL	MS/MSD
PJR-TR-SS-02-04 / QA	SURFACE SOIL	0907	EXPLOSIVE; METALS	1/15/2006	GPL	QA Split Sample
PJR-TR-SS-02-08	SURFACE SOIL	0938	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-07	SURFACE SOIL	1052	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-06	SURFACE SOIL	1116	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-20	SURFACE SOIL	1208	EXPLOSIVE; METALS	1/15/2006	STL	FD of PJR-TR-SS-02-02
PJR-TR-SS-02-21	SURFACE SOIL	1301	EXPLOSIVE; METALS	1/15/2006	STL	FD of PJR-TR-SS-02-04

Departures from approved SAP:

None Today

Instructions given by government personnel:

None today

Check all attachments:

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

Signed by:

Name	Jeff Ulmer, FTL	
Date:	13-Jan-07	
Phone	Mobile: 770-634-8561	Office#: 678-969-2398

Copies sent to:

Deborah Walker (MM CX)	Chris Cochrane (OE DC PM)
Heidi Novotny (HTRW CX)	Becky Terry (USAESCH)
Don Silkebakken (Parsons PM)	Teresa Carpenter (USAESCH)
Laura Kelley (Parsons DPM)	Charles Fales (CESAJ PM)
Tammy Chang (Parsons)	

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912DY-04-D-0005**	**DELIVERY ORDER NO.**	**0008**
JOB NO:	744647-03000	**DATE/DAY:**	14-Jan-07
SITE NAME:	Pinecastle Jeep Range, Florida	**REPORT NO:**	2
USACE DISTRICT:	CESAJ	**SHEET:**	1

WEATHER: Sunny, high of mid 70's, 3-5mph winds

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
0	***Miles Driven***	**0**
0	***Number of Flights/Miles Flown***	**3 / 1700**
3	***Personnel:***	**3**

2. Reconnaissance Acreage

0	***QR data in miles***	**0**

Discussion - actual reading will be provided once it is downloaded.

3. MC Sampling Details

5	***Soil Samples***	**11**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

4. QC Activities

0	***Soil Samples***	**6**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

5. QA Activities

0	***Soil Samples***	**2**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

6. Safety Activities

Morning safety briefing conducted covering weather, terrain, biological elements, heat/cold stress, and personal awareness.

PARSONS WORKFORCE		On-site Yes/No	Tailgate Brief Yes/No
Parsons FTL - Jeff Ulmer	Cell Phone: 770-634-8561	Yes	Yes
Parsons UXO TechIII/SSHO - Neil Feist	Cell Phone: 256-990-2707	Yes	Yes
Parsons FTM - Tim Nowicki	Cell Phone: 770-634-3525	Yes	Yes
VISITORS			
Richard Satkin - Matrix		Yes	Yes
Bo Bohannan - Matrix		Yes	Yes

EQUIPMENT LIST:

Schonstedt, PDA, Blue Logger GPS, Rhino Garmin, Field Computer

ADDITIONAL INFORMATION:

All other site details recorded in PDA/Logbook

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

Continue sample collection and QR tracking

REQUEST FOR PROJECT ACTION:

ACCIDENTS REPORTED TODAY: 0

ACCIDENTS TO DATE: 0

Prepared By Field Team Leader: Jeff Ulmer

DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: W912DY-04-D-0005
Delivery Order Number: 0008
Project Name: MMRP FUDS SI
Project Number: 744647-03000
Site Location: Pinecastle Jeep Range, Florida
Date: 14-Jan-07

Activities Conducted:

Met with Richard Satkin and Bo Bohannan, both from Matrix, in the northwest area of the Pinecastle Jeep Range. Continued sampling and QR. A total of five soil samples were collected, no QC or QA were collected, all samples will be kept on ice until Parsons can deliver to FEDEX on monday for first possible shipment. A lot of heavy brush and multiple swamps were encountered today, no ordnance related items were found today. Both men from Matrix departed the team at 1330, Mr Bohannan will rejoin the Parsons team tomorrow morning.

Work Planned:

Continue sampling and QR.

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

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
PJR-TR-SS-02-01	SURFACE SOIL	0704	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-03	SURFACE SOIL	0804	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-04	SURFACE SOIL	0843	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-08	SURFACE SOIL	1255	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-07	SURFACE SOIL	1402	EXPLOSIVE; METALS	1/15/2006	STL	

Departures from approved SAP:

None Today

Instructions given by government personnel:

None today

Check all attachments:

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

Signed by:

Name Jeff Ulmer, FTL
Date: 14-Jan-07
Phone Mobile: 770-634-8561 Office#: 678-969-2398

Copies sent to:

Deborah Walker (MM CX)	Chris Cochrane (OE DC PM)
Heidi Novotny (HTRW CX)	Becky Terry (USAESCH)
Don Silkebakken (Parsons PM)	Teresa Carpenter (USAESCH)
Laura Kelley (Parsons DPM)	Charles Fales (CESAJ PM)
Tammy Chang (Parsons)	

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912DY-04-D-0005**	**DELIVERY ORDER NO.**	**0008**
JOB NO:	744647-03000	**DATE/DAY:**	15-Jan-07
SITE NAME:	Pinecastle Jeep Range, Florida	**REPORT NO:**	3
USACE DISTRICT:	CESAJ	**SHEET:**	1

WEATHER: Partly Cloudy, high of low 80's, 3-5mph winds

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
0	***Miles Driven***	**0**
0	***Number of Flights/Miles Flown***	**3 / 1700**
0	***Personnel:***	**3**

2. Reconnaissance Acreage

0	***QR data in miles***	**0**

Discussion - actual reading will be provided once it is downloaded.

3. MC Sampling Details

2	***Soil Samples***	**13**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

4. QC Activities

0	***Soil Samples***	**6**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

5. QA Activities

0	***Soil Samples***	**2**
0	***Water Samples***	**0**

Sampling Notes: See Attached DQCR

6. Safety Activities

Morning safety briefing conducted covering weather, terrain, biological elements, heat/cold stress, and personal awareness.

PARSONS WORKFORCE		On-site Yes/No	Tailgate Brief Yes/No
Parsons FTL - Jeff Ulmer	Cell Phone: 770-634-8561	Yes	Yes
Parsons UXO TechIII/SSHO - Neil Feist	Cell Phone: 256-990-2707	Yes	Yes
Parsons FTM - Tim Nowicki	Cell Phone: 770-634-3525	Yes	Yes
VISITORS			
David Hiliar		Yes	Yes
Bo Bohannan - Matrix		Yes	Yes

EQUIPMENT LIST:

Schonstedt, PDA, Blue Logger GPS, Rhino Garmin, Field Computer

ADDITIONAL INFORMATION:

All other site details recorded in PDA/Logbook

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

Continue soil sample collection and QR tracking

REQUEST FOR PROJECT ACTION:

ACCIDENTS REPORTED TODAY: 0

ACCIDENTS TO DATE: 0

Prepared By Field Team Leader: Jeff Ulmer

DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: W912DY-04-D-0005
Delivery Order Number: 0008
Project Name: MMRP FUDS SI
Project Number: 744647-03000
Site Location: Pinecastle Jeep Range, Florida
Date: 15-Jan-07

Activities Conducted:

Met with David Hiliar (Allen Smith employee) first thing this morning. He assisted with showing the Parsons team around the lower southern area of the Pinecastle Jeep Range and then later in the afternoon he showed us around the eastern edge of Interstate 417 (all of which belongs to the Mockingbird LLC). Two soil samples and no QC or QA samples were collected today. No ordnance related items were found today.

Work Planned:

Continue sample collection and QR.

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

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
PJR-TR-SS-02-16	SURFACE SOIL	0747	EXPLOSIVE; METALS	1/15/2006	STL	
PJR-TR-SS-02-10	SURFACE SOIL	1354	EXPLOSIVE; METALS	1/15/2006	STL	

Departures from approved SAP:

None today

Instructions given by government personnel:

None today

Check all attachments:

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

Signed by:

Name	Jeff Ulmer, FTL	
Date:	15-Jan-07	
Phone	Mobile: 770-634-8561	Office#: 678-969-2398

Copies sent to:

Deborah Walker (MM CX)	Chris Cochrane (OE DC PM)
Heidi Novotny (HTRW CX)	Becky Terry (USAESCH)
Don Silkebakken (Parsons PM)	Teresa Carpenter (USAESCH)
Laura Kelley (Parsons DPM)	Charles Fales (CESAJ PM)
Tammy Chang (Parsons)	

FINAL

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912DY-04-D-0005**	**DELIVERY ORDER NO.**	**0008**
JOB NO:	744647-03000	**DATE/DAY:**	16-Jan-07
SITE NAME:	Pinecastle Jeep Range, Florida	**REPORT NO:**	4
USACE DISTRICT:	CESAJ	**SHEET:**	1

WEATHER: Partly Cloudy, high of low 80's, 3-5mph winds

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
0	*Miles Driven*	0
0	*Number of Flights/Miles Flown*	3 / 1700
3	*Personnel:*	3

2. Reconnaissance Acreage

0	*QR data in miles*	0

Discussion - actual reading will be provided once it is downloaded.

3. MC Sampling Details

3	*Soil Samples*	16
0	*Water Samples*	0

Sampling Notes: See Attached DQCR

4. QC Activities

0	*Soil Samples*	6
0	*Water Samples*	0

Sampling Notes: See Attached DQCR

5. QA Activities

0	*Soil Samples*	2
0	*Water Samples*	0

Sampling Notes: See Attached DQCR

6. Safety Activities

Morning safety briefing conducted covering weather, terrain, biological elements, heat/cold stress, and personal awareness.

PARSONS WORKFORCE		On-site Yes/No	Tailgate Brief Yes/No
Parsons FTL - Jeff Ulmer	Cell Phone: 770-634-8561	Yes	Yes
Parsons UXO TechIII/SSHO - Neil Feist	Cell Phone: 256-990-2707	Yes	Yes
Parsons FTM - Tim Nowicki	Cell Phone: 770-634-3525	Yes	Yes
VISITORS			
Bo Bohannan - Matrix		Yes	Yes

EQUIPMENT LIST:

Schonstedt, PDA, Blue Logger GPS, Rhino Garmin, Field Computer

ADDITIONAL INFORMATION:

All other site details recorded in PDA/Logbook

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

Continue of QR tracking

REQUEST FOR PROJECT ACTION:

ACCIDENTS REPORTED TODAY: 0

ACCIDENTS TO DATE: 0

Prepared By Field Team Leader: Jeff Ulmer

DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: W912DY-04-D-0005
Delivery Order Number: 0008
Project Name: MMRP FUDS SI
Project Number: 744647-03000
Site Location: Pinecastle Jeep Range, Florida
Date: 16-Jan-07

Activities Conducted:

Began the morning in the Orange County Landfill area located in the northeast corner area of the Pinecastle Jeep Range. Matrix representative, Bo Bohannan, was also on site with the Parsons team. Conducted some initial windshield observances by driving vehicle around the new landfill area, then began pedestrian QR in accordance with SSWP. Vegetation in the area was very difficult to traverse. The last three soil samples were collected with no QA or QC samples collected. Soil sample #5 was relocated as the ROE for the proposed location could not be secured by the District. The new location for #5 is to the south of it's original location where the concentration of bomb targets are located. The new location was picked/biased near the location of some observered potential bomb craters. No ordnance related items were found in this area or elsewhere throughout the day.

Work Planned:

Continue QR

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

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
PJR-TR-SS-02-15	SURFACE SOIL	0834	EXPLOSIVE; METALS	1/16/2006	STL	
PJR-TR-SS-02-09	SURFACE SOIL	1044	EXPLOSIVE; METALS	1/16/2006	STL	
PJR-TR-SS-02-05	SURFACE SOIL	1309	EXPLOSIVE; METALS	1/16/2006	STL	

Departures from approved SAP:

Relocation of soil sample PJR-TR-SS-02-05

Instructions given by government personnel:

None today

Check all attachments:

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

Signed by:

Name Jeff Ulmer, FTL
Date: 16-Jan-07
Phone Mobile: 770-634-8561 Office#: 678-969-2398

Copies sent to:

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Tammy Chang (Parsons)	

DAILY FIELD REPORT
MMRP SITE INSPECTION

CONTRACT NO.	**W912DY-04-D-0005**	**DELIVERY ORDER NO.**	**0008**
JOB NO:	744647-03000	**DATE/DAY:**	17-Jan-07
SITE NAME:	Pinecastle Jeep Range, Florida	**REPORT NO:**	5
USACE DISTRICT:	CESAJ	**SHEET:**	1

WEATHER: Partly Cloudy, high of low 80's, 3-5mph winds

WORK IN PROGRESS OR COMPLETED:

1. Mobilization/Demobilization

		CUMULATIVE
0	*Miles Driven*	0
0	*Number of Flights/Miles Flown*	3 / 1700
3	*Personnel:*	3

2. Reconnaissance Acreage

0	*QR data in miles*	0

Discussion - actual reading will be provided once it is downloaded.

3. MC Sampling Details

0	*Soil Samples*	16
0	*Water Samples*	0

4. QC Activities

0	*Soil Samples*	6
0	*Water Samples*	0

5. QA Activities

0	*Soil Samples*	2
0	*Water Samples*	0

6. Safety Activities

Morning safety briefing conducted covering weather, terrain, biological elements, heat/cold stress, and personal awareness.

PARSONS WORKFORCE		On-site Yes/No	Tailgate Brief Yes/No
Parsons FTL - Jeff Ulmer	Cell Phone: 770-634-8561	Yes	Yes
Parsons UXO TechIII/SSHO - Neil Feist	Cell Phone: 256-990-2707	Yes	Yes
Parsons FTM - Tim Nowicki	Cell Phone: 770-634-3525	Yes	Yes
VISITORS			
None			

EQUIPMENT LIST:

Schonstedt, PDA, Blue Logger GPS, Rhino Garmin, Field Computer

ADDITIONAL INFORMATION:

Continued with the QR data track collection in the northeast area just south of the Orange County Landfill. Very few roads in the area and very dense vegetation with multiple sightings of the local wildlife. No ordnance related items were detected or sited on the surface. All sample collection were completed on 16 Jan 07. Had no visitors tagging with Parsons team and no correspondences with any of the locals.

All other site details recorded in PDA/Logbook

ACTIVITIES SCHEDULED FOR NEXT WORK DAY:

Review data collected and collect any remaining areas that may need more QR

REQUEST FOR PROJECT ACTION:

None

ACCIDENTS REPORTED TODAY: 0

ACCIDENTS TO DATE: 0

Prepared By Field Team Leader: Jeff Ulmer

Signed by:

Name Jeff Ulmer, FTL

Date: 17-Jan-07

Phone Mobile: 770-634-8561 Office#: 678-969-2398

Copies send to:

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DAILY CONTRACTOR QUALITY CONTROL REPORT

Contract Number: W912DY-04-D-0005
Delivery Order Number: 0008
Project Name: MMRP FUDS SI
Project Number: 744647-03000
Site Location: Pinecastle Jeep Range, Florida
Date: 16-Jan-07

Activities Conducted:

Began the morning in the Orange County Landfill area located in the northeast corner area of the Pinecastle Jeep Range. Matrix representative, Bo Bohannan, was also on site with the Parsons team. Conducted some initial windshield observances by driving vehicle around the new landfill area, then began pedestrian QR in accordance with SSWP. Vegetation in the area was very difficult to traverse. The last three soil samples were collected with no QA or QC samples collected. Soil sample #5 was relocated as the ROE for the proposed location could not be secured by the District. The new location for #5 is to the south of it's original location where the concentration of bomb targets are located. The new location was picked/biased near the location of some observered potential bomb craters. No ordnance related items were found in this area or elsewhere throughout the day.

Work Planned:

Continue QR

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

Sample ID	Media	Time	Analysis	Shipment Date	Lab	Comments
PJR-TR-SS-02-15	SURFACE SOIL	0834	EXPLOSIVE; METALS	1/16/2006	STL	
PJR-TR-SS-02-09	SURFACE SOIL	1044	EXPLOSIVE; METALS	1/16/2006	STL	
PJR-TR-SS-02-05	SURFACE SOIL	1309	EXPLOSIVE; METALS	1/16/2006	STL	

Departures from approved SAP:

Relocation of soil sample PJR-TR-SS-02-05

Instructions given by government personnel:

None today

Check all attachments:

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

Signed by:

Name Jeff Ulmer, FTL
Date: 16-Jan-07
Phone Mobile: 770-634-8561 Office#: 678-969-2398

Copies sent to:

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Tammy Chang (Parsons)	

APPENDIX E

Photo-documentation Log

Field Team Leader's Site Observations
Pinecastle Jeep Range, Orange County, Florida

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 7:19:13 AM **Point_ID:** 24

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.473521712
Longitude: -81.260450942

Concrete footings to Jeep Track

Barrier:
Vegetation: Mixed Brush + Grass
Drainage: None
SoilType:
SoilColor: Tan

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 7:26:26 AM **Point_ID:** 25

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.47146553
Longitude: -81.257720868

Concrete Jeep Track

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Loam
SoilColor: Tan

Topography:
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 7:33:08 AM **Point_ID:** 26

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.472197448
Longitude: -81.256657448

Concrete Jeep Track

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography:
Surface Feature:
Surface Debris: None
Subsurface Met: High Density
MECMD: Unknown

Property: Pinecastle **Area:** Range Complex **Time** 7:42:43 AM **Point_ID:** 27

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.47208514
Longitude: -81.256528958

50. Caliber casings and balls in small pile near Jeep Track.

Barrier:
Vegetation: Grasses
Drainage: None
SoilType: Sand
SoilColor:

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: Medium Density
MECMD: SA, .50 cal

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 7:49:12 AM **Point_ID:** 28

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-02

MRSPP Menu: None
MRSPP Note:

Latitude: 28.470059991
Longitude: -81.255179903

ss-02 / qa, ms/msd, duplicate ss-20

Barrier:
Vegetation: Grasses
Drainage: None
SoilType:
SoilColor: Tan

Topography:
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 8:33:24 AM **Point_ID:** 29

Team Leader Jeff Ulmer
Sampler: None
Sample ID: PJR-TR-SS-02-03

MRSPP Menu: None
MRSPP Note:

Latitude: 28.463297802
Longitude: -81.254026012

General observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Loam
SoilColor: Tan

Topography: Broken Terrain
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 9:07:59 AM **Point_ID:** 30

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-04

MRSPP Menu: None
MRSPP Note:

Latitude: 28.457343521
Longitude: -81.256291525

General observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Loam
SoilColor: Tan

Topography: Broken Terrain
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 9:30:50 AM **Point_ID:** 31

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.46067538
Longitude: -81.246650201

General observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature: 4WD road
Surface Debris: Low Density
Subsurface Met: N/A
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 9:38:45 AM **Point_ID:** 32

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-08

MRSPP Menu: None
MRSPP Note:

Latitude: 28.456229281
Longitude: -81.244557217

General observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 9:58:02 AM **Point_ID:** 33

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.456715979
Longitude: -81.241701341

Lake

Barrier:
Vegetation: Thin Trees
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography:
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 10:12:49 AM **Point_ID:** 34

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.457065891
Longitude: -81.236590345

General observation

Barrier:
Vegetation: Grasses
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 10:21:45 AM **Point_ID:** 35

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.461801599
Longitude: -81.24029399

General observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography:
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: Single Item
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 10:27:47 AM **Point_ID:** 36

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.465173592
Longitude: -81.240878155

General observation

Barrier:
Vegetation: Grasses
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 10:38:27 AM **Point_ID:** 37

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.466584518
Longitude: -81.24338115

Multiple possible craters

Barrier:
Vegetation: Light Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: Medium Density
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 10:44:22 AM **Point_ID:** 38

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.466782841
Longitude: -81.243622434

Possible burial mound

Barrier:
Vegetation: Grasses
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography:
Surface Feature:
Surface Debris: None
Subsurface Met: High Density
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 10:52:45 AM **Point_ID:** 39

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-07

MRSPP Menu: None
MRSPP Note:

Latitude: 28.465365532
Longitude: -81.244819339

General observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 11:16:44 AM **Point_ID:** 40

Team Leader Jeff Ulmer
Sampler: None
Sample ID: PJR-TR-SS-02-06

MRSPP Menu: None
MRSPP Note:

Latitude: 28.47153283
Longitude: -81.24614009

SS-06

Barrier:
Vegetation: Grasses
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 11:33:41 AM **Point_ID:** 41

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.469620084
Longitude: -81.249475833

2nd Possible burial mound

Barrier:
Vegetation: Light Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography:
Surface Feature:
Surface Debris: None
Subsurface Met: High Density
MECMD: None

Saturday, January 13, 2007

Property: Pinecastle **Area:** Range Complex **Time** 11:36:36 AM **Point_ID:** 42

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.469867288
Longitude: -81.249548012

3rd Possible burial mound next to 2nd

Barrier:
Vegetation: Thin Trees
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography:
Surface Feature:
Surface Debris: None
Subsurface Met: High Density
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 12:55:26 PM **Point_ID:** 43

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.458501018
Longitude: -81.259112313

Lake / 1950s dump area near small arms firing points.

Barrier:
Vegetation: Thin Trees
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography:
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: High Density
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 7:04:48 AM **Point_ID:** 44

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-01

MRSPP Menu: None
MRSPP Note:

Latitude: 28.477754684
Longitude: -81.258163834

Very heavy brush and trees.

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Loam
SoilColor: Black

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 7:15:44 AM **Point_ID:** 45

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.477953422
Longitude: -81.257993839

SS-01 wooded entrance

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 7:58:01 AM **Point_ID:** 46

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.485466097
Longitude: -81.231657073

General Observation

Barrier: Barbed wire fence
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 8:04:44 AM **Point_ID:** 47

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-13

MRSPP Menu: None
MRSPP Note:

Latitude: 28.485591739
Longitude: -81.23173098

Moved sample due to swamp.

Barrier:
Vegetation: Heavy Brush
Drainage: Wetland
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 8:43:53 AM **Point_ID:** 48

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-14

MRSPP Menu: None
MRSPP Note:

Latitude: 28.485297048
Longitude: -81.216801534

Heavy palmettos

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 8:57:10 AM **Point_ID:** 49

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.486604561
Longitude: -81.216908825

Trail near SS-14

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography:
Surface Feature: Game Trail
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 9:10:32 AM **Point_ID:** 50

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.489454758
Longitude: -81.217386522

Swampy area

Barrier:
Vegetation: Light Brush
Drainage: Wetland
SoilType: Sand
SoilColor: Black

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 9:27:56 AM **Point_ID:** 51

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.487365548
Longitude: -81.215337349

Old road

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Broken Terrain
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 9:43:20 AM **Point_ID:** 52

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.486443104
Longitude: -81.214800001

General Observation

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography:
Surface Feature: Game Trail
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 12:06:42 PM **Point_ID:** 53

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.481016773
Longitude: -81.227931346

General observations

Barrier: Barbed wire fence
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: White

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: Low Density
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 12:55:18 PM **Point_ID:** 54

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-12

MRSPP Menu: None
MRSPP Note:

Latitude: 28.477596906
Longitude: -81.232716399

SS-12

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 1:26:10 PM **Point_ID:** 55

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.478556076
Longitude: -81.23240373

General observations

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: White

Topography: Flat
Surface Feature: Game Trail
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Sunday, January 14, 2007

Property: Pinecastle **Area:** Range Complex **Time** 1:54:25 PM **Point_ID:** 56

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.472547783
Longitude: -81.227602126

General observations

Barrier: Barbed wire fence
Vegetation:
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: Game Trail
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 2:02:37 PM **Point_ID:** 57

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-11

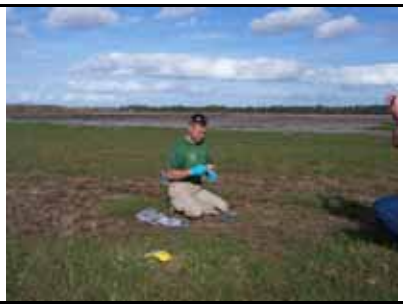
MRSPP Menu: None
MRSPP Note:

Latitude: 28.471311575
Longitude: -81.225009448

Landfill area

Barrier: Chainlink fence
Vegetation:
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None



Monday, January 15, 2007

Property: Pinecastle **Area:** Range Complex **Time** 6:45:52 AM **Point_ID:** 58

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.43960944
Longitude: -81.205428605

Open field w/palmettos

Barrier:
Vegetation: Mixed Brush + Grass
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: Low Density
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 7:47:42 AM **Point_ID:** 179

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-16

MRSPP Menu: None
MRSPP Note:

Latitude: 28.446151721
Longitude: -81.204124236

Dense palmettos

Barrier:
Vegetation: Heavy Brush
Drainage: Wetland
SoilType: Organic
SoilColor: Black

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Monday, January 15, 2007

Property: Pinecastle **Area:** Range Complex **Time** 8:20:08 AM **Point_ID:** 180

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.449546923
Longitude: -81.193839439

South of highway

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: White

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 8:34:29 AM **Point_ID:** 181

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.447654427
Longitude: -81.18105093

General observations

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: White

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Monday, January 15, 2007

Property: Pinecastle **Area:** Range Complex **Time** 8:43:26 AM **Point_ID:** 182

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

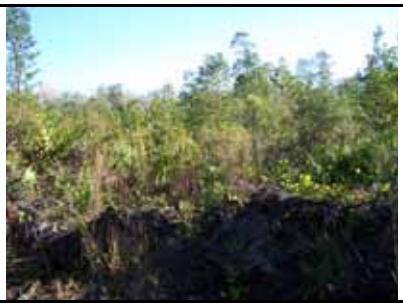
MRSPP Menu: None
MRSPP Note:

Latitude: 28.442978981
Longitude: -81.178108593

General observations

Barrier: Barbed wire fence
Vegetation: Mixed Trees + Brush
Drainage: Wetland
SoilType: Sand
SoilColor:

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None



Property: Pinecastle **Area:** Range Complex **Time** 9:11:30 AM **Point_ID:** 183

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.442571801
Longitude: -81.196135011

General observations

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: White

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Monday, January 15, 2007

Property: Pinecastle **Area:** Range Complex **Time** 9:29:49 AM **Point_ID:** 184

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.428446808
Longitude: -81.191178247

Gas and power line

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: White

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 9:48:37 AM **Point_ID:** 185

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.428595899
Longitude: -81.182064801

Gas and powerline right-of-way.

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: Wetland
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Monday, January 15, 2007

Property: Pinecastle **Area:** Range Complex **Time** 10:20:13 AM **Point_ID:** 186

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.437740195
Longitude: -81.213506776

General observations

Barrier: Barbed wire fence
Vegetation:
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 10:46:12 AM **Point_ID:** 187

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.445116235
Longitude: -81.229254567

Near interstate

Barrier: Chainlink fence
Vegetation: Heavy Brush
Drainage: Wetland
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: Low Density
MECMD: None

Monday, January 15, 2007

Property: Pinecastle **Area:** Range Complex **Time** 1:54:45 PM **Point_ID:** 188

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-10

MRSPP Menu: None
MRSPP Note:

Latitude: 28.467070396
Longitude: -81.234111758

General observations

Barrier: Chainlink fence
Vegetation:
Drainage: Wetland
SoilType: Sand
SoilColor: Brown

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 2:34:16 PM **Point_ID:** 189

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.462020583
Longitude: -81.228810827

General observations

Barrier:
Vegetation: Thin Trees
Drainage: Wetland
SoilType: Sand
SoilColor: Black

Topography:
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Tuesday, January 16, 2007

Property: Pinecastle **Area:** Range Complex **Time** 7:41:02 AM **Point_ID:** 190

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.474231948
Longitude: -81.207093816

Abandoned firing range.

Barrier:
Vegetation: Grasses
Drainage: Manmade Ditch
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 8:01:09 AM **Point_ID:** 191

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.470177682
Longitude: -81.209493906

General observations

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: Wetland
SoilType: Sand
SoilColor: Tan

Topography: Broken Terrain
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Tuesday, January 16, 2007

Property: Pinecastle **Area:** Range Complex **Time** 8:34:33 AM **Point_ID:** 284

Team Leader Tim Nowicki
Sampler: Jeff Ulmer
Sample ID: PJR-TR-SS-02-15

MRSPP Menu: None
MRSPP Note:

Latitude: 28.466416184
Longitude: -81.206490185

General observations

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: Wetland
SoilType: Loam
SoilColor: Black

Topography: Broken Terrain
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 10:02:51 AM **Point_ID:** 285

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.459954825
Longitude: -81.222367186

General observations

Barrier:
Vegetation: Grasses
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Tuesday, January 16, 2007

Property: Pinecastle **Area:** Range Complex **Time** 10:44:48 AM **Point_ID:** 286

Team Leader Jeff Ulmer
Sampler: Tim Nowicki
Sample ID: PJR-TR-SS-02-09

MRSPP Menu: None
MRSPP Note:

Latitude: 28.459185986
Longitude: -81.223845719

General observations

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: Wetland
SoilType: Loam
SoilColor: Black

Topography: Broken Terrain
Surface Feature:
Surface Debris: None
Subsurface Met: No Detect
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 11:35:13 AM **Point_ID:** 287

Team Leader
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.480572685
Longitude: -81.1864134

General observations

Barrier:
Vegetation: Grasses
Drainage: Manmade Ditch
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: Asphalt road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Tuesday, January 16, 2007

Property: Pinecastle **Area:** Range Complex **Time** 11:44:06 AM **Point_ID:** 288

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.474174671
Longitude: -81.199453183

General observations

Barrier: Chainlink fence
Vegetation:
Drainage: Wetland
SoilType: Sand
SoilColor: Tan

Topography:
Surface Feature: Gravel/rock road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 11:57:28 AM **Point_ID:** 289

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

MRSPP Menu: None
MRSPP Note:

Latitude: 28.463752102
Longitude: -81.185795924

General observations

Barrier:
Vegetation: Heavy Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature: Gravel/rock road
Surface Debris: None
Subsurface Met: N/A
MECMD: None

Tuesday, January 16, 2007

Property: Pinecastle **Area:** Range Complex **Time** 1:09:24 PM **Point_ID:** 290

Team Leader Jeff Ulmer
Sampler: None
Sample ID: PJR-TR-SS-02-05

MRSPP Menu: None
MRSPP Note:

Latitude: 28.463264668
Longitude: -81.247786839

Craters all around area, sample collected from inside crater.

Barrier:
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

Topography: Flat
Surface Feature:
Surface Debris: None
Subsurface Met: Low Density
MECMD: None

Property: Pinecastle **Area:** Range Complex **Time** 1:24:30 PM **Point_ID:** 291

Team Leader Jeff Ulmer
Sampler: None
Sample ID: None

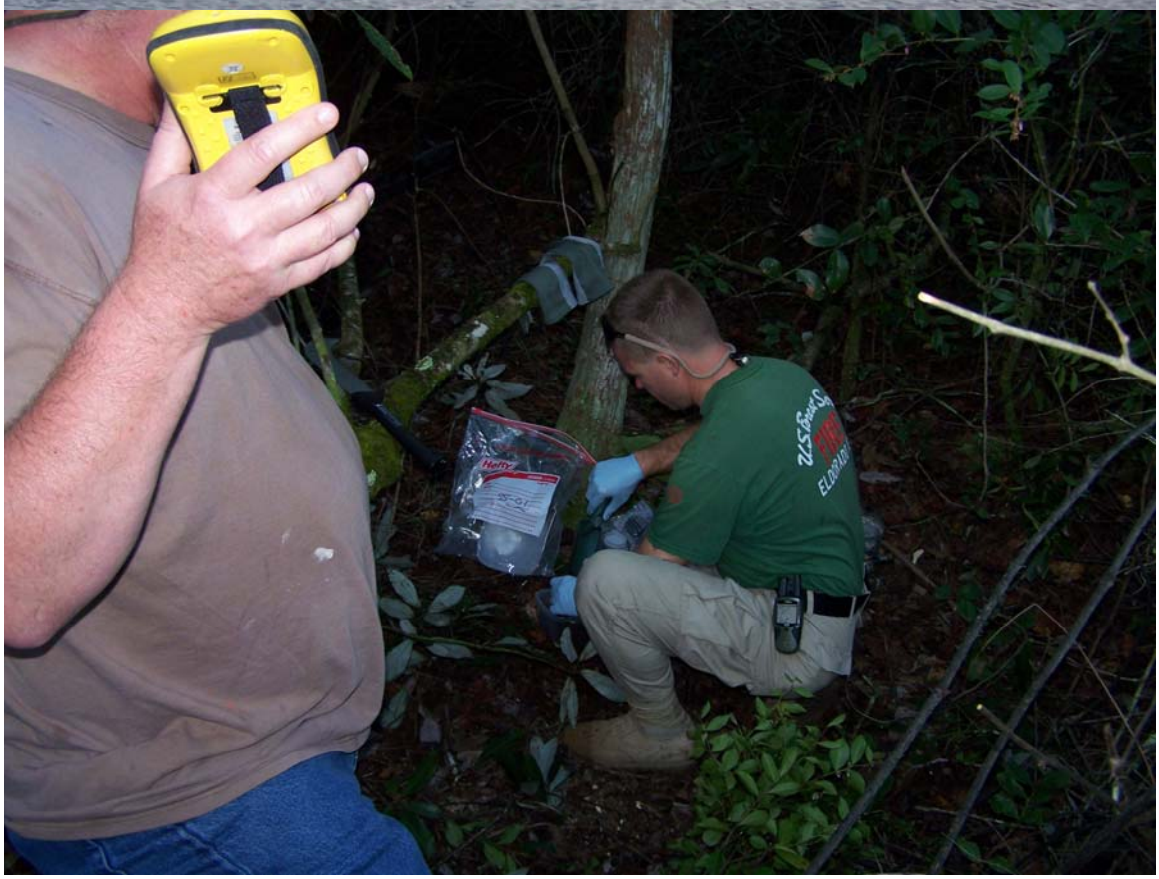
MRSPP Menu: None
MRSPP Note:

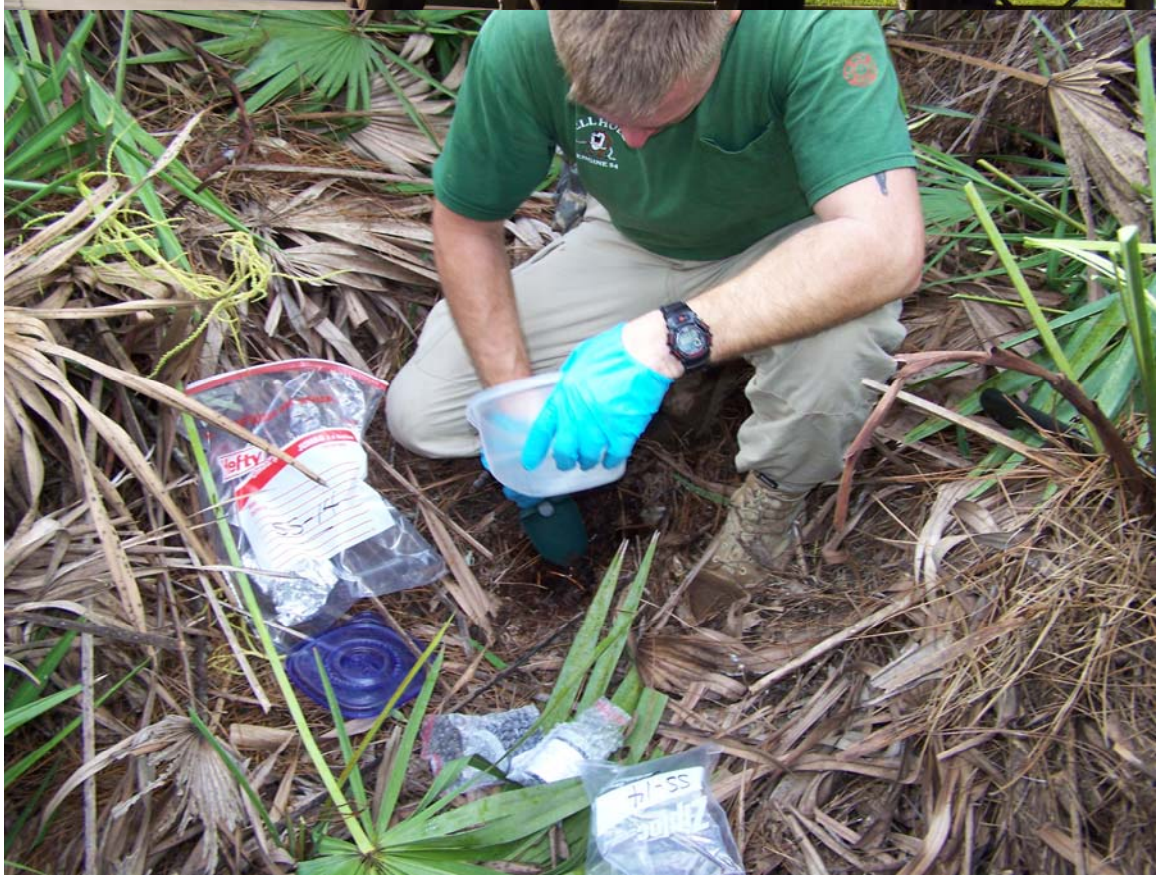
Latitude: 28.46362928
Longitude: -81.24856334

Multiple large craters

Barrier: Chainlink fence
Vegetation: Mixed Trees + Brush
Drainage: None
SoilType: Sand
SoilColor: Tan

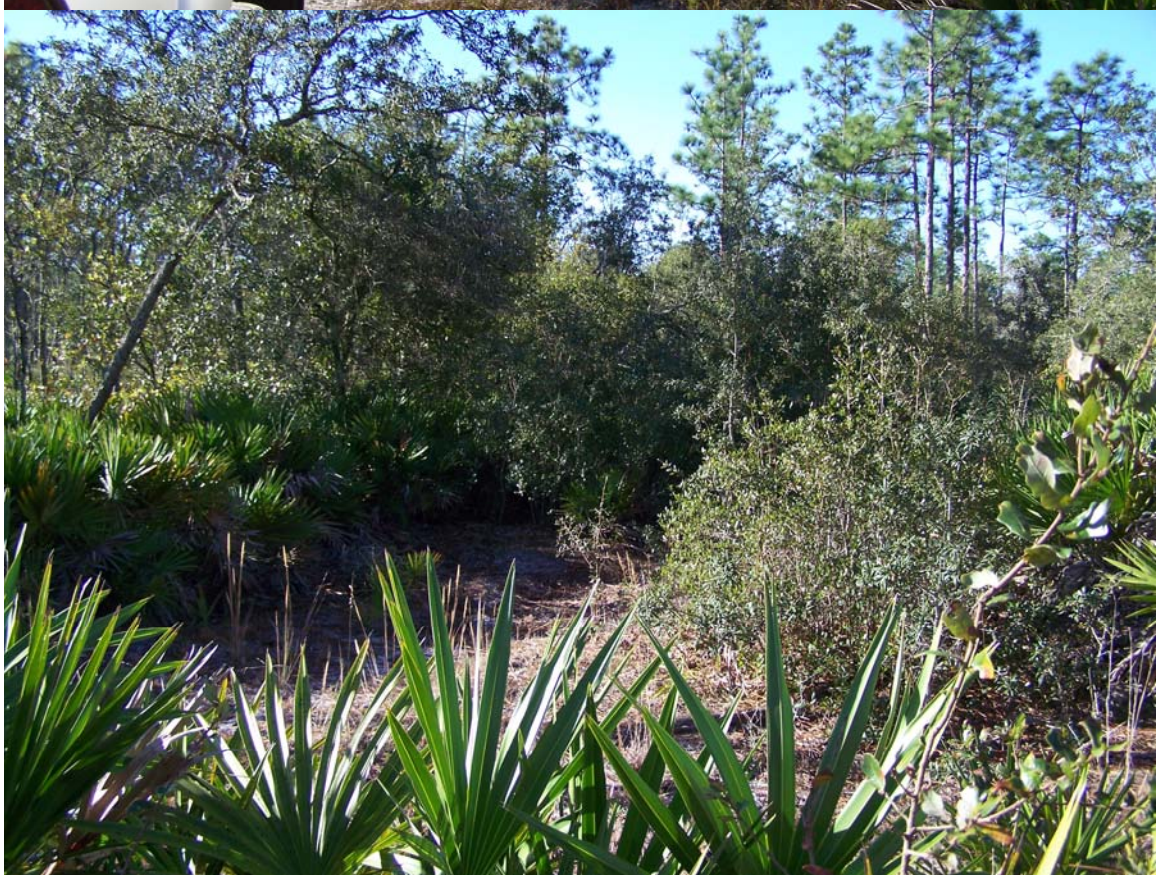
Topography: Flat
Surface Feature: 4WD road
Surface Debris: None
Subsurface Met: Low Density
MECMD: None





Contents:
SS-11

PS-16



Ziploc
SS-15

SCHONSTEDT

Hefty
JUMBO
SS-ΦS

APPENDIX F

Analytical Data
Electronic Only

Document too large to insert into Report
See CD for Reference

APPENDIX G

Analytical Data QA/QC Report and USACE-prepared Chemical Data Quality Assurance Report

DATA VALIDATION SUMMARY REPORT

for samples collected from

PINECASTLE JEEP RANGE

Orange County, Florida

Data Validation by: Katherine LaPierre

Parsons - Austin

INTRODUCTION

The following data validation summary report covers soil samples collected from Pinecastle Jeep Range in Orange County, Florida from January 13 through January 15, 2007. Samples were logged in under the following Sample Delivery Group (SDG):

D7A160210

The samples were analyzed for explosives and metals. The table below details the requested parameters for each sample. The field quality control (QC) samples collected in association with this SDG included two field duplicate samples and two matrix spike/matrix spike duplicate (MS/MSD) pair. The field QC samples were analyzed for the same parameters as the associated parent samples.

All samples were collected by Parsons. All analyses were performed by STL-Denver following the procedures outlined in the Standard Subcontract and the Sampling and Analysis Addendum for the Southeast Region. The samples in this SDG were shipped to the laboratory in two coolers. The coolers were received by the laboratory at temperatures of 4.1 and 1.6°C. Although one of the two coolers was below the 2-6° C range recommended by the Work Plan, only soils were included in the shipment, so data quality was not affected and no corrective action was necessary.

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	Matrix	Explosives	Metals	Comments
PJR-TR-SS-02-01	S	X	X	
PJR-TR-SS-02-02	S	X	X	MS/MSD
PJR-TR-SS-02-03	S	X	X	
PJR-TR-SS-02-04	S	X	X	MS/MSD
PJR-TR-SS-02-06	S	X	X	
PJR-TR-SS-02-07	S	X	X	
PJR-TR-SS-02-08	S	X	X	
PJR-TR-SS-02-10	S	X	X	
PJR-TR-SS-02-11	S	X	X	
PJR-TR-SS-02-12	S	X	X	
PJR-TR-SS-02-13	S	X	X	
PJR-TR-SS-02-14	S	X	X	
PJR-TR-SS-02-16	S	X	X	
PJR-TR-SS-02-20	S	X	X	FD of PJR-TR-SS-02-02
PJR-TR-SS-02-21	S	X	X	FD of PJR-TR-SS-02-04

S = soil

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the Project Work Plan. 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 rule was 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 reporting limit 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 United States Army Corps of Engineers (USACE) chemist for laboratory to use the historically developed control limits for the explosive analysis. See table below.

Analyte	LCS/MS/MSD Control Limits for Soil	Maximum RPD (%) for Soil
HMX	53-115	30
RDX	70-121	30
1,3,5-Trinitrobenzene	47-131	30
1,3-dinitrobenzene	69-128	30
Nitrobenzene	59-150	30
Tetryl	10-160	30
Nitroglycerin	32-135	30
2,4,6-Trinitrotoluene	58-130	30
4-Amino-2,6-dinitrotoluene	60-133	30
2-Amino-4,6-dinitrotoluene	53-141	30
2,4-Dinitrotoluene	61-128	30
2,6-Dinitrotoluene	59-134	30
3-Nitrotoluene	51-153	30
PETN	28-178	30
2-Nitrotoluene	55-147	30
4-Nitrotoluene	65-146	30

For metals, the control limits for accuracy are 80-120% for LCS, MS, and MSD. The precision control limits for the MS/MSD are RPD ≤ 20%.

EXPLOSIVES

General

The explosives portion of this SDG consisted of fifteen (15) soil samples. The samples were collected from January 13 through January 15, 2007 and were analyzed for the full list of explosives as specified in the Work Plan.

The explosives analyses were performed according to the laboratory's modification of USEPA SW846 Method 8321A. All samples in this SDG were analyzed following the procedures outlined in the laboratory Standard Operation Procedure (SOP). All samples were prepared and analyzed within the holding time required by the method.

The samples for explosives analyses were extracted and analyzed in a single batch (#7019440) under a single initial calibration (ICAL). It should be noted that sample PJR-TR-SS-02-01 required a 50x dilution for nitroglycerin due to the high concentration present. In addition, sample PJR-TR-SS-02-03 required a 4x dilution for tetryl due to matrix interference.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) samples, MS/MSD samples, and the surrogate spikes. Samples PJR-TR-SS-02-02 and PJR-TR-SS-02-04 were designated for MS/MSD analyses on the COC.

All LCS and MS/MSD percent recoveries were within acceptance criteria.

All surrogate spike recoveries were within acceptance criteria, with the following exceptions:

Sample ID	Dilution	Surrogate	%R	Criteria
PJR-TR-SS-02-01	50x	Nitrobenzene-d5	174	50-150%
PJR-TR-SS-02-03	4x	Nitrobenzene-d5	174	50-150%

The dilutions listed above were only used for nitroglycerin and tetryl respectively. Both compounds were non-detect in the associated dilutions, so data quality was not affected by the high surrogate recoveries and no corrective action was necessary.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD concentrations. Precision was further assessed by comparing the field duplicate analyte results. Sample PJR-TR-SS-02-20 was collected as a field duplicate of sample PJR-TR-SS-02-02. Sample PJR-TR-SS-02-21 was collected as a field duplicate of sample PJR-TR-SS-02-04.

All analytes met RPD criteria in both MS/MSD pair.

All analytes were non-detect in the parent sample PJR-TR-SS-02-02 and the associated field duplicate.

All analytes were below the reporting limit (RL) in the parent sample PJR-TR-SS-02-04 and the associated field duplicate.

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 analysis.

The 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 and continuing calibration verification criteria were met.
- MDLs were developed within 12 months of sample analyses.

One method blank was associated with the explosives analyses in this SDG. The method blank was non-detect for all target compounds.

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. Thus, the completeness for the explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

ICP-AES METALS

General

The ICP-AES portion of this SDG consisted of fifteen (15) soil samples. The samples were collected from January 13 through January 15, 2007 and were analyzed for aluminum, calcium, iron, magnesium, potassium, sodium, strontium, and titanium.

The ICP-AES metals analyses were performed using USEPA SW846 Method 6010B. The samples in this SDG 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.

The samples for ICP-AES analysis were digested and analyzed in two batches (#7018475 and #7050295) under two different ICALs.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS samples and MS/MSD samples. Samples PJR-TR-SS-02-02 and PJR-TR-SS-02-04 were designated for MS/MSD analyses on the COC.

Two LCS samples were anlayzed, one for each batch. All LCS recoveries were within acceptance criteria.

All analytes met accuracy criteria in the MS/MSD analyzed on sample PJR-TR-SS-02-02, except for the following:

Parent Sample	Metal	MS %R	MSD %R	Criteria
PJR-TR-SS-02-02	Aluminum	124	131	80-120%

Aluminum was flagged "J" in the parent sample, in accordance with the SAP.

All analytes met accuracy criteria in the MS/MSD analyzed on sample PJR-TR-SS-02-04, except for the following:

Parent Sample	Metal	MS %R	MSD %R	Criteria
PJR-TR-SS-02-04	Aluminum	133	207	80-120%
	Iron	0	0	

It should be noted that the parent sample concentration for iron was greater than five times the amount spiked, resulting in the anomalous recovery. Both non-compliant metals were flagged "J" in the parent sample, in accordance with the SAP.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD concentrations. Precision was further assessed by comparing the field duplicate analyte results. Sample PJR-TR-SS-02-20 was collected as a field duplicate of sample PJR-TR-SS-02-02. Sample PJR-TR-SS-02-21 was collected as a field duplicate of sample PJR-TR-SS-02-04.

All MS/MSD RPDs were within acceptance criteria for both MS/MSD pair.

All metals detected above the RL in both the parent and field duplicate met criteria for the following:

PJR-TR-SS-02-02

Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Aluminum	230	210	9.1	RPD ≤ 70
Calcium	470	430	8.9	
Iron	160	160	0	
Strontium	5.6	5.3	5.5	
Titanium	17	18	5.7	

All metals detected above the RL in both the parent and field duplicate met criteria for the following:

PJR-TR-SS-02-04

Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Aluminum	480	470	2.1	RPD ≤ 70
Calcium	2000	1900	5.1	
Iron	870	880	1.1	
Magnesium	200	190	5.1	
Strontium	12	11	8.7	
Titanium	19	15	24	

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.

The 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 second source verification criteria were met. The initial calibration verification samples were prepared using a secondary source.
- All continuing calibration verification criteria were met.
- All interference check criteria were met.
- All RL check standard criteria were met.
- A dilution test (DT) for batch #7018475 was analyzed on sample PJR-TR-SS-02-02. The DT met criteria for all metals detected in the parent sample at a concentration of 50 times the MDL or greater, with the exception of those in **bold** below:

Metal	%D	Criteria
Strontium	1.6	%D ≤ 10
Titanium	**14**	

- A post digestion spike (PDS) for batch #7018475 was analyzed on the same sample as the DT. All metals met criteria in the PDS as follows:

Metal	%R	Criteria
Titanium	115	75-125%

- A DT for batch #7050295 was analyzed on sample PJR-TR-SS-02-04. The DT met criteria for all metals detected in the parent sample at a concentration of 50 times the MDL or greater, with the exception of those in **bold** below:

Metal	%D	Criteria
Aluminum	8.3	%D ≤ 10
Calcium	1.6	
Iron	1.4	
Strontium	3.1	
Titanium	**41**	

- A PDS for batch #7050295 was analyzed on the same sample as the DT. Titanium failed to meet criteria in the PDS, as follows:

Metal	%R	Criteria
Titanium	211	75-125%

The only sample analyzed in batch 7050295 was PJR-TR-SS-02-04, so the titanium result for this sample was flagged "J" in accordance with the SAP.

Two method blanks and several calibration blanks were associated with the ICP-AES 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 ICP-AES metals results for the samples in this SDG were considered usable. The completeness for the ICP metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

ICP/MS METALS

General

The ICP/MS portion of this SDG consisted of fifteen (15) soil samples. The samples were collected from January 13 through January 15, 2007 and were analyzed for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

The ICP/MS metals analyses were performed using USEPA SW846 Method 6020. 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 and the Work Plan.

The samples for ICP/MS metals were digested in one batch (#7018470) and analyzed in two batches under two different ICALs.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS samples and MS/MSD samples. Samples PJR-TR-SS-02-02 and PJR-TR-SS-02-04 were designated for MS/MSD analyses on the COC.

All LCS recoveries were within acceptance criteria.

All analytes met accuracy criteria in the MS/MSD pair performed on sample PJR-TR-SS-02-02.

All analytes met accuracy criteria in the MS/MSD pair performed on sample PJR-TR-SS-02-04, except for the following:

Parent Sample	Metal	MS %R	MSD %R	Criteria
PJR-TR-SS-02-04	Antimony	(82)	77	80-120%
	Manganese	(93)	75	
	Zinc	78	57	

The non-compliant metals were flagged "J" in the parent sample, in accordance with the SAP.

Precision

Precision was evaluated using the RPD calculated from the MS/MSD concentrations. Precision was further assessed by comparing the field duplicate analyte results. Sample PJR-TR-SS-02-20 was collected as a field duplicate of sample PJR-TR-SS-02-02. Sample PJR-TR-SS-02-21 was collected as a field duplicate of sample PJR-TR-SS-02-04.

All metals met RPD criteria in both MS/MSD pair.

All metals detected above the RL in both the parent and field duplicate met criteria for the following:

PJR-TR-SS-02-02

Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Barium	6.2	5.2	18	RPD ≤ 70
Chromium	1.4	1.0	33	
Copper	5.2	3.7	34	
Lead	3.5	2.4	37	

All metals detected above the RL in both the parent and field duplicate met criteria for the following:

PJR-TR-SS-02-04

Metal	Parent Conc. (mg/kg)	FD Conc. (mg/kg)	RPD	Criteria
Barium	7.7	7.3	5.3	RPD ≤ 70
Chromium	1.5	1.1	31	
Cobalt	0.20	0.18	11	
Copper	3.6	3.4	5.7	
Lead	13	11	17	
Manganese	11	10	9.5	
Nickel	1.2	0.96	22	
Vanadium	1.5	1.3	14	
Zinc	19	16	17	

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.

The 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 metals met criteria in the RL check standard.
- All second source criteria were met. The ICV was prepared using a secondary source.
- All CCV criteria were met.
- All interference check (ICSA/ICSAB) criteria were met with one exception. Cadmium was detected in the ICSA samples at a concentration above the RL (1.0µg/L). However, cadmium is a verified trace impurity in the ICSA standard, so no corrective action was necessary.
- A DT was analyzed on sample PJR-TR-SS-02-02. The DT met criteria for all metals detected in the parent sample at a concentration of 50 times the MDL or greater, as follows:

Metal	%D	Criteria
Barium	7.3	%D ≤ 10
Copper	3.8	

Lead	3.4	

- A PDS was not required because all metals met criteria in the DT.

One method blank and several calibration blanks were associated with the ICP/MS 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 ICP/MS results for the samples in this SDG were considered usable. Therefore, the completeness for the ICP/MS portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

MERCURY

General

The mercury portion of this SDG consisted of fifteen (15) soil samples. The samples were collected from January 13 through January 15, 2007 and were analyzed for mercury.

The mercury analyses were performed using USEPA SW846 Method 7471A. 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 and the Work Plan.

The mercury samples were analyzed in one batch (#7024198) under a single ICAL.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS samples and MS/MSD samples. Samples PJR-TR-SS-02-02 and PJR-TR-SS-02-04 were designated for MS/MSD analyses on the COC.

All LCS and MS/MSD recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD concentrations. Precision was further assessed by comparing the field duplicate analyte results. Sample PJR-TR-SS-02-20 was collected as a field duplicate of sample PJR-TR-SS-02-02. Sample PJR-TR-SS-02-21 was collected as a field duplicate of sample PJR-TR-SS-02-04.

The MS/MSD RPD met criteria for both MS/MSD pair.

Mercury was below the reporting limit in the parent sample PJR-TR-SS-02-02 and the associated field duplicate.

Mercury was below the reporting limit in the parent sample PJR-TR-SS-02-04 and the associated field duplicate.

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.

The 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 initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV sample was prepared using a secondary source.
- A DT was analyzed on sample PJR-TR-SS-02-02. The DT was not applicable because mercury was below the RL in the parent sample.

One method blank and several calibration blanks were associated with the mercury 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 mercury results for the samples in this SDG were considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

DATA USABILITY

All calculations were spot checked and verified. All data in this SDG are usable and all DQO requirements were met.

DATA VALIDATION SUMMARY REPORT

for samples collected from

PINECASTLE JEEP RANGE

Orange County, Florida

Data Validation by: Katherine LaPierre

Parsons - Austin

INTRODUCTION

The following data validation summary report covers soil samples collected from Pinecastle Jeep Range in Orange County, Florida on January 16, 2007. Samples were logged in under the following Sample Delivery Group (SDG):

D7A170169

The samples were analyzed for explosives and metals. The table below details the requested parameters for each sample. No field quality control (QC) samples were collected in association with this SDG.

All samples were collected by Parsons. All analyses were performed by STL-Denver following the procedures outlined in the Standard Subcontract and the Sampling and Analysis Addendum for the Southeast Region. The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 1.5°C, which is slightly below the 2-6° C range recommended by the Work Plan. However, only soils were included in the shipment so data quality was not affected and no corrective action was necessary.

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	Matrix	Explosives	Metals	Comments
PJR-TR-SS-02-05	S	X	X	
PJR-TR-SS-02-09	S	X	X	
PJR-TR-SS-02-15	S	X	X	

S = soil

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the Project Work Plan. 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 rule was 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 reporting limit 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 United States Army Corps of Engineers (USACE) chemist for laboratory to use the historically developed control limits for the explosive analysis. See table below.

Analyte	LCS/MS/MSD Control Limits for Soil	Maximum RPD (%) for Soil
HMX	53-115	30
RDX	70-121	30
1,3,5-Trinitrobenzene	47-131	30
1,3-dinitrobenzene	69-128	30
Nitrobenzene	59-150	30
Tetryl	10-160	30
Nitroglycerin	32-135	30
2,4,6-Trinitrotoluene	58-130	30
4-Amino-2,6-dinitrotoluene	60-133	30
2-Amino-4,6-dinitrotoluene	53-141	30
2,4-Dinitrotoluene	61-128	30
2,6-Dinitrotoluene	59-134	30
3-Nitrotoluene	51-153	30
PETN	28-178	30
2-Nitrotoluene	55-147	30
4-Nitrotoluene	65-146	30

For metals, the control limits for accuracy are 80-120% for LCS, MS, and MSD. The precision control limits for the MS/MSD are RPD ≤ 20%.

EXPLOSIVES

General

The explosives portion of this SDG consisted of three (3) soil samples. The samples were collected on January 16, 2007 and were analyzed for the full list of explosives as specified in the Work Plan.

The explosives analyses were performed according to the laboratory's modification of USEPA SW846 Method 8321A. All samples in this SDG were analyzed following the

procedures outlined in the laboratory Standard Operation Procedure (SOP). All samples were prepared and analyzed within the holding time required by the method.

The samples for explosives analyses were extracted and analyzed in a single batch (#7020046) under a single initial calibration (ICAL).

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) sample and the surrogate spikes. No sample was designated for matrix spike/matrix spike duplicate (MS/MSD) analyses on the COC.

All LCS and surrogate spike recoveries were within acceptance criteria.

Precision

Precision could not be evaluated for the explosives portion of this SDG because no duplicate analyses were performed.

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 analysis.

The 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 and continuing calibration verification criteria were met.
- MDLs were developed within 12 months of sample analyses.

One method blank was associated with the explosives analyses in this SDG. The method blank was non-detect for all target compounds.

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. Thus, the completeness for the explosives portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

ICP-AES METALS

General

The ICP-AES portion of this SDG consisted of three (3) soil samples. The samples were collected on January 16, 2007 and were analyzed for aluminum, calcium, iron, magnesium, potassium, sodium, strontium, and titanium.

The ICP-AES metals analyses were performed using USEPA SW846 Method 6010B. The samples in this SDG 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.

The samples for ICP-AES analysis were digested and analyzed in one batch (#7024508) under a single ICAL.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and MS/MSD samples. No sample was designated for MS/MSD analyses on the COC. However, the laboratory analyzed an MS/MSD pair on sample PJR-TR-SS-02-15.

All LCS recoveries were within acceptance criteria.

All MS/MSD recoveries were within acceptance criteria, except for the following:

Metal	MS %R	MSD %R	Criteria
Iron	58	60	80-120%

Iron was flagged "J" in the parent sample, in accordance with the SAP.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD concentrations.

All MS/MSD RPDs were within acceptance criteria.

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.

The 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 second source verification criteria were met. The initial calibration verification samples were prepared using a secondary source.
- All continuing calibration verification criteria were met.
- All interference check criteria were met.
- All RL check standard criteria were met.
- A dilution test (DT) was analyzed on sample PJR-TR-SS-02-15. The DT met criteria for all metals detected in the parent sample at a concentration of 50 times the MDL or greater, as follows:

Metal	%D	Criteria
Aluminum	7.2	%D ≤ 10
Titanium	0.2	

- A post digestion spike (PDS) was not required because all metals met criteria in the DT.

One method blank and several calibration blanks were associated with the ICP-AES 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 ICP-AES metals results for the samples in this SDG were considered usable. The completeness for the ICP metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

ICP/MS METALS

General

The ICP/MS portion of this SDG consisted of three (3) soil samples. The samples were collected on January 16, 2007 and were analyzed for antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

The ICP/MS metals analyses were performed using USEPA SW846 Method 6020. 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 and the Work Plan.

The samples for ICP/MS metals were digested and analyzed in one batch (#7018470) under a single ICAL.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample. No sample was designated for MS/MSD analyses on the COC.

All LCS recoveries were within acceptance criteria.

Precision

Precision could not be evaluated for the ICP/MS metals portion of this SDG because no duplicate analyses were performed.

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.

The 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 metals met criteria in the RL check standard.
- All second source criteria were met. The ICV was prepared using a secondary source.
- All CCV criteria were met.
- All interference check (ICSA/ICSAB) criteria were met with one exception. Cadmium was detected in the ICSA samples at a concentration above the RL (1.0µg/L). However, cadmium is a verified trace impurity in the ICSA standard, so no corrective action was necessary.
- A DT was analyzed on sample PJR-TR-SS-02-02 from Pinecastle SDG D7A160210. The DT met criteria for all metals detected in the parent sample at a concentration of 50 times the MDL or greater, as follows:

Metal	%D	Criteria
Barium	7.3	%D ≤ 10
Copper	3.8	
Lead	3.4	

- A PDS was not required because all metals met criteria in the DT.

One method blank and several calibration blanks were associated with the ICP/MS 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 ICP/MS results for the samples in this SDG were considered usable. Therefore, the completeness for the ICP/MS 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. The samples were collected on January 16, 2007 and were analyzed for mercury.

The mercury analyses were performed using USEPA SW846 Method 7471A. 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 and the Work Plan.

The mercury samples were analyzed in one batch (#7024195) under a single ICAL.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS sample and MS/MSD samples. NO sample was designated for MS/MSD analyses on the COC. However, the laboratory analyzed an MS/MSD pair on sample PJR-TR-SS-02-15.

All LCS and MS/MSD recoveries were within acceptance criteria.

Precision

Precision was evaluated using the RPD obtained from the MS/MSD concentrations.

The MS/MSD RPD was within acceptance criteria.

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.

The 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 initial calibration criteria were met.
- All calibration verification criteria were met.
- All second source verification criteria were met. The ICV sample was prepared using a secondary source.
- A DT was analyzed on sample PJR-TR-SS-02-15. The DT was not applicable because mercury was below the RL in the parent sample.

One method blank and several calibration blanks were associated with the mercury 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 mercury results for the samples in this SDG were considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

DATA USABILITY

All calculations were spot checked and verified. All data in this SDG are usable and all DQO requirements were met.

APPENDIX H

Geographic Information Systems Data
Electronic Only

APPENDIX I

Geophysical Data
Electronic Only
Not Applicable

APPENDIX J

Conceptual Site Model

CONCEPTUAL SITE EXPOSURE MODEL

PINECASTLE JEEP RANGE
ORLANDO, FLORIDA
ORANGE COUNTY

Subsite/Range	Acreage	Suspect Past DoD Activities	Potential MEC/MD Presence	MEC/MD Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Proposed Field Sampling/ Qualitative Reconnaissance
CHEMICAL DEMONSTRATION RANGE (MRS 01)	5	Demonstration Area	Blasting Caps, M1 Detonation Chemical ID Set	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Open Marshy Wooded Land	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	No soil sample proposed / QR path TBD
AIR-TO-GROUND ROCKET RANGE (MRS 02)	1,419	Strafing Target	Small Arms, General; 50 Cal. Machine Gun; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M38A2 100-lb Practice Bomb; HVAR 5-inch Rocket	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	Nine soil samples proposed (samples #5 - #8, and #10 - #14 on Figures 3A & 3B) / QR path TBD
TURRET GUNNERY RANGE RANGE COMPLEX NO. 1 (MRS 03)	4,209	Ground-to-Ground Moving Target Range	Small Arms, General; 50 Cal. Machine Gun	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Open Marshy Wooded Land, Highway	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	Twelve soil samples proposed (samples #2, #5, #6, #7, & #9 - #16 on Figures 3A & 3B) / QR path TBD
CQ-3 RANGE RANGE COMPLEX NO. 1 (MRS 03)	4,498	Ground-to-Air Radio Controlled Pilotless Target	Small Arms, General; 50 Cal. Machine Gun	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway, Landfill	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	Ten soil sample proposed (sample #2, #6, #7, #9 - #12, and #14 - #16 on Figures 3A & 3B) / QR path TBD
RIFLE RANGE NO. 1 RANGE COMPLEX NO. 1 (MRS 03)	48	Rifle Range	Small Arms, General	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Open Marshy Wooded Land, Highway	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	Four soil samples proposed (samples #4, #7, #8, & #10 on Figures 3A & 3B) / QR path TBD
RIFLE RANGE NO. 2 RANGE COMPLEX NO. 1 (MRS 03)	463	Rifle Range	Small Arms, General	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Open Marshy Wooded Land, Highway	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	Three soil samples proposed (samples #4, #8, & #9 on Figures 3A & 3B) / QR path TBD
SMALL ARMS RANGE RANGE COMPLEX NO. 1 (MRS 03)	287	Small Arms Range	Small Arms, General	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Open Marshy Wooded Land, Highway	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	Three soil samples proposed (samples #4, #8, & #9 on Figures 3A & 3B) / QR path TBD
PISTOL RANGE RANGE COMPLEX NO. 1 (MRS 03)	3	Pistol Range	Small Arms, General	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Open Marshy Wooded Land, Highway	Public Access Available	No- Intrusive or non-intrusive, No MEC on surface or subsurface, No access restrictions	One soil sample proposed (sample #4 on Figures 3A & 3B) / QR path TBD
SHIP TARGET RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Three soil samples proposed (samples #1, #2, & #6 on Figures 3A & 3B) / QR path TBD
CONVOY TARGET RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Two soil samples proposed (samples #2 & #6 on Figures 3A & 3B) / QR path TBD

CONCEPTUAL SITE EXPOSURE MODEL, CONTINUED

PINECASTLE JEEP RANGE
ORLANDO, FLORIDA
ORANGE COUNTY

Subsite/Range	Acreage	Suspect Past DoD Activities	Potential MEC/MD Presence	MEC/MD Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Proposed Field Sampling/ Qualitative Reconnaissance
TANKS (NEW) RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge; HVAR 5-inch Rocket; HVAR 5-inch Practice Rocket; 11.75-inch Practice Tiny Tim Rocket;	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Four soil samples proposed (samples #2, #3, #6 & #7 on Figures 3A & 3B) / QR path TBD
TANKS (OLD) RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge; HVAR 5-inch Rocket; HVAR 5-inch Practice Rocket; 11.75-inch Practice Tiny Tim Rocket;	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Four soil samples proposed (samples #2, #3, #6 & #7 on Figures 3A & 3B) / QR path TBD 3B) / QR path TBD
CIRCULAR TARGET RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; An-M50 4-lb Incendiary Bomb; AN-M52 2-lb Incendiary Bomb; AN-M54 4-lb Incendiary Bomb; AN-M69 6-lb Incendiary Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Three soil samples proposed (samples #1, #2, & #6 on Figures 3A & 3B) / QR path TBD
TARGET NO. 1 RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; AN-M41 20-lb Frag Bomb; An-M50 4-lb Incendiary Bomb; AN-M52 2-lb Incendiary Bomb; AN-M54 4-lb Incendiary Bomb; AN-M67 10-lb Incendiary Bomb; AN-M76 500-lb Incendiary Bomb; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Four soil samples proposed (samples #2, #3, #4 & #7 on Figures 3A & 3B) / QR path TBD 3B) / QR path TBD
TARGET NO. 2 RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; M38A2 100-lb Practice Bomb; M1A1 Spotting Charge	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Two soil samples proposed (samples #6 & #7 on Figures 3A & 3B) / QR path TBD
TARGET NO. 3 RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; AN-M30 100-lb General Purpose Bomb; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; AN-M67 10-lb Incendiary Bomb; AN-M50 4-lb Incendiary Bomb; AN-M69 6-lb Incendiary Bomb; M48 20-lb Practice Bomb; M1A1 Spotting Charge; M38A2 100-lb Practice Bomb.	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	One soil sample proposed (sample #10 on Figures 3A & 3B) / QR path TBD
TARGET NO. 4 RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; An-M30 100-lb General Purpose Bomb; AN-M41 20-lb Fragmentation Bomb; AN-M67 10-lb Incendiary Bomb; AN-M690 6-lb Incendiary Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M1A1 Spotting Charge; M38A2 100-lb Practice Bomb	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	One soil sample proposed (sample #11 on Figures 3A & 3B) / QR path TBD
WAREHOUSE TARGET RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	M38A2 100-lb Practice Bomb	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Three soil samples proposed (samples, #1, #2, & #6 on Figures 3A & 3B) / QR path TBD

CONCEPTUAL SITE EXPOSURE MODEL, CONTINUED

PINECASTLE JEEP RANGE
ORLANDO, FLORIDA
ORANGE COUNTY

Subsite/Range	Acreage	Suspect Past DoD Activities	Potential MEC/MD Presence	MEC/MD Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Proposed Field Sampling/ Qualitative Reconnaissance
SIMULATED ENEMY AIRSTRIP RANGE COMPLEX NO. 2 (MRS 04)	649	Bombing Range	Small Arms, General; 50 cal. Machine Gun; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Practice Bomb; M48 20-lb Practice Bomb; M1A1 Spotting Charge; M38A2 100-lb Practice Bomb; HVAR 5-inch Rocket	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	Residential, Open Marshy Wooded Land, Highway,	Public Access Available	Possible- Intrusive or non-intrusive, Possible MEC on surface and subsurface, No access restrictions	Three soil samples proposed (samples, #3, #7, & #8 on Figures 3A & 3B) / QR path TBD
REMAINING LAND	5,375	N/A	N/A	N/A	Half of the site was dedudded in 1948; letter does not state which half. (3)	N/A	N/A	N/A	No samples proposed
TOTAL	12,483								

*Number represents actual acreage for each individual subsite/range and may include area outside the project boundaries. Total acreage, accounts for overlap of subsites/ranges and is limited to the project boundaries.

Source
1 = Private account - nonconfirmed
2 = EOD response
3 = ASR (1997)
4 = ASR Supplement (2004)
5 = Other government correspondence

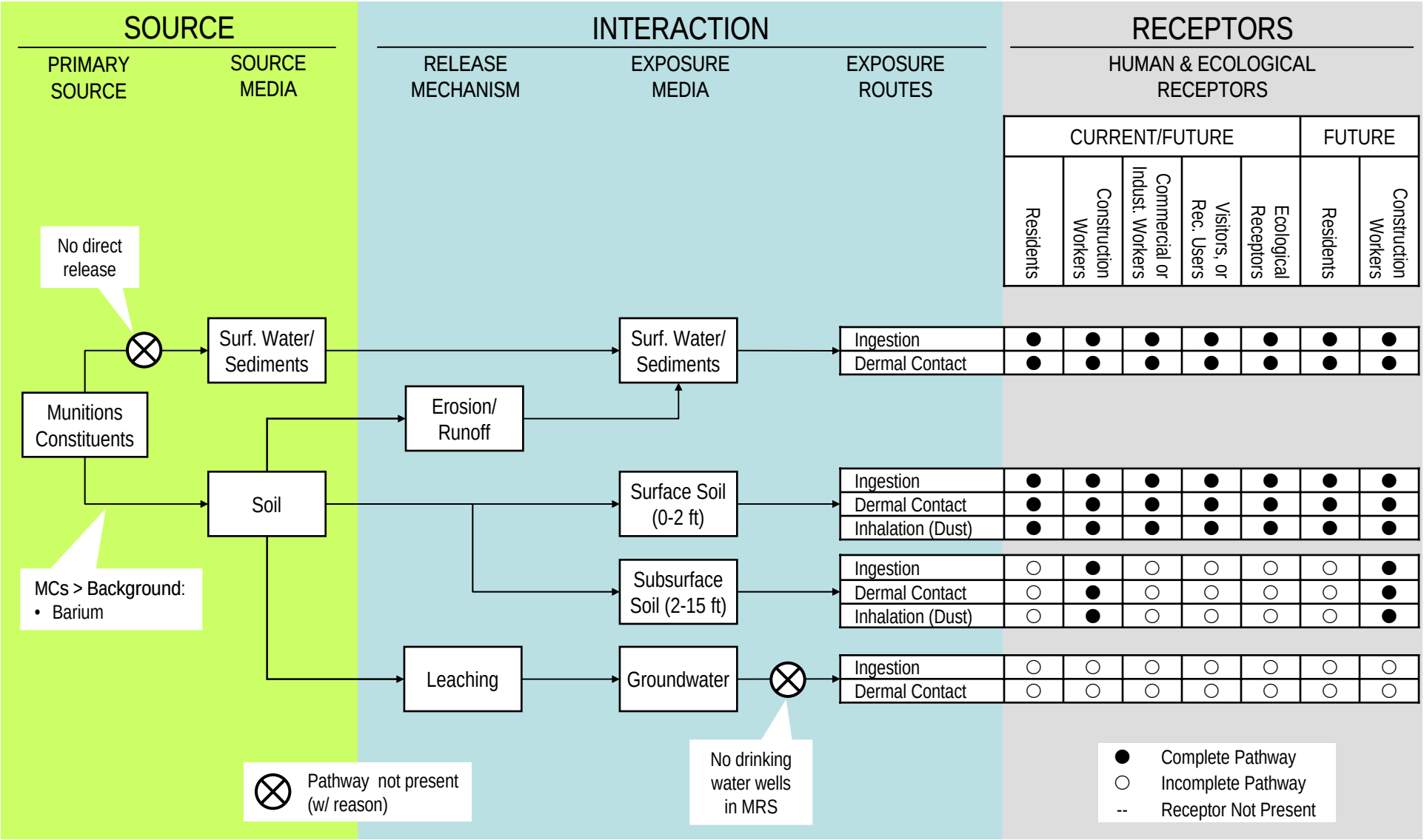
ASR = Archives Search Report
DoD = Department of Defense
EOD = Explosives Ordnance Disposal
HVAR = High-velocity aircraft rocket
MD = Munitions debris
MEC = Munitions and explosives of concern
TBD = To be determined
QR = Qualitative Reconnaissance

CONCEPTUAL SITE EXPOSURE MODEL

MRS Name: PINECASTLE JEEP RANGE – Air to Ground Rocket Range (MRS 02)

Completed By: James Salisbury, Parsons

Date Completed: August 13, 2007

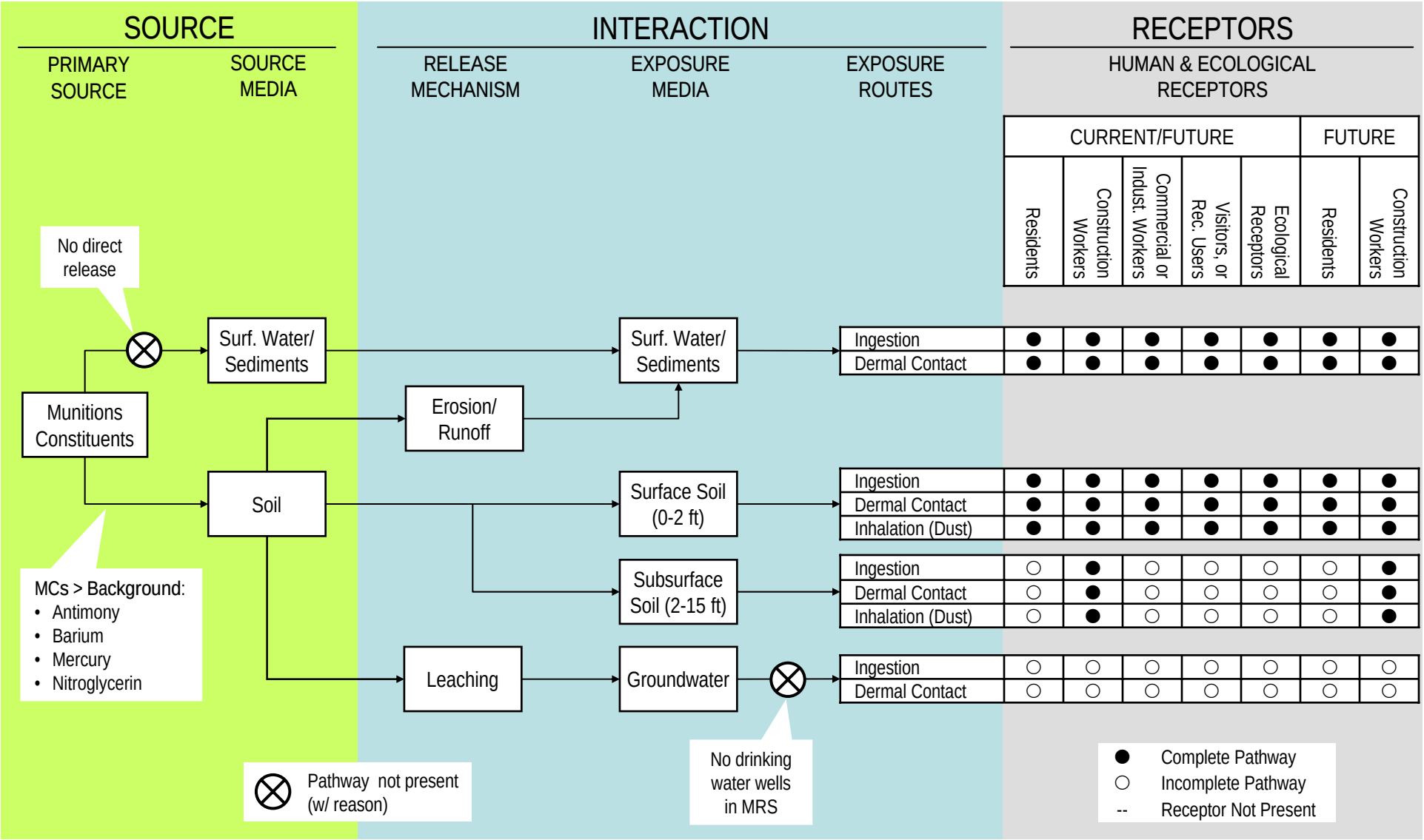


CONCEPTUAL SITE EXPOSURE MODEL

MRS Name: PINECASTLE JEEP RANGE – Range Complex No. 1 (Small Arms Range) (MRS 03)

Completed By: James Salisbury, Parsons

Date Completed: August 13, 2007

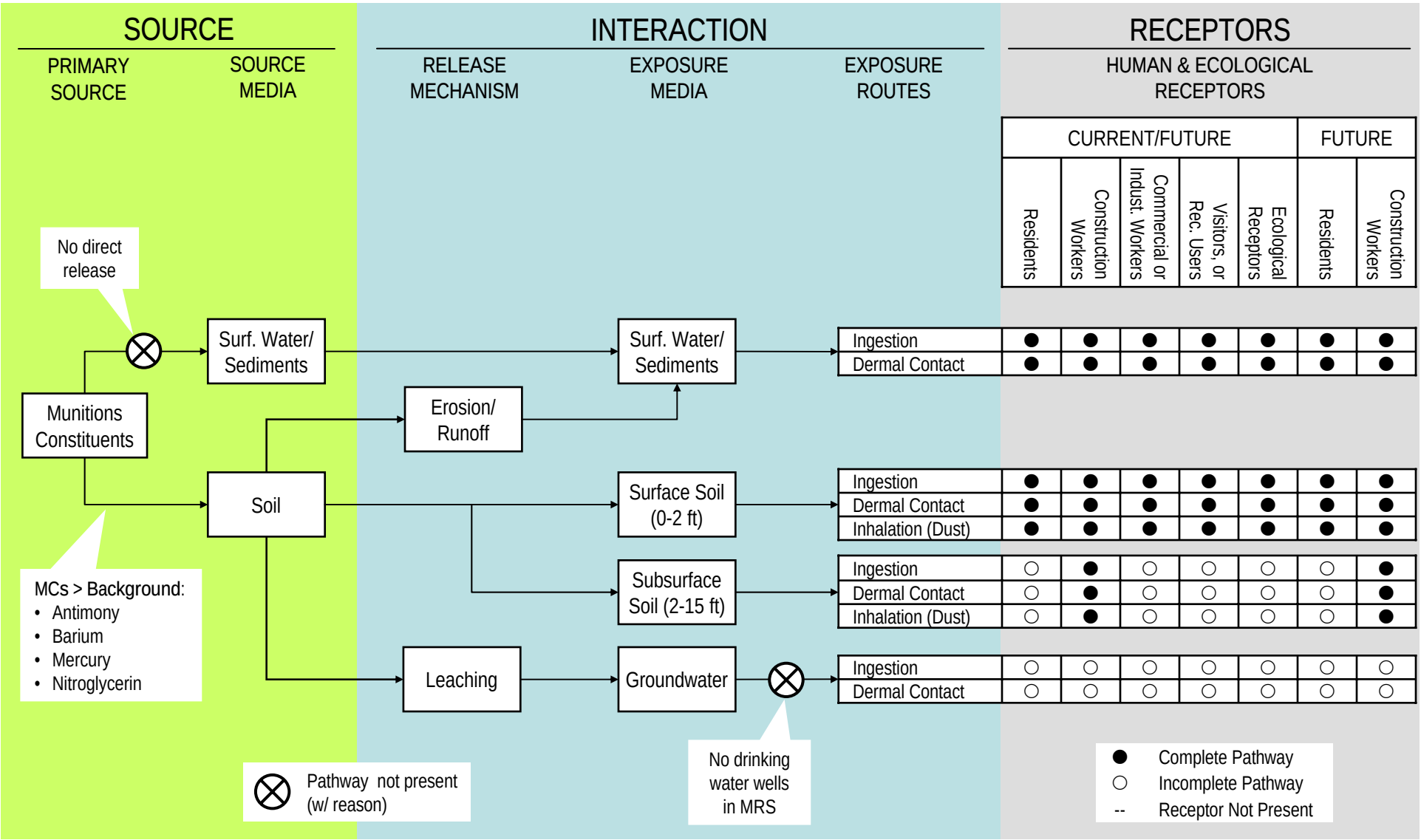


CONCEPTUAL SITE EXPOSURE MODEL

MRS Name: PINECASTLE JEEP RANGE – Range Complex No. 2 (Bombing Range) (MRS 04, including Chemical Demonstration Range (MRS 01)

Completed By: James Salisbury, Parsons

Date Completed: August 13, 2007



APPENDIX K

Munitions Response Site Prioritization Protocol Evaluations (MRSPP)

CWM FUDS

Site Name:	Pinecastle Jeep Rng	***Division:***	SAD
Project Location:	Orlando, Orange Co, Florida	***POC:***	Sharon Taylor
Project Number:	I04FL0405	***Phone:***	404-562-5212
Contract/TO Number:	DACA87-00-D-0038/27	***District:***	SAJ
Type of Action:	CWM Scoping & Security Study	***POC 2***	Robert Bridgers
Current RAC (Score):	3 for OEW	***Phone:***	904-232-3085

Site Description:

During 1943 the U.S. Government leased 12,483 acres of land in Orange County, Florida for use as the Pinecastle Jeep Range. The site was also known as the Tactical Demonstration Range, the Orlando Range, Pinecastle Range, Pinecastle Bombing Range and the Pinecastle Chemical Demonstration Range. The range was an off-post site of Pinecastle Army Air Field.

Site History:

Pinecastle AAF used the range as a gunnery and demonstration range. The Army Air Forces Tactical Center at Orlando AAB used the site for testing and troop instruction in methods of tactical bombing and strafing. The Army Air Forces reported the Pinecastle Jeep Range surplus to its needs on 2 December 1946 and by 5 December 1947, the War Department terminated the lease on the 12,483 acre range. The Orlando AAB Demonstration Section conducted chemical and ordnance demonstration at the former Pinecastle Jeep Range for students stationed at Orlando AAB. The Demonstrations encompassed all phases of chemical attack and defense as well as usage of ordnance related equipment. The demonstrations provided the visual illustration of equipment and tactics taught in the classroon. The students observed the demonstration from a protected ground shelter at the Pinecastle Range. Demonstration regulation 3-12 was performed. It consisted of a two hour demonstration of chemical warfare weapons, agents, and defense against chemical attack. The other demonstration regulation followed was 3-13. It had three phases. Phase One demonstrated a coordinated attack against a simulated enemy airstrip and aircraft on the ground. During phase 1 Two P-51 aircraft with chemical spray fans 'attacked the student convoy while enroute to the viewing stands. Water was used in four M10 tanks. Next aircraft performed strafing runs using .5 caliber guns, then aircraft fired rockets, 5" HVAR, and strafed with .50 cal guns, then the next set of aircraft fired .50 caliber and dropped 100 pound practice cluster bombs, M48 PARA M72 and M73 with Fuze M104, next heavy bombers dropped 100 pound practice bombs with spotting charges, 60 pound AC British Training Bombs and 100 pound Sky Marker bombs T-8, finally B-29's dropped 500 pound incendiary bombs, M76 w/fuze bomb nose, VIT., T-51E1 with Fuze Bomb Tail AN-M101A2. Phase two simulated attack against lines of supply and signal communications. Aircraft strafed with .50 cal guns, then aircraft dropped 100 pound practice bombs with spotting charges, the next round dropped 100 pound inert G.P. Bombs with anti-ricochet device M-16 (consisting of one Para Unit M-7, one fuze adapter assembly M-202 and one arming wire assembly) 500 pound incendiary Clusters M-7, then glide bombed with 100 pound M38A2 w/ spotting charge. Phase three simulated attack against ground objectives in direct support if ground troops in seizing simulated enemy airstrip. An aircraft attacked with 5" HVAR, then aircraft Aircraft 11.75 rocket with inert head and more 5" HVAR, aircraft then bombed dummy personnel with Cluster Frag Bomb 100 pound M2A1 Stabilized, next aircraft dropped 100 pound practice Mc8A2 with spotting charge, followed up with bombing with 165 gallon belly tanks(Fire Bombs), and the final run aircraft dropped 100 ppund bombs with spotting charges and 60 pound British Training practice bombs on dummy troop concentrations. The ASR indicated that there was no evidence that CWM was used at Pinecast Jeep Range. All indications are that simulants, water and molasses residuum, were used during demonstrations. Incendiaries and fire bombs were also used but are no longer considered CWM. During 1945 the Army Air Forces Tactical Center located at Orlando, Florida, performed tests at the Chemical Warfare Demonstration Range. These tests consisted of spraying D.D.T. from 500 pound British S.C.I. (Smoke Curtain Installation) bomb bay spray tanks (Army Air Forces Board 1945, #8).

Previous Actions:

Inventory Project Report (INPR) 14 July 1994, ASR Findings, Pinecastle Jeep Range, Orlando, FL, Orange County, Sept 1997

Current Status:

Currently local government agencies and private individuals own the former site and use it for various purposes including residential, highway/expressway, landfill and undeveloped pasture land.

Issues and Concerns:

None

CWM FUDS

Pinecastle Jeep Rng

Current RAC Score 3

Review Concur ☑

Non-Concur ☐

Current RAC Score

Reviewer 2 Concur ☐

Non-Concur ☐

Ranking Points 33

Concur ☑

Non-Concur ☐

Comments:

This site should be categorized as an OE site.

☑ ***FUDS***

☐ ***BRAC***

☐ ***IR***

☐ ***OTHER***

Cost to Complete:

Date of Cost Est:

Table 11
Classifications within the CHE Configuration Data Element

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 that have been damaged (CWM/DMM)	**0**
	- The CWM known or suspected of being present at the MRS are CWM/DMM that are co-mingled with conventional munitions that are UXO.	**0**
CWM, explosive configuration that are DMM (unused)	- The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	**0**
CWM, not-explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: - Non-explosively configured CWM/DMM - Bulk CWM/DMM (e.g., ton container).	**0**
CAIS K941 and CAIS K942	- The CWM/DMM known or suspected of being present at the MRS is K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	**0**
CAIS (chemical agent identification sets)	- The CWM known or suspected of being present at the MRS are only CAIS/DMM. The CAIS present cannot include CAIS K941, toxic gas set M-1; and K942, toxic gas set M-2/E11 for the MRS to be assigned this rating.	**0**
Evidence of no CWM	- Following investigation, the physical evidence indicated that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	**0**

Notes:
- The notation CWM/DMM means CWM that are DMM.
- The term CWM/UXO means CWM that are UXO.
- Historical evidence means that the investigation; (1) found written documentation or records, or (2) documented interviews of persons with knowledge of site conditions, or (3) found and verified other forms of information.
- Physical evidence means: (1) recorded observations from on-site investigations, such as finding intact UXO or DMM, or components, fragments, or other peices of military munitions, or (2) the results of field or laboratory sampling and analysis procedures, or (3) the results of geophysical investigations.

Table 12
Classifications within the CHE Sources of CWM Data Element

Classification	Description	Score
Live-fire involving CWM:	- The MRS is a range that supported live-fire of explosively configured CWM and the CWM/UXO are known or suspected of being present on the surface or in the subsurface. - The MRS is a range that supported live-fire with conventional munitions, and CWM/DMM are on the surface or in the subsurface co-mingled with conventional munitions that are UXO.	**0**
Damaged CWM/DMM or CAIS/DMM, surface or subsurface:	- There are damaged CWM/DMM on the surface or in the subsurface at the MRS.	**0**
Undamaged DWM/DMM or CAIS/DMM, surface:	- There are undamaged CWM/DMM on the surface at the MRS.	**0**
Undamaged CWM/DMM, or CAIS/DMM,	- There are undamaged CWM/DMM in the subsurface at the MRS.	**0**
Production facilities of CWM or CAIS:	- The MRS is a facility that engaged in production of CWM, and there are CWM/DMM suspected of being present on the surface or in the subsurface.	**0**
RDTE facility using CWM or CAIS:	- The MRS is at a facility that was involved in non-live fire Research, Development, Testing, and Evaluation (RDTE) activities (including static testing) involving CWM, and there are CWM/DMM suspected of being present on the surface or in the subsurface.	**0**
Training Facility using CWM or CAIS:	- The MRS is a location that was involved in training activities involving CWM and/or CAIS (e.g., training in recognition of CWA, decontamination training) and CWM/DMM are suspected of being present on the surface or in the subsurface.	**0**
Storage or transfer points of CWM:	- The MRS is a former storage facility or transfer point (e.g., inter-modal transfer) for CWM.	**0**
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**

Notes:

- The notation CWM/DMM means CWM that are DMM.
- The term CWM/UXO means that CWM that are UXO.
- Historical evidence means that the investigation; (1) found written documentation or records, or (2) documented interviews of persons with knowledge of site conditions, or (3) found and verified other forms of information.
- Physical evidence means: (1) recorded observations from on-site investigations, such as finding intact UXO or DMM, or components, fragments, or other peices of military munitions, or (2) the results of field or laboratory sampling and analysis procedures, or (3) the results of geophysical investigations.
- In the subsurface means the CWM (i.e., a DMM or UXO) is: (1) entirely beneath the ground surface, or (2) fully submerged in a water body.
- On the surface means the CWM (i.e., a DMM or UXO) is: (1) entirely or partially exposed above the ground surface, or (2) entirely or partially exposed above the surface of a water body (e.g., as a result of tidal activity).

Table 13
Classifications within the CHE Information of CWM Data Element

Classification	Description	Score
Confirmed surface:	- Physical evidence indicates there are CWM on the surface of the MRS. - Historical evidence (e.g., a confirmed incident report or accident report) indicates there are CWM on the surface of the MRS.	**0**
Confirmed subsurface, active:	- Physical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are likely to cause CWM to be exposed in the future by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or there are on-going intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose CWM. - Historical evidence indicates that CWM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause CWM to be exposed in the future by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or there are on-going intrustive activities (e.g., plowing, construction, dredging) at the MRS that are likely to expose CWM.	**0**
Confirmed subsurface, stable:	- Physical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause CWM to be exposed in the future by naturally occurring phenomena, or there are on-going intrusive activities at the MRS that are likely to cause CWM to be exposed. - Historical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause CWM to be exposed in the future by naturally occurring phenomena, or there are on-going intrusive activities at the MRS that are likely to either occur, or if the activities do occur, are likely to cause CWM to be exposed.	**0**
Suspected (physical evidence):	- There is physical evidence other than the documented presence of CWM, indicating that CWM may be present at the MRS.	**0**
Suspected (historical evidence):	- There is historical evidence indicating that CWM may be present at the MRS.	**0**
Subsurface, physical	- There is physical or historical evidence indicating the CWM may be present in the subsurface, but there is a physical contraint (e.g., pavement, water depth over 120 feet) preventing direct access to the CWM.	**0**
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**

Notes:

- Historical evidence means that the investigation; (1) found written documentation or records, or (2) documented interviews of persons with knowledge of site conditions, or (3) found and verified other forms of information.

- Physical evidence means: (1) recorded observations from on-site investigations, such as finding intact UXO or DMM, or components, fragments, or other peices of military munitions, or (2) the results of field or laboratory sampling and analysis procedures, or (3) the results of geophysical investigations.

- In the subsurface means the CWM (i.e., a DMM or UXO) is: (1) entirely beneath the ground surface, or (2) fully submerged in a water body.

- On the surface means the CWM (i.e., a DMM or UXO) is: (1) entirely or partially exposed above the ground surface, or (2) entirely or partially exposed above the surface of a water body (e.g., as a result of tidal activity).

- The term small arms ammunition means solid projectile ammunition that is .50 caliber or smaller and shotgun shells.

Table 14
Classifications within the CHE Ease of Access Data Element

Classification	Description	Score
No barrier:	- There is no barrier preventing access to all parts of the MRS (i.e., all parts of the MRS are accessible).	**10**
Barrier to MRS access is incomplete:	- There is a barrier preventing access to parts of the MRS but not the entire MRS.	**0**
Barrier to MRS access is complete, but not monitored:	- There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effetively preventing access to all parts of the MRS.	**0**
Barrier to MRS access is complete and monitored:	- There is a barrier preventing access to all parts of the MRS, and there is active continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	**0**

Notes:
- Barrier means a natural obstacle or obstacles (e.g., difficult terrain, dense vegetation, deep or fast moving water), a man-made obstacle or obstacles (e.g., fencing), or a combination of natural and man-made obstacles.

Table 15
Classifications within the CHE Status of Property Data Element

Classification	Description	Score
Non-DoD control:	- The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by the DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by American Indian or Alaskan Native Tribes, or State or local governments; and lands or water bodies managed by other Federal agencies.	**5**
Scheduled for transfer from DoD control:	- The MRS is on land or is a water body that is owned by, leased to, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to control of another entity (e.g., State, American Indian, Alaskan Native, or local government; a private party; another Federal agency) within 3 years from the date the Protocol is applied.	**0**
DoD control:	- The MRS is on land or is a water body that is owned by, leased to, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD controls access to the property 24-hours per day, every day of the calendar year.	**0**

Table 16
Classifications within the CHE Population Density Data Element

Classification	Description	Score
>500 persons per square mile:	-There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	**5**
100-500 persons per square mile:	-There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	**0**
<100 persons per square mile:	-There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	**0**

Notes:
-If an MRS is in more than one county, the DoD Component will use the largest population value among the counties. If the MRS is within or borders a city or town, the population density for the city or town instead of the county population density is used.

Table 17
Classifications within the CHE Population Near Hazard Data Element

Classification	Description	Score
26 or more structures:	-There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or	**5**
16 to 25:	-There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**0**
11 to 15:	-There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**0**
6 to 10:	-There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**0**
1 to 5:	-There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**0**
0:	-There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**0**

Notes:
- The term inhabited structures means permanent or temporary structures, other than DoD munitions-related structures, that are routinely occupied by one or more persons for any portion of a day.

Table 18
Classifications within the CHE Types of Activities/Structures Data Element

Classification	Description	Score
Residential, educational, commercial, or subsistence:	-Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, play grounds, community gathering areas, religious sites or sites used by subsistence hunting, fishing, and gathering.	**5**
Parks and recreational areas:	- Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or within the MRS's boundary that are associated with parks, nature preserves or other recreational uses.	**0**
Agricultural, forestry:	- Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or within the MRS's boundary that are associated with agriculture or forestry.	**0**
Industrial or warehousing:	- Activities are conducted or inhabited structures are located up to 2 miles from the MRS's boundary or within the MRS's boundary that are associated with industrial activities or warehousing.	**0**
No known or recurring activities:	- There are no known recurring activities occuring up to 2 miles from the MRS's boundary or within the MRS's boundary.	**0**

Notes:
- The term inhabited structures means permanent or temporary structures, other than DoD munitions-related structures, that are routinely occupied by one or more persons for any portion of a day.

Table 19
Classifications within the CHE Ecological and/or Cultural Resources Data Element

Classification	Description	Score
Ecological and cultural resources present:	- There are both ecological and cultural resources present on the MRS.	**0**
Ecological resources present:	- There are ecological resources present on the MRS.	**3**
Cultural resources present:	- There are cultural resources present on the MRS.	**0**
No ecological or cultural resources present:	- There are no ecological or cultural resources present on the MRS.	**0**

Notes:
- Ecological resources means that: (1) a threatened or endangered species (designated under the Endangered Species Act (ESA)) is present on the MRS; or (2) the MRS is designated under the ESA as a critical habitat for a threatened or endangered species; or (3) there are identified sensitive ecosystems such as wetlands or breeding grounds present on the MRS.
- Cultural resources means there are recognized cultural, spiritual, traditional, religious, or historical features (e.g., structures, artifacts, symbolism) on the MRS. For example, American Indians or Alaska Natives deem the MRS to be of spiritual significance or there are areas that are used by American Indians or Alaska Natives for subsistence activities (e.g., hunting, fishing). Requirements for determining if a particular feature is a cultural resource are found in the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, Archeological Resources Protection Act, Executive Order 13007, and the American Indian Religious Freedom Act.

Table 20
Classifications within the CHE Rating from the CHE Module Score

Overall CHE Module Score	CHE Rating
The MRS has an overall CHE module score from 92 to 100:	
The MRS has an overall CHE module score from 82 to 91:	
The MRS has an overall CHE module score from 71 to 81:	
The MRS has an overall CHE module score from 60 to 70:	
The MRS has an overall CHE module score from 48 to 59:	
The MRS has an overall CHE module score from 38 to 47:	
The MRS has an overall CHE module score less than 38:	CHE Rating G

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: MRS-01-Chemical Demonstration Range

Component: U.S. Army Corps of Engineers, Jacksonville District

Installation/Property Name: Pinecastle Jeep Range

Location (City, County, State): Orlando, Orange, Florida

Site Name (RMIS ID)/Project Name (Project No.): RMIS ID I04FL040501M01/ Project No. I04FL0405

Date Information Entered/Updated: 07/20/07

Point of Contact (Name/Phone): Mr. Charlie Fales, Project Manager (904) 232-1017

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 Pinecastle Jeep Range was used by the Army Air Force from 1943-1946 as a gunnery and demonstration range for testing and troop instruction in methods of tactical bombing and strafing. Range uses included small arms firing, air tactics evaluations, and training demonstrations of strafing, practice bombing, air-to-ground rocket firing, and high explosive bombing. The chemical demonstration range is designated as 5–acre area located approximately 410 feet east of the northern end of the jeep range. This area was reportedly used for chemical warfare demonstrations with M1 Chemical ID Sets and Blasting caps. The MRS is located within the boundary of Range Complex #2, on which high explosive and incendiaries were used, therefore there is a potential for MEC to be used. No MEC or MD has been identified on the site.

Description of Pathways for Human and Ecological Receptors:

No samples were collected.

Description of Receptors (Human and Ecological):

The site contains Odyssey Middle School and undeveloped pastureland. Access is unrestricted and extensive commercial, industrial and residential development is occurring in surrounding areas. Threatened and endangered species are present in the county, although none have been documented on the MRS.

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***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

The ASR notes that there is no indication that this range was ever used, and MEC or MD has not been reported on the MRS. (2007 SI Report, Section 2.4.1). Therefore, 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	0	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	0
Ease of Access	Table 4	0	
Status of Property	Table 5	0	
Receptor Factor Data Elements			
Population Density	Table 6	0	0
Population Near Hazard	Table 7	0	
Types of Activities/ Structures	Table 8	0	
Ecological and /or Cultural Resources	Table 9	0	
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	***0***

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 that CWM was used on the MRS. (2007 SI Report, Sections 2.4, 4.2 5.2 and 6.1.5.3). Therefore, Tables 12 through 19 have been 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	0	
Accessibility Factor Data Elements			
Location of CWM	Table 13	0	0
Ease of Access	Table 14	0	
Status of Property	Table 15	0	
Receptor Factor Data Elements			
Population Density	Table 16	0	0
Population Near Hazard	Table 17	0	
Types of Activities/ Structures	Table 18	0	
Ecological and /or Cultural Resources	Table 19	0	
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	✓

It is assumed that the MRS was never used for its intended purposes and that there is no potential for MC contamination (2007 SI Report, Section 6.1.5.3)

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	✓

It is assumed that the MRS was never used for its intended purposes and that there is no potential for MC contamination (2007 SI Report, Section 6.1.5.3)

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 sediment 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 sediment 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	✓

It is assumed that the MRS was never used for its intended purposes and that there is no potential for MC contamination (2007 SI Report, Section 6.1.5.3)

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 ✓

It is assumed that the MRS was never used for its intended purposes and that there is no potential for MC contamination (2007 SI Report, Section 6.1.5.3)

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 sediment 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 sediment 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 ✓

It is assumed that the MRS was never used for its intended purposes and that there is no potential for MC contamination (2007 SI Report, Section 6.1.5.3)

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	✓

It is assumed that the MRS was never used for its intended purposes and that there is no potential for MC contamination (2007 SI Report, Section 6.1.5.3)

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	

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***	

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: MRS 02 Air-to-Ground Rocket Range

Component: U.S. Army Corps of Engineers, Jacksonville District

Installation/Property Name: FL49799F7224**/**Pinecastle Jeep Range

Location (City, County, State): Orlando, Orange, Florida

Site Name (RMIS ID)/Project Name (Project No.): RMIS ID I04FL040501R01 / Project No. I04FL0405

Date Information Entered/Updated: 07/20/07
Point of Contact (Name/Phone): Mr. Charlie Fales, Project Manager (904) 232-1017
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 munitions, if known) or munitions constituents (by type, if known) known or suspected to be present):

The Pinecastle Jeep Range was used by the Army Air Force from 1943-1946 as a gunnery and demonstration range for testing and troop instruction in methods of tactical bombing and strafing. The Air-to Ground Rocket Range consists of 1419 acres located in the west central portion of the FUDS boundary. Uses included small arms firing, air tactics evaluations, and training demonstrations of strafing, practice bombing, air-to-ground rocket firing, and high explosive bombing. Ordnance expected to be used at the site includes both practice (with spotting charge) and high explosive bombs, 500lb. incendiary bombs, 5-inch high-velocity aircraft rackets (HVAR), and small arms. No MEC, MD or bomb craters have been identified on the MRS.

Description of Pathways for Human and Ecological Receptors:

Surface soil was investigated.

Description of Receptors (Human and Ecological):

The site contains residences, a portion of a landfill, and undeveloped pastureland. Access is unrestricted and extensive commercial, industrial and residential development is occurring. Threatened and endangered species are present in the county, and may occur on the site.

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).	***25***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

- Small Arms, General; 50 Cal. Machine Gun; AN-M41 20-lb Fragmentation Bomb; AN-M76 500-lb Incendiary Bomb; M48 20-lb Practice Bomb; M38A2 100-lb Practice Bomb; HVAR 5-inch Rocket were used on this MRS. (2007 SI Report Chapter 2.5.3.1)

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	***10***
Former munitions treatment (i.e., OB/OD) unit	The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	***10***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

- The MRS was used for Air-to- Ground Rocket Range used for testing and troop instruction. (2007 SI Report Sections 2.3 and 2.4.1).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	Physical evidence indicates that there are UXO or DMM on the surface of the MRS Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	There is historical evidence indicating that UXO or DMM may be present at the MRS.	***5***
Subsurface, physical constraint	There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
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
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

- The site is characterized as an Air-to-Ground Gunnery Range based on information contained in historical documents, no MEC or MD have been found on the MRS. (2007 SI Report, Sections 2.5 and 4.3).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	***10***
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	***10***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

- Access to the site is not controlled and can be achieved either by paved and unpaved roads or by foot. (2007 SI Report, Section 5.3.4.1)

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	***5***
Scheduled for transfer from DoD control	The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

- The site is owned by several local government agencies and private industries. (2007 SI Report, Section 2.2.6).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	***5***
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

- The population density of Orange County, Florida is 988.3 persons per square mile. (2007 SI Report, Section 2.2.5)

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	***5***
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

- Residential areas and commercial development surround the site. (2007 SI Report, Section 2.2.6)

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	***5***
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	***3***
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	***2***
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

- Land uses on the MRS and surrounding areas include residences, a portion of the landfill and pasture lands. (2007 SI Report, Sections 2.2.4and 2.2.6)

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	***5***
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

- According to the USFWS, there is the potential for several federally and state listed threatened and endangered species to occur within the Pinecastle Jeep Range, although none have been specifically documented at the site. In addition, during the site visit for the SI sampling, field personnel observed several bald eagles in the area and wetlands are present. (2007 SI Report, Section 6.3)
- Reviews of available records indicate that four archeological sites are located on the Pinecastle Jeep Range site. (2007 SI Report, Section 3.3.2)

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	25	35
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	5	20
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	20
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			75

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	***C***

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 indication of any CWM at this site in any historical materials or from the Site Investigation (2007 SI Report, Sections 2.5 and 4.3). Therefore Tables 12-19 have been 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	0	
Accessibility Factor Data Elements			
Location of CWM	Table 13	0	0
Ease of Access	Table 14	0	
Status of Property	Table 15	0	
Receptor Factor Data Elements			
Population Density	Table 16	0	0
Population Near Hazard	Table 17	0	
Types of Activities/ Structures	Table 18	0	
Ecological and /or Cultural Resources	Table 19	0	
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 ❑

Note: Per TPP concurrence, groundwater samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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 ❑

Note: Per TPP concurrence, surface water samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 sediment 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 sediment 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 ❑

Note: Per TPP concurrence, sediment samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 ❑

Note: Per TPP concurrence, surface water samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 sediment 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 sediment 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	❑

Note: Per TPP concurrence, sediment samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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
Barium	7.8	1600	0.049
CHF Scale	**CHF Value**	**Sum the Ratios**	***0.049***
CHF > 100	**H (High)**		
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).		***L***

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).	***L***

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).	***L***
	No Known or Suspected Surface Soil MC Hazard	❑

Note: Soil was tested for explosives and metals. Metals that are attributable to DoD use of the site, that exceeded background concentrations, are CERCLA Hazardous (Table 5.6, 2007 SI Report) contribute to the score. MPF is rated low given the nature of the site which limits potential soil redepostion. RF is rated low given the lack of contamination measured. Comparison values from the MRSPP Appendix B-2 (May 2007) were used for scoring purposes.

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
Surface Soil	Strontium	5.5	47000	0.00011

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)	L	L	L	LLL	G

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	***G***

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
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				***4***	

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: MRS 03-Range Complex No. 1

Component: U.S. Army Corps of Engineers, Jacksonville District

Installation/Property Name: Pinecastle Jeep Range

Location (City, County, State): Orlando, Orange, Florida

Site Name (RMIS ID)/Project Name (Project No.): RMIS ID I04FL040501R02 / Project No. I04FL0405

Date Information Entered/Updated: 07/20/07
Point of Contact (Name/Phone): Mr. Charlie Fales, Project Manager (904) 232-1017
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 munitions, if known) or munitions constituents (by type, if known) known or suspected to be present):
The Pinecastle Jeep Range was used by the Army Air Force from 1943-1946 as a gunnery and demonstration range for testing and troop instruction in methods of tactical bombing and strafing. Range Complex #1 consists of six small arms ranges located along the western boundary of the Pinecastle range. Ranges include a Turret Gunnery Range, a CQ Range, two rifle ranges, a pistol range, and a multi purpose small arms range. No MEC or MD has been identified on the range complex.

Description of Pathways for Human and Ecological Receptors:

Surface soil was investigated.

Description of Receptors (Human and Ecological):

The site contains Odyssey Middle School, residences, a landfill and undeveloped pastureland. Access is unrestricted and extensive commercial, industrial and residential development is occurring. Threatened and endangered species are present in the county, and may occur on the site.

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).	***2***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

- Range Complex #1 consists of 6 small arms ranges. General small arms and 50 Cal. Machine Guns would have been used at these ranges. (2007 SI Report Subchapter 2.5.3.1)

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	***1***
Evidence of no munitions	Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	***1***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

- According to the ASR Supplement, Range Complex #1 consists of 6 small arms ranges. (2007 SI Report Section 4.3.1).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	Physical evidence indicates that there are UXO or DMM on the surface of the MRS Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	***1***
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
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	***1***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

- The site is characterized as an Small Arms Range Complex based on information contained in historical documents, no MEC or MD have been found on the MRS. (2007 SI Report, Sections 2.5.3 and 4.3).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	***10***
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	***10***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

Access to the MRS is not controlled and can be achieved either by paved and unpaved roads or by foot. (2007 SI Report, Section 5.4.4.1)

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	***5***
Scheduled for transfer from DoD control	The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

- The site is owned by several local government agencies and private industries. (2007 SI Report, Section 2.2.6).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	***5***
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

- The population density of Orange County, Florida is 988.3 persons per square mile. (2007 SI Report, Section 2.2.5)

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	***5***
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

- Residential areas and commercial development surround the site. (2007 SI Report, Section 2.2.6)

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	***5***
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	***4***
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	***3***
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	***2***
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

- Land uses on the MRS and surrounding areas include schools, residences, a landfill and pasture lands. (2007 SI Report, Sections 2.2.4and 2.2.6)

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	***5***
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

- According to the USFWS, there is the potential for several federally and state listed threatened and endangered species to occur within the Pinecastle Jeep Range, although none have been specifically documented at the site. In addition, during the site visit for the SI sampling, field personnel observed several bald eagles in the area and wetlands are present. (2007 SI Report, Section 6.3)

- Reviews of available records indicate that four archeological sites are located on the Pinecastle Jeep Range site. (2007 SI Report, Section 3.3.2)

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	2	3
Source of Hazard	Table 2	1	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	1	16
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	18
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			37

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	***G***

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 indication of any CWM at this site in any historical materials or from the Site Investigation (2007 SI Report, Sections 2.5 and 4.4). Therefore Tables 12-19 have been 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	0	
Accessibility Factor Data Elements			
Location of CWM	Table 13	0	0
Ease of Access	Table 14	0	
Status of Property	Table 15	0	
Receptor Factor Data Elements			
Population Density	Table 16	0	0
Population Near Hazard	Table 17	0	
Types of Activities/ Structures	Table 18	0	
Ecological and /or Cultural Resources	Table 19	0	
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 ❑

Note: Per TPP concurrence, groundwater samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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 ❑

Note: Per TPP concurrence, surface water samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 sediment 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 sediment 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 ❑

Note: Per TPP concurrence, sediment samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 ❑

Note: Per TPP concurrence, surface water samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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.

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Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**		
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 sediment 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 sediment 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 ❑

Note: Per TPP concurrence, sediment samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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.

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Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
Nitroglycerin	220	1000	0.22
Antimony	0.16	31	0.0052
Barium	17	16000	0.0011
Mercury	0.068	23	0.0030
CHF Scale	**CHF Value**	**Sum the Ratios**	***0.28***
CHF > 100	**H (High)**		
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).		***L***

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).	***L***

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).	***L***
	No Known or Suspected Surface Soil MC Hazard	❑

Note: Soil was tested for explosives and metals. Metals that are attributable to DoD use of the site, that exceeded background concentrations, are CERCLA Hazardous (Table 5.7, 2007 SI Report) contribute to the score. MPF is rated low given the nature of the site which limits potential soil redepostion. RF is rated low given the lack of contamination measured. Comparison values from the MRSPP Appendix B-2 (May 2007) were used for scoring purposes.

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)	L	L	L	LLL	G

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	***G***

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				***8***	

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: MRS 04-Range Complex #2

Component: U.S. Army Corps of Engineers, Jacksonville District

Installation/Property Name: Pinecastle Jeep Range

Location (City, County, State): Orlando, Orange, Florida

Site Name (RMIS ID)/Project Name (Project No.): RMIS ID I04FL040501R03 / Project No. I04FL0405

Date Information Entered/Updated: 07/20/07
Point of Contact (Name/Phone): Mr. Charlie Fales, Project Manager (904) 232-1017
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 munitions, if known) or munitions constituents (by type, if known) known or suspected to be present):

The Pinecastle Jeep Range was used by the Army Air Force from 1943-1946 as a gunnery and demonstration range for testing and troop instruction in methods of tactical bombing and strafing. Range Complex #2 consisted of a series of 10 individual bomb targets used for demonstrations to give students a practical illustration of equipment and tactics discussed in classroom lectures. Practice munitions were primarily used for demonstration, but the use of HE, fragmentation bombs, air to ground rocket firing and strafing were also reported to have been used on the individual targets that comprise the range complex. No MEC or MD was observed at this MRS. .50 cal casings and balls were found near the jeep track 1997 ASR site visit and multiple large craters and three areas observed that appeared to look like burial mounds were noted in portions of this area during the site visit conducted for the 2007 SI Report.

Description of Pathways for Human and Ecological Receptors:

Surface soil was investigated.

Description of Receptors (Human and Ecological):

The site contains Odyssey Middle School, residences, a landfill and undeveloped pastureland. Access is unrestricted and extensive commercial, industrial and residential development is occurring. Threatened and endangered species are present in the county, and may occur on the site.

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).	***25***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

- Munitions include Small Arms, AN-M30 100-lb General Purpose Bombs; various fragmentation bombs, incendiary bombs, practice bombs with spotting charges, and HVAR 5-inch Rockets, HVAR 5-inch Practice Rockets, and 11.75-inch Practice Rockets. (2007 SI Report Subchapter 2.5.3.1)

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	***10***
Former munitions treatment (i.e., OB/OD) unit	The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	1
Evidence of no munitions	Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	***10***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

- The MRS was used for bombing demonstrations and troop instruction. (2007 SI Report Sections 2.3 and 2.4.1).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms *surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	Physical evidence indicates that there are UXO or DMM on the surface of the MRS Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	***25***
Confirmed subsurface, active	Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	1
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
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	***25***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

- The site is characterized as a bombing demonstration range based on information contained in historical documents; no MEC was found on the MRS prior to or during the 2007 SI. The 2007 SI team noted numerous large craters that indicate bombing occurred on the site. (2007 SI Report, Sections 2.5 and 4.4).
- **Subsequent to the SI, the landowner reported suspect UXO onsite. The 45th Ordnance Flight Disposal Squadron responded and detonated what they documented as five M400A1 Practice Fragmentation Bombs with live fuses and one M64 6-lb live incendiary bomblet.**

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	***10***
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	***10***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

- Access to the range is not controlled and can be achieved either by paved and unpaved roads or by foot. (2007SI Report, Section 5.5.4.1)

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	***5***
Scheduled for transfer from DoD control	The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

- The site is owned by several local government agencies and private industries. (2007 SI Report, Section 2.2.6).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	***5***
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

- The population density of Orange County, Florida is 988.3 persons per square mile. (2007 SI Report, Section 2.2.5)

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	***5***
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

- Residential areas and commercial development surround the site. (2007 SI Report, Section 2.2.6)

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	***5***
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	***3***
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	***2***
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

- Land uses on the MRS and surrounding areas include Odyssey Middle School, residences, a landfill and pasture lands. (2007 SI Report, Sections 2.2.4and 2.2.6

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	***5***
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

- According to the USFWS, there is the potential for several federally and state listed threatened and endangered species to occur within the Pinecastle Jeep Range, although none have been specifically documented at the site. In addition, during the site visit for the SI sampling, field personnel observed several bald eagles in the area and wetlands are present. (2007 SI Report, Section 6.3)

- Reviews of available records indicate that four archeological sites are located on the Pinecastle Jeep Range site. (2007 SI Report, Section 3.3.2)

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	25	35
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	25	40
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	20
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	5	
EHE MODULE TOTAL			95

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	***A***

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 indication of any CWM at this site in any historical materials or from the Site Investigation (2007 SI, section 2.5.1). Therefore, Tables 12-19 have been 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	0	
Accessibility Factor Data Elements			
Location of CWM	Table 13	0	0
Ease of Access	Table 14	0	
Status of Property	Table 15	0	
Receptor Factor Data Elements			
Population Density	Table 16	0	0
Population Near Hazard	Table 17	0	
Types of Activities/ Structures	Table 18	0	
Ecological and /or Cultural Resources	Table 19	0	
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 ❑

Note: Per TPP concurrence, groundwater samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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 ❑

Note: Per TPP concurrence, surface water samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 sediment 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 sediment 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 ❑

Note: Per TPP concurrence, sediment samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 ❑

Note: Per TPP concurrence, surface water samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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)**		
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 sediment 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 sediment 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 ❑

Note: Per TPP concurrence, sediment samples were not collected for the SI Report. (2007 SI Report, Section 3.2)

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
Nitroglycerin	44000	1000	4.4
Antimony	0.21	31	0.0068
Barium	17	16000	0.0010
Mercury	0.2	23	0.0087
CHF Scale	**CHF Value**	**Sum the Ratios**	***4.48***
CHF > 100	**H (High)**		
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).		***M***

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).	***L***

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).	***M***
	No Known or Suspected Surface Soil MC Hazard	❑

Note: Soil was tested for explosives and metals. Metals that are attributable to DoD use of the site, that exceeded background concentrations, are CERCLA Hazardous (Table 5.7, 2007 SI Report) contribute to the score. MPF is rated low given the nature of the site which limits potential soil redepostion. RF is rated low given the lack of contamination measured. Comparison values from the MRSPP Appendix B-2 (May 2007) were used for scoring purposes.

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)	M	L	M	MML	E

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	***E***

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				***2***	

APPENDIX L

Reference Copies

Inside: How to cook with less fat — but full flavor, E1

Orlando Sentinel

ORLANDOSENTINEL.COM WEDNESDAY, JULY 25, 2007 FINAL EDITION 50 CENT

FOUNDED 1876

Live bombs discovered near school

By RICH McKAY
SENTINEL STAFF WRITER

Live World War II bombs, explosives, shrapnel and harmful chemicals leaking from old munitions are scattered on land near an Orange County middle school and Innovation Way, the county's high-tech development corridor, federal officials confirmed Tuesday.

At least two live, 60-year-old test bombs were found two weeks ago about 1,500 feet behind Odyssey Middle School, which was built about six years ago on part of a former bombing range.

More bombs likely remain in an area near the school that is mostly dense woods and swamps, but federal authorities think there is no immediate danger if people stay away from that area. School is not currently in session.

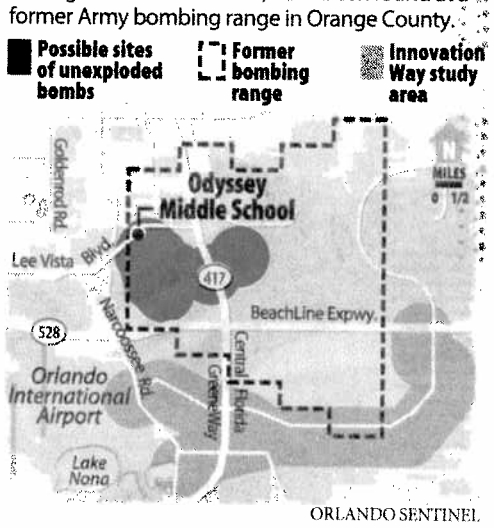
Chris Davis, Odyssey Middle School vice principal, said he planned to speak with other school officials late Tuesday night and get notices to parents before the new school year starts Aug. 20.

Orange County School Board Chair-

PLEASE SEE BOMBS, A11

WHERE THE BOMBS ARE

World War II-era bombs, including suspected live explosives, shrapnel and harmful chemicals leaking from old munitions, have been found at a former Army bombing range in Orange County.



ORLANDO SENTINEL

Live World War II bombs found near Orange middle school

BOMBS FROM A1

woman Karen Ardaman said she planned to contact the superintendent immediately and "take whatever steps are necessary."

"Oh, my goodness," Ardaman said late Tuesday when informed about the finding. "We had absolutely no idea."

A federal official with the Formerly Used Defense Sites agency told Davis that September would be the earliest his agency could hire contractors to start cleaning the site.

The bombs found July 13 weighed 4 to 7 pounds each. They were destroyed by a team from Patrick Air Force Base.

Officials doubt more live bombs are closer to the school or lying directly underneath it because construction of the building and excavation of the site happened without incident. It is possible, however, that bombs could be buried deeper, officials said. But they hope to examine the area further.

The school is at or near a site where Army generals and officials would watch bombing practices on the former Pinecastle Jeep Range in southeast Orange County.

"I had absolutely no idea that we were built on a bombing range," Davis said.

The news stunned a small group of people attending a community meeting at North-Lake Park Community School.

Tests began in January

The Army Corps of Engineers unveiled the results of tests begun in January for World War II-era munitions at the former Pinecastle Jeep Range.

The study was being done because the government is examining the nation's former bombing ranges, and the land in east Orange is within and near the Innovation Way corridor, where major development is expected in coming years.

The corridor eventually will link Orlando International Airport and the University of Central Florida. The plans include an undergraduate medical school and a Burnham Institute for Medical Research facility.

Federal officials suspected bombs were on the land, but their discovery near the school was unexpected.

Davis said he knew there was once a military installation behind the school but didn't realize it had been used for bombing practice.

Just before the meeting Tuesday, the federal government promised the Corps $1 million to start cleaning up the 40-acre area near the school.

'Oh, my goodness . . . We had absolutely no idea.'

— KAREN ARDAMAN
ORANGE COUNTY SCHOOL BOARD CHAIRWOMAN

But the larger area — about 4,000 vacant acres west of State Road 417 and north of the BeachLine — also will need to have bombs and other munitions removed. The project could take years and cost more than $20 million, the Corps said.

"Yes, there are actual, unexploded munitions, and yes, they could still be live bombs," said Charlie Fales, the Corps project manager for the former 12,483-acre range just northeast of Lake Nona.

County officials say the cleanup shouldn't delay development plans for Innovation Way.

Orange County officials say they didn't know about potential problems when they planned the Innovation Way area. Even though records show the county was informed about the former bombing range, county officials say it was overlooked.

Senators help with money

Orange County Mayor Rich Crotty, reached late Tuesday night, applauded the efforts of Republican Sen. Mel Martinez and Democratic Sen. Bill Nelson for helping to get money to help clear the school site.

"While it doesn't appear to be any immediate danger, I believe our two senators are on top of this and will help implement the steps necessary to protect the public."

Crotty pointed out that only a southern sliver of Innovation Place — one of the larger developments of homes, offices and shops planned for the area — crosses into the range, and said any costs associated with the cleanup will be paid for by the federal government.

The Corps also found nitroglycerin and high levels of mercury in some soil samples, Fales said. Those materials and other chemicals could cause an environmental and health risk for animals and people if they get into the water or food chain.

Jay Berlinsky, a manager of the proposed Innovation Place, said less than 5 percent of his land is affected.

"Frankly, if there was anything serious out there, you'd think they would have found it years ago," he said.

Rich McKay can be reached at rmckay@orlandosentinel.com or 407-420-5470.

ASR SUPPLEMENT

INSTALLATION NAME: PINECASTLE JEEP RNG

INSTALLATION AKA: ORLANDO RANGE, DEMONSTRATION RANGE

FFID: FL9799F7224

FUDS PROPERTY NUMBER: I04FL0405

TOTAL PROPERTY ACREAGE: 12483

MSC: South Atlantic Division - 41506
PINECASTLE, FL 32829

POC for this data:
Mike Dace, Chief of Ordnance and Technical Services Branch, St Louis District
Phone: 314-331-8036
Email: michael.e.dace@usace.army.mil

DOES THE INSTALLATION HAVE ANY A/I RANGES? NO

DOES THE INSTALLATION HAVE ANY CTT RANGES? YES

TYPES OF MUNITIONS USED ON THIS INSTALLATION: Conventional, Chemical

INFORMATION IN THIS SUPPLEMENT WAS GATHERED FROM THE: ASR

MMR AREA SUMMARY						
PROJECT NO.	**PLATE NO.**	**RANGE NAME**	**SUB-RANGE NAME**	**ACREAGE**	**AARS AOC**	**RMIS RANGE ID**
01	M01	Chemical Demonstration Range		5		I04FL040501M01
01	R01	Air-to-Ground Rocket Range		1419		I04FL040501R01
01	R02	Range Complex No. 1		5194		I04FL040501R02
01	R02-SR01		Turret Gunnery Range	4209		I04FL040501R02-SR01
01	R02-SR02		CQ-3 Range	4498		I04FL040501R02-SR02

01	R02-SR03		Rifle Range No. 1	48		I04FL040501R02-SR03
01	R02-SR04		Rifle Range No. 2	463		I04FL040501R02-SR04
01	R02-SR05		Small Arms Range	287		I04FL040501R02-SR05
01	R02-SR06		Pistol Range	3		I04FL040501R02-SR06
01	R03	Range Complex No.2		2452		I04FL040501R03
01	R03-SR01		Ship Target	649		I04FL040501R03-SR01
01	R03-SR02		Convoy Target	649		I04FL040501R03-SR02
01	R03-SR03		Tanks (new)	649		I04FL040501R03-SR03
01	R03-SR04		Tanks (old)	649		I04FL040501R03-SR04
01	R03-SR05		Circular Target	649		I04FL040501R03-SR05
01	R03-SR06		Target No.1	649		I04FL040501R03-SR06
01	R03-SR07		Target No.2	649		I04FL040501R03-SR07
01	R03-SR08		Target No.3	649		I04FL040501R03-SR08
01	R03-SR09		Target No.4	649		I04FL040501R03-SR09
01	R03-SR10		Warehouse Target	649		I04FL040501R03-SR10
01	R03-SR11		Simulated Enemy Airstrip	649		I04FL040501R03-SR11

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April 19, 2007

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Norcross, GA 30092

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Pinecastle Jeep Range

Orlando, Florida

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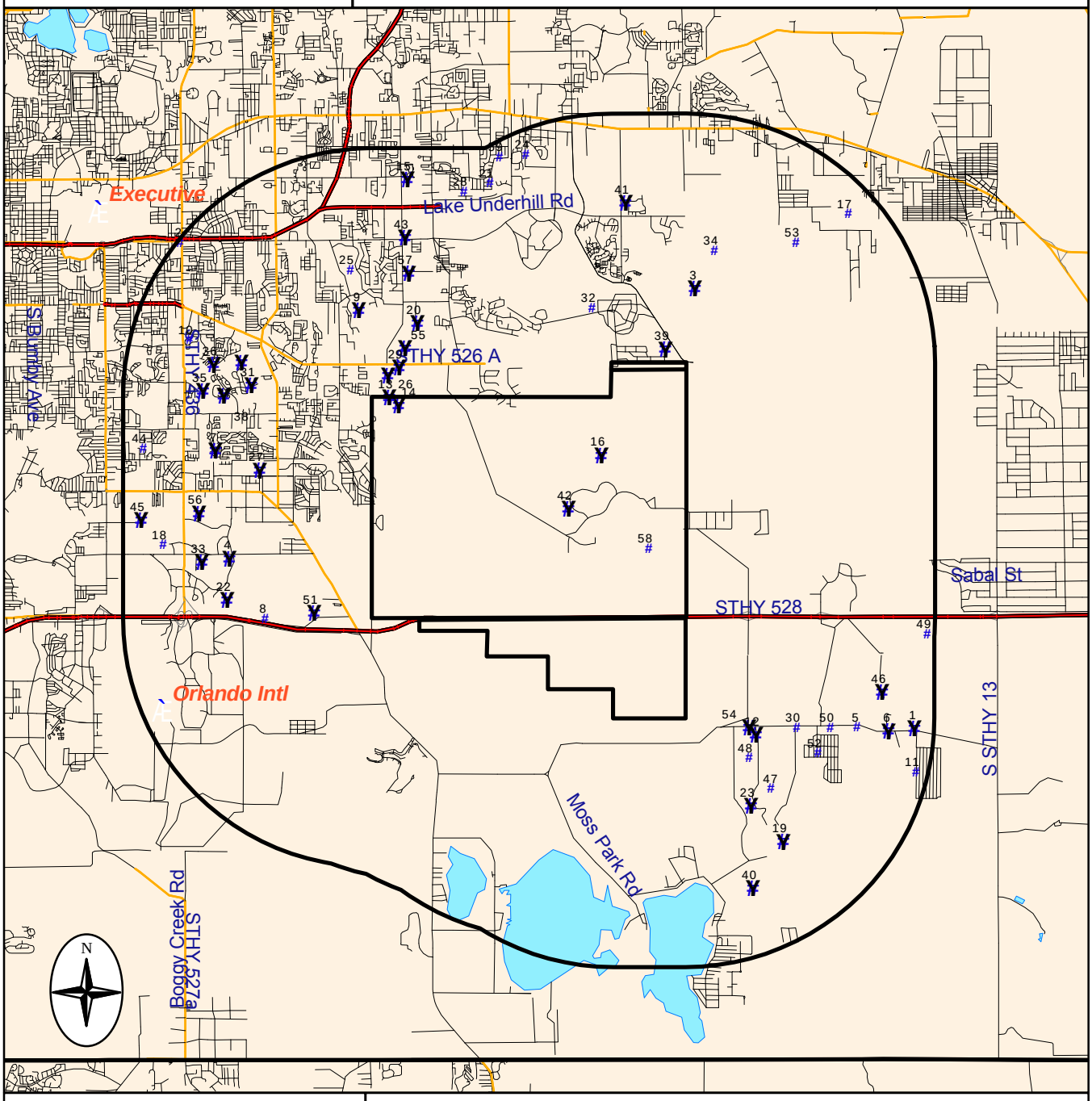
Water Well Report™

Map of Wells within Four Miles



Subject Site
Ground Water Wells (Cluster)
Ground Water Well
Airport
Hospital
Highway
Primary road
Secondary and connecting road
Local road
Access road
Water body
Park
State

0 1 2 3 4 5 6 Miles

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April 19, 2007

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Water Well Report ™

DETAILS

		MAP ID
State ID	50245	1
Banks ID	1209500007	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	710 '	
Completion Date	N/A	
Longitude	-81.11712	
Latitude	28.42505	

		MAP ID
State ID	7698	2
Banks ID	1209500008	
Owner Of Well	MOBIL 02-GY3	
Type Of Well	Proposed	
Depth Drilled	25 '	
Completion Date	N/A	
Longitude	-81.31118	
Latitude	28.53861	

		MAP ID
State ID	7617	3
Banks ID	1209500011	
Owner Of Well	EASTWOOD	
Type Of Well	Inactive	
Depth Drilled	290 '	
Completion Date	N/A	
Longitude	-81.17506	
Latitude	28.52778	

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DETAILS

		MAP ID
State ID	7617	3
Banks ID	1209500031	
Owner Of Well	EASTWOOD	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.17562	
Latitude	28.52806	

		MAP ID
State ID	3169	4
Banks ID	1209500015	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.29812	
Latitude	28.46472	

		MAP ID
State ID	3169	4
Banks ID	1209500045	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	435 '	
Completion Date	N/A	
Longitude	-81.29673	
Latitude	28.46167	

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		MAP ID
State ID	50245	5
Banks ID	1209500017	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	400 '	
Completion Date	N/A	
Longitude	-81.13225	
Latitude	28.42546	

		MAP ID
State ID	3419	6
Banks ID	1209500019	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.12395	
Latitude	28.42445	

		MAP ID
State ID	3419	6
Banks ID	1209500088	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.11978	
Latitude	28.42195	

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		MAP ID
State ID	3419	6
Banks ID	1209500095	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.12423	
Latitude	28.42778	

		MAP ID
State ID	86536	7
Banks ID	1209500020	
Owner Of Well	Starlight Ranch	
Type Of Well	Active	
Depth Drilled	460 '	
Completion Date	N/A	
Longitude	-81.30181	
Latitude	28.48985	

		MAP ID
State ID	81240	7
Banks ID	1209500022	
Owner Of Well	Loving His People Israel Worship Center	
Type Of Well	Proposed	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.29883	
Latitude	28.48497	

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State ID	3317	MAP ID
Banks ID	1209500027	7
Owner Of Well	OCU Water Service Areas	
Type Of Well	Inactive	
Depth Drilled	427 '	
Completion Date	N/A	
Longitude	-81.30395	
Latitude	28.48722	

State ID	86536	MAP ID
Banks ID	1209500047	7
Owner Of Well	Starlight Ranch	
Type Of Well	Active	
Depth Drilled	460 '	
Completion Date	N/A	
Longitude	-81.30154	
Latitude	28.48955	

State ID	3317	MAP ID
Banks ID	1209500091	7
Owner Of Well	OCU Water Service Areas	
Type Of Well	Inactive	
Depth Drilled	444 '	
Completion Date	N/A	
Longitude	-81.30397	
Latitude	28.48639	

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		MAP ID
State ID	3317	7
Banks ID	1209500097	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Inactive	
Depth Drilled	1400 '	
Completion Date	N/A	
Longitude	-81.3034	
Latitude	28.48632	

		MAP ID
State ID	3317	7
Banks ID	1209500103	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Inactive	
Depth Drilled	700 '	
Completion Date	N/A	
Longitude	-81.30645	
Latitude	28.48667	

		MAP ID
State ID	7660	8
Banks ID	1209500021	
Owner Of Well	DOLLAR RENT A CAR	
Type Of Well	Active	
Depth Drilled	300 '	
Completion Date	N/A	
Longitude	-81.28868	
Latitude	28.45084	

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State ID	3388	MAP ID
Banks ID	1209500023	9
Owner Of Well	Rio Pinar Country Club	
Type Of Well	Active	
Depth Drilled	250 '	
Completion Date	N/A	
Longitude	-81.26395	
Latitude	28.52278	

State ID	3388	MAP ID
Banks ID	1209500072	9
Owner Of Well	Rio Pinar Country Club	
Type Of Well	Active	
Depth Drilled	250 '	
Completion Date	N/A	
Longitude	-81.26367	
Latitude	28.5225	

State ID	7276	MAP ID
Banks ID	1209500024	10
Owner Of Well	TUSCANY BAY APARTMENTS (FORMERLY	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.30873	
Latitude	28.51592	

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DETAILS

		MAP ID
State ID	3419	11
Banks ID	1209500025	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.11673	
Latitude	28.415	

		MAP ID
State ID	3419	12
Banks ID	1209500028	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.15895	
Latitude	28.42361	

		MAP ID
State ID	50245	12
Banks ID	1209500029	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.15462	
Latitude	28.42533	

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DETAILS

State ID	3317	MAP ID
Banks ID	1209500030	13
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.25585	
Latitude	28.50235	

State ID	3317	MAP ID
Banks ID	1209500054	13
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.26	
Latitude	28.50053	

State ID	3317	MAP ID
Banks ID	1209500060	13
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.2595	
Latitude	28.49757	

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		MAP ID
State ID	3317	14
Banks ID	1209500034	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.25342	
Latitude	28.50049	

		MAP ID
State ID	3317	14
Banks ID	1209500064	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.2534	
Latitude	28.50389	

		MAP ID
State ID	3317	14
Banks ID	1209500112	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.25255	
Latitude	28.49687	

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DETAILS

		MAP ID
State ID	3244	15
Banks ID	1209500001	
Owner Of Well	Valencia Community College East Campus	
Type Of Well	Active	
Depth Drilled	270 '	
Completion Date	N/A	
Longitude	-81.25034	
Latitude	28.55667	

		MAP ID
State ID	3244	15
Banks ID	1209500012	
Owner Of Well	Valencia Community College East Campus	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.25057	
Latitude	28.55315	

		MAP ID
State ID	3244	15
Banks ID	1209500035	
Owner Of Well	Valencia Community College East Campus	
Type Of Well	Active	
Depth Drilled	296 '	
Completion Date	N/A	
Longitude	-81.25113	
Latitude	28.5532	

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DETAILS

State ID	3244	MAP ID
Banks ID	1209500065	15
Owner Of Well	Valencia Community College East Campus	
Type Of Well	Active	
Depth Drilled	315 '	
Completion Date	N/A	
Longitude	-81.24986	
Latitude	28.55287	

State ID	3354	MAP ID
Banks ID	1209500018	16
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.19978	
Latitude	28.48861	

State ID	3354	MAP ID
Banks ID	1209500037	16
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.19978	
Latitude	28.48889	

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DETAILS

		MAP ID
State ID	3354	16
Banks ID	1209500071	
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.19978	
Latitude	28.48889	

		MAP ID
State ID	3353	17
Banks ID	1209500038	
Owner Of Well	SEBAG CITRUS	
Type Of Well	Proposed	
Depth Drilled	300 '	
Completion Date	N/A	
Longitude	-81.1345	
Latitude	28.54528	

		MAP ID
State ID	3169	18
Banks ID	1209500039	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.31562	
Latitude	28.46806	

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DETAILS

		MAP ID
State ID	3419	19
Banks ID	1209500040	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.15173	
Latitude	28.39862	

		MAP ID
State ID	50245	19
Banks ID	1209500084	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	602 '	
Completion Date	N/A	
Longitude	-81.1552	
Latitude	28.39893	

		MAP ID
State ID	3317	20
Banks ID	1209500041	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.24845	
Latitude	28.51972	

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		MAP ID
State ID	3317	20
Banks ID	1209500053	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.24832	
Latitude	28.52455	

		MAP ID
State ID	3400	21
Banks ID	1209500042	
Owner Of Well	FORMER BP/GULF COLONIAL DRIVE	
Type Of Well	Proposed	
Depth Drilled	30 '	
Completion Date	N/A	
Longitude	-81.22923	
Latitude	28.5525	

		MAP ID
State ID	3169	22
Banks ID	1209500005	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.30368	
Latitude	28.45639	

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		MAP ID
State ID	3169	22
Banks ID	1209500043	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	545 '	
Completion Date	N/A	
Longitude	-81.29868	
Latitude	28.455	

		MAP ID
State ID	50245	23
Banks ID	1209500003	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	603 '	
Completion Date	N/A	
Longitude	-81.16026	
Latitude	28.40211	

		MAP ID
State ID	50245	23
Banks ID	1209500044	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	602 '	
Completion Date	N/A	
Longitude	-81.16027	
Latitude	28.40693	

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		MAP ID
State ID	50245	23
Banks ID	1209500048	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.16065	
Latitude	28.41146	

		MAP ID
State ID	5111	24
Banks ID	1209500049	
Owner Of Well	Palm Harbor Golf Course	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.21978	
Latitude	28.55917	

		MAP ID
State ID	3388	25
Banks ID	1209500050	
Owner Of Well	Rio Pinar Country Club	
Type Of Well	Active	
Depth Drilled	250 '	
Completion Date	N/A	
Longitude	-81.26617	
Latitude	28.53222	

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		MAP ID
State ID	3317	26
Banks ID	1209500026	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.25968	
Latitude	28.50672	

		MAP ID
State ID	3317	26
Banks ID	1209500051	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	598 '	
Completion Date	N/A	
Longitude	-81.25623	
Latitude	28.50743	

		MAP ID
State ID	3271	27
Banks ID	1209500004	
Owner Of Well	Bailon	
Type Of Well	Active	
Depth Drilled	234 '	
Completion Date	N/A	
Longitude	-81.29034	
Latitude	28.48472	

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		MAP ID
State ID	3271	27
Banks ID	1209500052	
Owner Of Well	Bailon	
Type Of Well	Active	
Depth Drilled	340 '	
Completion Date	N/A	
Longitude	-81.29006	
Latitude	28.48528	

		MAP ID
State ID	3317	28
Banks ID	1209500056	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Inactive	
Depth Drilled	450 '	
Completion Date	N/A	
Longitude	-81.23615	
Latitude	28.55059	

		MAP ID
State ID	3317	29
Banks ID	1209500058	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.2533	
Latitude	28.5093	

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		MAP ID
State ID	50245	30
Banks ID	1209500059	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	702 '	
Completion Date	N/A	
Longitude	-81.14827	
Latitude	28.42537	

		MAP ID
State ID	300	31
Banks ID	1209500061	
Owner Of Well	Ventura Country Club	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.29229	
Latitude	28.50517	

		MAP ID
State ID	50035	32
Banks ID	1209500062	
Owner Of Well	Eastern WRF	
Type Of Well	Active	
Depth Drilled	500 '	
Completion Date	N/A	
Longitude	-81.20228	
Latitude	28.52333	

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		MAP ID
State ID	3169	33
Banks ID	1209500032	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.30618	
Latitude	28.46278	

		MAP ID
State ID	3169	33
Banks ID	1209500063	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.30534	
Latitude	28.46389	

		MAP ID
State ID	51223	34
Banks ID	1209500066	
Owner Of Well	Northwood	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.16989	
Latitude	28.53684	

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		MAP ID
State ID	3159	35
Banks ID	1209500068	
Owner Of Well	Orlando Utilities Commission	
Type Of Well	Active	
Depth Drilled	1450 '	
Completion Date	N/A	
Longitude	-81.30506	
Latitude	28.50389	

		MAP ID
State ID	3159	35
Banks ID	1209500098	
Owner Of Well	Orlando Utilities Commission	
Type Of Well	Active	
Depth Drilled	1450 '	
Completion Date	N/A	
Longitude	-81.30534	
Latitude	28.50361	

		MAP ID
State ID	300	36
Banks ID	1209500070	
Owner Of Well	Ventura Country Club	
Type Of Well	Removed	
Depth Drilled	300 '	
Completion Date	N/A	
Longitude	-81.30229	
Latitude	28.51	

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State ID	300	MAP ID
Banks ID	1209500013	37
Owner Of Well	Ventura Country Club	
Type Of Well	Active	
Depth Drilled	140 '	
Completion Date	N/A	
Longitude	-81.29495	
Latitude	28.50994	

State ID	300	MAP ID
Banks ID	1209500073	37
Owner Of Well	Ventura Country Club	
Type Of Well	Active	
Depth Drilled	140 '	
Completion Date	N/A	
Longitude	-81.29491	
Latitude	28.51042	

State ID	300	MAP ID
Banks ID	1209500075	37
Owner Of Well	Ventura Country Club	
Type Of Well	Active	
Depth Drilled	140 '	
Completion Date	N/A	
Longitude	-81.29579	
Latitude	28.5101	

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State ID	300	MAP ID
Banks ID	1209500014	38
Owner Of Well	Ventura Country Club	
Type Of Well	Removed	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.3013	
Latitude	28.50562	

State ID	300	MAP ID
Banks ID	1209500074	38
Owner Of Well	Ventura Country Club	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.29963	
Latitude	28.5028	

State ID	7706	MAP ID
Banks ID	1209500076	39
Owner Of Well	Les Springs Golf Course	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.18284	
Latitude	28.51361	

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		MAP ID
State ID	7706	39
Banks ID	1209500087	
Owner Of Well	Les Springs Golf Course	
Type Of Well	Proposed	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.18201	
Latitude	28.5125	

		MAP ID
State ID	50245	40
Banks ID	1209500016	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.15647	
Latitude	28.38373	

		MAP ID
State ID	50245	40
Banks ID	1209500033	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.16025	
Latitude	28.39225	

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		MAP ID
State ID	50245	40
Banks ID	1209500077	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.15978	
Latitude	28.38774	

		MAP ID
State ID	7203	41
Banks ID	1209500006	
Owner Of Well	Waterford Lakes	
Type Of Well	Capped	
Depth Drilled	560 '	
Completion Date	N/A	
Longitude	-81.19312	
Latitude	28.5475	

		MAP ID
State ID	7203	41
Banks ID	1209500078	
Owner Of Well	Waterford Lakes	
Type Of Well	Active	
Depth Drilled	480 '	
Completion Date	N/A	
Longitude	-81.19339	
Latitude	28.54778	

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		MAP ID
State ID	3354	42
Banks ID	1209500009	
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	220 '	
Completion Date	N/A	
Longitude	-81.20869	
Latitude	28.47892	

		MAP ID
State ID	3354	42
Banks ID	1209500036	
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Inactive	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.2087	
Latitude	28.47738	

		MAP ID
State ID	3354	42
Banks ID	1209500069	
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Inactive	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.20916	
Latitude	28.4814	

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DETAILS

State ID	3354	MAP ID
Banks ID	1209500080	42
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	460 '	
Completion Date	N/A	
Longitude	-81.20847	
Latitude	28.47637	

State ID	3354	MAP ID
Banks ID	1209500094	42
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.20913	
Latitude	28.48065	

State ID	3354	MAP ID
Banks ID	1209500107	42
Owner Of Well	Orange County Landfill (Ltr Mod)	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.20822	
Latitude	28.47991	

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DETAILS

		MAP ID
State ID	3317	43
Banks ID	1209500002	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	669 '	
Completion Date	N/A	
Longitude	-81.25173	
Latitude	28.54028	

		MAP ID
State ID	3317	43
Banks ID	1209500081	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	650 '	
Completion Date	N/A	
Longitude	-81.25173	
Latitude	28.53972	

		MAP ID
State ID	3317	43
Banks ID	1209500092	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	669 '	
Completion Date	N/A	
Longitude	-81.25117	
Latitude	28.53972	

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		MAP ID
State ID	3317	43
Banks ID	1209500093	
Owner Of Well	OCU Water Service Areas	
Type Of Well	Active	
Depth Drilled	700 '	
Completion Date	N/A	
Longitude	-81.2509	
Latitude	28.54056	

		MAP ID
State ID	3308	44
Banks ID	1209500082	
Owner Of Well	CONWAY RECREATIONAL PARK	
Type Of Well	Capped	
Depth Drilled	409 '	
Completion Date	N/A	
Longitude	-81.3209	
Latitude	28.49056	

		MAP ID
State ID	3169	45
Banks ID	1209500079	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.32368	
Latitude	28.47111	

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		MAP ID
State ID	3169	45
Banks ID	1209500083	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.32145	
Latitude	28.47361	

		MAP ID
State ID	3169	45
Banks ID	1209500105	
Owner Of Well	Lee Vista Center	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.32173	
Latitude	28.47417	

		MAP ID
State ID	3419	46
Banks ID	1209500046	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.12117	
Latitude	28.42945	

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		MAP ID
State ID	3419	46
Banks ID	1209500085	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.12562	
Latitude	28.43361	

		MAP ID
State ID	3419	47
Banks ID	1209500086	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.15506	
Latitude	28.41112	

		MAP ID
State ID	50245	48
Banks ID	1209500089	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.16078	
Latitude	28.41833	

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		MAP ID
State ID	3419	49
Banks ID	1209500090	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.11367	
Latitude	28.44722	

		MAP ID
State ID	50245	50
Banks ID	1209500096	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	761 '	
Completion Date	N/A	
Longitude	-81.13933	
Latitude	28.42542	

		MAP ID
State ID	62555	51
Banks ID	1209500010	
Owner Of Well	Lake Nona Transportation Center	
Type Of Well	Proposed	
Depth Drilled	389 '	
Completion Date	N/A	
Longitude	-81.27613	
Latitude	28.45237	

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		MAP ID
State ID	62555	51
Banks ID	1209500057	
Owner Of Well	Lake Nona Transportation Center	
Type Of Well	Active	
Depth Drilled	420 '	
Completion Date	N/A	
Longitude	-81.27572	
Latitude	28.45232	

		MAP ID
State ID	62555	51
Banks ID	1209500099	
Owner Of Well	Lake Nona Transportation Center	
Type Of Well	Proposed	
Depth Drilled	400 '	
Completion Date	N/A	
Longitude	-81.2757	
Latitude	28.45199	

		MAP ID
State ID	3419	52
Banks ID	1209500100	
Owner Of Well	Magnolia	
Type Of Well	Active	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.14256	
Latitude	28.41945	

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		MAP ID
State ID	9919	53
Banks ID	1209500101	
Owner Of Well	SUNFLOWER TRAIL ESTATES	
Type Of Well	Active	
Depth Drilled	457 '	
Completion Date	N/A	
Longitude	-81.14839	
Latitude	28.53861	

		MAP ID
State ID	50245	54
Banks ID	1209500102	
Owner Of Well	City of Cocoa	
Type Of Well	Active	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.16076	
Latitude	28.42527	

		MAP ID
State ID	3241	55
Banks ID	1209500104	
Owner Of Well	MARY HANDLEY	
Type Of Well	Active	
Depth Drilled	250 '	
Completion Date	N/A	
Longitude	-81.25173	
Latitude	28.51389	

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State ID	3317	MAP ID
Banks ID	1209500108	55
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.24813	
Latitude	28.51312	

State ID	3352	MAP ID
Banks ID	1209500067	56
Owner Of Well	Post Fountains at Lee Vista	
Type Of Well	Active	
Depth Drilled	325 '	
Completion Date	N/A	
Longitude	-81.30562	
Latitude	28.47556	

State ID	3352	MAP ID
Banks ID	1209500106	56
Owner Of Well	Post Fountains at Lee Vista	
Type Of Well	Active	
Depth Drilled	290 '	
Completion Date	N/A	
Longitude	-81.30618	
Latitude	28.47528	

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State ID	3317	MAP ID
Banks ID	1209500055	57
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.25158	
Latitude	28.53396	

State ID	3317	MAP ID
Banks ID	1209500109	57
Owner Of Well	OCU Water Service Areas	
Type Of Well	Proposed	
Depth Drilled	600 '	
Completion Date	N/A	
Longitude	-81.2507	
Latitude	28.53133	

State ID	58728	MAP ID
Banks ID	1209500110	58
Owner Of Well	Land Fill Borrow Pit	
Type Of Well	Proposed	
Depth Drilled	0 '	
Completion Date	N/A	
Longitude	-81.18726	
Latitude	28.46716	

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State ID	3317
Banks ID	1209500111
Owner Of Well	OCU Water Service Areas
Type Of Well	Inactive
Depth Drilled	437 '
Completion Date	N/A
Longitude	-81.22681
Latitude	28.55865

MAP ID
59

P.O. Box 12851, Capitol Station, Austin, TX 78711
1601 Rio Grande Street, Suite 500 Austin, TX 78701
512.478.0059 FAX 512.478.1433 e-mail banks@banksinfo.com
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Water Well Report Research Mapping Protocol

Banks Information Solutions, Inc. Water Well Report is prepared from existing state water well databases and additional file data/records research conducted at the St. Johns Water Management District located in Palatka, Florida. With this information, groundwater wells are geocoded/geoplotted using a GIS application, ArcView 3.0a, and the water well report is produced from the database information provided by the state district.

Banks Information Solutions, Inc. has performed a thorough and diligent search of all groundwater well information provided and recorded with the St. Johns Water Management District. All mapped locations are based on information obtained from the SJWMD. Although Banks performs quality assurance and quality control on all research projects, we recognize that any inaccuracies of the records and mapped well locations could possibly be traced to the appropriate regulatory authority or the actual driller. It may be possible that some water well schedules and logs have never been submitted to the regulatory authority by the water driller and, thus, may explain the possible unaccountability of privately drilled wells. It is uncertain if the above listing provides 100% of the existing wells within the area of review. Therefore, Banks Information Solutions, Inc. cannot fully guarantee the accuracy of the data or well location(s) of those maps and records maintained by the Florida regulatory authorities.

Installation/FFID/CTC Delta from FY04*				Phase	Completed		Underway		Future		Schedule Impact in FY05**		Costs Incurred Thru FY05 ($000)		FY05 Funds Obligated ($000)		FY06 Execution Planned ($000)		FY07 Planning Estimate ($000)		Estimated Costs By Fiscal Year ($000)		
RAB					IRP	MMRP	IRP	MMRP	IRP	MMRP	IRP	MMRP	IRP	MMRP	IRP	MMRP	IRP	MMRP	IRP	MMRP	Fiscal Year	IRP	MMRP
BRAC Year					Sites (Actions)																		
NPL/Proposed NPL																							
FORMERLY USED DEFENSE SITES - PINECASTLE JEEP RNG/FL49799F722400																							
IRP Sites by Classification		MMRP Sites by Classification		Study	0	0	0	1	0	0			$12	$130	$0	$123	$0	$114	$0	$0	FY08	$0	$0
Response Complete	0	Response Complete	0	IRA	0 (0)	0 (0)	0 (0)	0 (0)					$0	$0	$0	$0	$0	$0	$0	$0	FY09	$0	$0
High	0	RAC-1	1	Design	0	0	0	0	0	1			$0	$0	$0	$0	$0	$0	$0	$0	FY10	$0	$0
Medium	0	RAC-2	0																				
Low	0	RAC-3	0	RA-C	0	0	0	0	0	1			$0	$0	$0	$0	$0	$0	$0	$0	FY11	$0	$0
Not Evaluated	0	RAC-4	0	RA-O	0	0	0	0	0	0			$0	$0	$0	$0	$0	$0	$0	$0	FY06 - Comp.IRP		$0
Not Required	0	RAC-5	0																				
		Not Evaluated	0	LTM	0	0	0	0	0	1			$0	$0	$0	$0	$0	$0	$0	$0	FY06 - Comp.MMRP		$18,529
Total IRP Sites:	0	Total MMRP Sites:	1								Total:		$12	$130	$0	$123	$0	$114	$0	$0	FY06 - Complete		$18,529

IRP Progress in FY05: No IRP projects identified.

IRP Progress Planned for FY06 - FY07: No IRP projects identified.

MMRP Progress in FY05: Conducted site investigation activities.

MMRP Progress Planned for FY06 - FY07: Continue site investigation activities.

Footnotes
* CTC Delta Reason: C-TECH-Technical Issues, C-REG-Regulatory Issues, C-EST-Estimating Criteria.
** Schedule Impact Reason: TECH-Technical, CONT-Contracting, PERS-Personnel, REG-Regulatory, FUND-Funding.

Defense Environmental Programs Annual Report to Congress | DERP Search Tools & Information Fiscal Year 2005

MMRP Site Inventory

View printable PDF of all MMRP Sites in Florida |

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FORMERLY USED DEFENSE SITES - PINECASTLE JEEP RNG - FFID FL49799F722400

The following is a listing of Military Munitions Response site details for PINECASTLE JEEP RNG.

Site ID	RAC Score	Nearest City	Ownership Interest	Range Total Acres	Land Use Restrictions	Land Use Access Controls	Congressional District
01MMRP	1	No Data Available	No Data Available	No Data Available	None Specified	None Specified	1224

104FL0405 PINECASTLE JEEP RANGE - 01 - MMRP - RAC 1 ASR COMPL

Table A

MRS Background Information

DIRECTIONS Record the background information below for the MRS to be evaluated. Much of this information is available from Service and 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 (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: Chemical Demonstration Range; Air-to-Ground Rocket Range; Range Complex No. 1; Range Complex No.2
Component: FUDS/SAD/Jacksonville District (SAJ)
Installation/Property Name: FL49799F722400 PINECASTLE JEEP RANGE
Location (City, County, State): PINECASTLE, ORANGE, FL
Site Name/Project Name (Project No.): RAC 1 ASR COMPL (01)

Date Information Entered/Updated:
Point of Contact (Name/Phone): Public Affairs 904-232-2235
Project Phase:

☐ PA	☐ SI	☐ RI/FS	☑ EE/CA	☐ IRA	☐ RmD
☐ RmA-C	☐ RD	☐ RA-C	☐ RA-O	☐ LTM	☐ PCO

Media Evaluated:

☐ 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):

Description of Pathways for Human and Ecological Receptors:

Description of Receptors (Human and Ecological):

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