FINAL

Site Inspection Report for Mitchel Field, Garden City, NY

DERP FUDS Project No. **C02NY064503**

Prepared Under: **Contract No. W912DY-04-D-0017**
Task Order # 00170001

Prepared for:
U.S. Army Engineering and Support Center, Huntsville
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Qualitative Reconnaissance at MRS 2

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December 2009

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SCIENCE AND TECHNOLOGY

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December 2009

CONTRACTOR STATEMENT OF AUTHORSHIP AND INDEPENDENT TECHNICAL REVIEW

Alion Science and Technology Corporation prepared this Site Inspection Report for the Mitchel Field, Formerly Used Defense Site (FUDS), Project No. C02NY064503. An independent technical review was conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Programmatic Work 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; 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 existing Corps policy. In accordance with Corps requirements, significant authors to this report are presented below.

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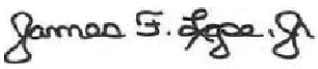
Jim Lape Risk Assessor Integral Consulting, Inc. (Under contract to Alion Science and Technology Corporation)	12/22/09	
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Significant concerns and explanation of the resolutions are documented within the project file.

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LIST OF ACRONYMS AND ABBREVIATIONS

Alion	Alion Science and Technology Corporation
ADC	Air Defense Command
AN	Army Navy
ASR	Archive Search Report
bgs	Below Ground Surface
CAS	Chemical Abstract Service
CAIS	Chemical Agent Identification Sets
CDQAR	Chemical Data Quality Assessment Report
CENAB	Corps of Engineers North Atlantic Baltimore
CENAN	Corps of Engineers North Atlantic New York
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CN	Chloroacetophenone
COPC	Chemicals of Potential Concern
COPEC	Chemicals of Potential Ecological Concern
CQAR	Chemical Quality Assurance Report
CSM	Conceptual Site Model
CTT	Closed, Transferring, and Transferred
CWM	Chemical Warfare Materiel
CX	Center of Expertise
DBR	Demonstration Bombing Range
DC	Design Center
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DA	Department of the Army
DoD	Department of Defense
DoI	Department of Interior
DQI	Data Quality Indicator
DQO	Data Quality Objective
Eco-SSL	Ecological Soil Screening Level
EDMS	Environmental Document Management Systems
EDS	Environmental Data Services, Inc.
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
˚F	Degree (s) Fahrenheit
ft	Foot or Feet
FDE	Findings and Determination of Eligibility

LIST OF ACRONYMS AND ABBREVIATIONS

FNH	Flashless Non-hygroscopic
FUDS	Formerly Used Defense Site(s)
FUDSMIS	FUDS Management Information System
FS	Sulfur trioxide-chlorsulfonic acid mixture
GIS	Geographic Information Systems
GPL	GPL Laboratories, LLLP
HE	High Explosive
HHE	Health Hazard Evaluation
HHRA	Human Health Risk Assessment
HRS	Hazard Ranking System
HTRW	Hazardous Toxic and Radioactive Waste
HQ	Hazard Quotient
ID	Identification
IMR	Improved Military Rifle
In.	Inch (es)
INPR	Inventory Project Report
IRIS	Integrated Risk Information System
ITRC	Interstate Technology and Regulatory Council
LDSP	Landscape 1000-inch Range
LLLP	Limited Liability Limited Partnership
MC	Munitions Constituents
MCL	Maximum Contaminant Level
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
MF	Mitchel Field
mg/kg	Milligram per kilogram
MGR	Machine Gun Range
Mi	Mile(s)
MK	Mark
m	meter
mm	Millimeter(s)
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MQO	Measurement Quality Objective
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	Mean Sea Level

LIST OF ACRONYMS AND ABBREVIATIONS

NA	Not Applicable
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Non Detect
NDAI	No Department of Defense Action Indicated
NG	Nitroglycerin
NOAA	National Oceanographic and Atmospheric Administration
NSL	No Screening Level
NTCRA	Non-Time Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation
NYS GISC	New York State Geographic Information Systems Clearinghouse
NYSOPRHP	New York State Office of Parks, Recreation, and Historic Preservation
OS	Overall Site
PAOI	Potential Area of Interest
PETN	Pentaerythrite Tetranitrate
PGM	Program Manager
PM	Project Manager
PMMQL	Preferred Maximum Method Quantitation Limits
PWP	Programmatic Work Plan
PWS	Performance Work Statement
QA	Quality Assurances
QC	Quality Control
QSM	Quality Systems Manual
RAC	Risk Assessment Code
RCWM	Recovered Chemical Warfare Materiel
RI/FS	Remedial Investigation /Feasibility Study
RL	Reporting Limit
RMIS	Range Management Information System
SB	Subsurface Soil sample
SI	Site Inspection
SL	Screening Level
SLERA	Screening Level Ecological Risk Assessment
SR	Skeet Range
SS	Surface Soil sample
SSL	Soil Screening Level
SS-WP	Site-Specific Work Plan

LIST OF ACRONYMS AND ABBREVIATIONS

T&E	Threatened and Endangered
TCRA	Time Critical Removal Action
TPP	Technical Project Planning
UKM	Unknown Mortar Range
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
WWII	World War II
WOE	Weight of Evidence

GLOSSARY OF TERMS

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)— Congress enacted CERCLA, commonly known as Superfund, on 11 December 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment (USACE 2004b).

Discarded Military Munitions (DMM)—Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations. (10 USC 2710(e)(2)) (Department of the Army [DA] 2005).

Explosive Ordnance Disposal (EOD)—The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration (DA 2005).

Explosives Safety—A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions (DA 2005).

Formerly Used Defense Site (FUDS)— A FUDS is defined as a facility or site (property) that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination by hazardous substances. By the Department of Defense Environmental Restoration Program (DERP) policy, the FUDS program is limited to those real properties that were transferred from DoD control prior to 17 October 1986. FUDS properties can be located within the 50 States, District of Columbia, Territories, Commonwealths, and possessions of the United States. ER 200-3-1 (May 10, 2004).

Material Potentially Presenting an Explosive Hazard (MPPEH)—Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions (DA 2005).

GLOSSARY OF TERMS

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 DoD, 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. The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other then nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 USC 2011 et seq.) have been completed. (10 USC 101(e)(4)(A) through (C)) (DA 2005).

Munitions and Explosives of Concern (MEC)—This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 USC 101(e)(5); (B) DMM, as defined in 10 USC 2710(e)(2); or (C) Munitions constituents (e.g., trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard (DA 2005).

Munitions Constituents (MC)—Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710(e)(3)) (DA 2005).

Munitions Debris (MD)—Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal (DA 2005).

Munitions Response Area—Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites (32 Code of Federal Regulations [CFR] 179.3).

Munitions Response Site (MRS)—A discrete location within a Munitions Response Area that is known to require a munitions response (32 CFR 179.3).

GLOSSARY OF TERMS

Munitions Response Site Prioritization Protocol (MRSPP)—The MRSPP was published as a rule on 5 October 2005. This rule implements the requirement established in Section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the DoD to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing UXO, DMM, or MC. The DoD adopted the MRSPP under the authority of 10 USC 2710(b). Provisions of 10 USC 2710(b) require that the DoD assign to each defense site in the inventory a relative priority for response activities based on the overall conditions at each location and taking into consideration various factors related to safety and environmental hazards.

Non-Time Critical Removal Action (NTCRA)—Actions initiated in response to a release or threat of a release that poses a risk to human health or the environment where more than six months planning time is available (USACE 2000).

Range—A designated land or water area that is set aside, managed, and used for range activities of the DoD. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 USC 101(e)(1)(A) and (B)) (DA 2005).

Range Activities—Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 USC 101(e)(2)(A) and (B)) (DA 2005).

Range Related Debris—Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g. target debris, military munitions packaging, and crating material).

Risk Assessment Code (RAC)—An expression of the risk associated with a hazard. The RAC combines the hazard severity and accident probability into a single Arabic number on a scale from 1 to 5, with 1 being the greatest risk and 5 the lowest risk. The RAC is used to prioritize response actions (USACE 2004b).

Time Critical Removal Action (TCRA)—Removal actions conducted to respond to an imminent danger posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within 6 months to reduce risk to public health or the environment (DA 2005).

Unexploded Ordnance (UXO)—Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause. (10 USC 101(e)(5)(A) through (C)) (DA 2005).

EXECUTIVE SUMMARY

ES.1 Under contract with the United States Army Corps of Engineers (USACE), Alion Science and Technology Corporation (Alion) prepared this Site Inspection (SI) Report to document SI activities and findings for the Mitchel Field Formerly Used Defense Site (FUDS), Property No. C02NY0645, located in Garden City, Nassau County, New York. The Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address potential munitions and explosives of concern (MEC) and munitions constituents (MC) remaining at FUDS. This SI was completed under MMRP Project No. C02NY064503 and addresses potential MMRP hazards remaining at the Mitchel Field FUDS.

ES.2 **Site Inspection Objectives and Scope**. The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a Time Critical Removal Action (TCRA); (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the United States Environmental Protection Agency (USEPA); and (iii) collects data, as appropriate, to characterize the hazardous substance release for effective and rapid initiation of the remedial investigation/feasibility study (RI/FS). An additional objective of the SI is to collect the additional data necessary to evaluate munitions response sites (MRSs) using the Munitions Response Site Prioritization Protocol (MRSPP).

ES.3 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of the FUDS prior to property transfer. Potential releases of hazardous, toxic, or radioactive waste (HTRW) are not within the SI scope.

ES.4 **Mitchel Field**. The Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used during each war the U.S. participated in through the Korean War. During the Revolutionary War it was known as Hempstead Plains and used as an Army enlistment center. At the time of the War of 1812 and the Mexican Was, the property was used as an infantry training center. Mitchel Field has been known as Camp Black during the Spanish American War, Camp Mills in 1917, and finally Mitchel Field in 1918 when the facility became an active flying field. In the 1930's and during World War II (WWII) the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber,

and practice demonstration bombing target. Mitchel Field also was used as a base for anti-sub patrol missions operated by Army Air Force planes. The facility was used by the Air Defense Command after WWII and then an Air Force Reserve Base after the Korean War. In April 1961, Mitchel Field was deactivated officially and released to various private and public entities.

ES.5 **Technical Project Planning.** The SI approach was developed in concert with stakeholders through USACE's technical project planning (TPP) framework, which was applied at the initial TPP meeting on 17 July 2008. Stakeholders agreed to the SI approach, as presented and modified during the TPP meeting and finalized in the Site-Specific Work Plan (SS-WP). In summary, these agreements were to inspect the MRSs and complete sampling in accordance with the Data Quality Objectives (DQOs) and Final Site SS-WP. The TPP # 2 meeting was held on 16 December 2009. All stakeholders agreed to the conclusions and recommendations presented during the meeting.

ES.6 USACE programmatic range documents identified six MRS areas at the Mitchel Field FUDS: MRS 1, Landscape 1000-inch Range (Range Management Information System [RMIS] Range ID No. C02NY064503R01); MRS 2, Skeet Range (RMIS Range ID No. C02NY064503R02); MRS 3, Demonstration Bombing Range (C02NY064503R03); MRS 4, Firing-in Butt (C02NY064503R04); MRS 5, Machine Gun Range (C02NY064503R05); and MRS 6, Unknown Mortar Range (C02NY064503R06). There was no potential area of interest (PAOI) identified at Mitchel Field. The Firing-in Butt (MRS 4) has been completely redeveloped and the land is either under the footprint of buildings or under paved parking lots. Based on current site conditions stakeholders agreed that no field work would be completed at this MRS during the SI.

ES.7 **Qualitative Site Reconnaissance and Munitions and Explosives of Concern Assessment**. SI field activities were performed on 18 and 19 May 2009. A qualitative site reconnaissance of the FUDS was performed over approximately 2.9 acres of land during which analog geophysics was conducted and visual observations were made, where possible. The field sampling approach included magnetometer-assisted reconnaissance following a meandering path in and around sampling locations to verify the location of the training area and former ranges and to identify the presence/absence of MEC/munitions debris (MD) or other areas of interest (i.e. areas having indications of munitions use) at the FUDS. During the reconnaissance and sampling activities, subsurface anomalies were detected at Mitchel Field; however no MD/MEC was identified.

ES.8 A qualitative MEC screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the Inventory Project Report (INPR), Archives Search Report (ASR), and the ASR Supplement. Since military use ended in 1961, there have been reports of munitions or munitions related debris being found at the FUDS. In the 1960s it was reported by Nassau County officials that unidentified bombs were found during campus construction. The quantity, location, nomenclature and configuration of these items were not reported. Additionally, between 1980 and 1982 four suspected mortars were found within the Mitchel Field FUDS; three suspected 81mm mortars and one suspected 60mm mortar round all presumed to be inert. During the TPP meeting, an employee of the Nassau County Parks Department stated that an unspecified quantity of shell casings was discovered in the vicinity of the firing point at MRS 5 (Machine Gun Range) in the mid 1990's during the construction of athletic fields.

The potential risk posed by MEC, assessed through three risk factors (i.e., presence of MEC source, accessibility or pathway presence and potential receptor contact), is low for MRS 1, MRS 2, MRS 3, MRS 4, MRS 5 and MRS 6. At MRS 1, 2 and 5 only small arms were known to be used and small arms pose little to no explosive risk. Small arms bullets do not contain explosive charges and only a small amount of explosive material is present in the propellant of unfired rounds. Similarly, the explosive risk posed by the potential presence of practice bombs is low at MRS 3 due to the small quantity of explosive material in the spotting charges. The potential explosive risk at MRS 4 is also considered to be low due to the lack of accessibility. The potential explosive risk posed by MEC also is considered low for MRS 6. Although the possible presence of mortars (High Explosive [HE] or Practice) below the ground surface could pose a moderate degree of explosive hazard, access to any remaining items would be very limited. The four areas that comprise MRS 6 are largely redeveloped and potential exposure to MEC is unlikely. The majority of the FUDS have limited access due to pavement, parking lots, buildings and fences while other areas are open to the general public. The overall accessibility or potential exposure to MEC is considered limited or low throughout the FUDS, due to the presence of large buildings and structures within the FUDS (Hofstra University and Nassau Community College), parking lots, office buildings and the Nassau Coliseum. Although there are numerous potential receptors to MEC the likelihood of exposure is considered low based on the current site conditions.

ES.9 **Munitions Constituents Sampling and Risk Screening**. A total of 14 surface and subsurface soil and two groundwater samples were collected at Mitchel Field. At the Landscape 1000-inch range (MRS 1), two surface soil and two subsurface soils samples were collected at the suspected firing point. At MRS 2, Skeet Range, four surface soil samples and four subsurface

soil samples were collected at the MRS, two near the firing point and two in the southern portion of the MRS. At MRS 3 three surface soil samples and three subsurface soil samples were collected in the southeastern portion of the MRS. There were no samples collected at MRS 4, as agreed upon during the TPP meeting. At MRS 5 three surface soil samples and three subsurface soil samples were collected at northwestern portion of the MRS near the suspected firing point. At MRS 6 two surface soil samples and two subsurface soil samples were collected in the vicinity of the suspected mortar discoveries. All surface and subsurface soil samples were collocated. Additionally, two groundwater samples were collected within the southeast portion of the FUDS near MRS 1 and 2 from existing monitoring wells.

ES.10 A list of munitions constituents (MC) associated with the specific munitions used at each MRS was developed and used to select which metals and/or explosive MC should be analyzed for at each MRS. The laboratory results from samples collected in the field were then used to conduct a risk screening evaluation for each media type and receptor.

The metallic MC of concern identified at MRS 1 (Landscape 1000-inch Range) and MRS 5 (Machine Gun Range) includes the metals antimony, copper, iron, lead, and nickel, which are constituents of the small arms bullets. Explosive MC included nitroglycerine (NG), dinitrotoluene (DNT) and DNT breakdown products. Surface soil was identified as a medium with a potentially complete exposure pathway for human and ecological receptors at MRS 1 and MRS 5. Groundwater and subsurface soil were identified as potentially complete pathways for human receptors only. Due to the detection of copper, lead and nickel above background concentrations in surface soil and copper and lead in subsurface soil, both soil pathways are complete for human receptors at MRS 1. Similarly, copper, iron, lead and nickel were detected above background in both surface and subsurface soil at MRS 5. The surface soil pathway also is complete for ecological receptors at MRS 1 and MRS 5. At both MRS 1 and 5, iron was detected at concentrations exceeding the human health screening value in surface soil only and was selected as chemical of potential concern (COPC). Maximum concentrations of lead at MRS 1 and MRS 5 exceeded the ecological screening criteria and lead was identified as a chemical of potential ecological concern (COPEC) for surface soil. Based on the weight-of-evidence (WOE) evaluation for the COPC and COPEC in surface soil at MRS 1 and MRS 5, no unacceptable risks to ecological or human receptors were identified. No explosive MC were detected groundwater samples; therefore the groundwater pathway is incomplete for MRS 1.

The non-explosive MC of concern within MRS 2 (Skeet Range) includes lead and antimony which are associated with the lead shotgun shot and the explosive MC include NG, DNT and DNT breakdown products. Surface soil was identified as a medium with a potentially complete

exposure pathway for human and ecological receptors in MRS 2. Groundwater and subsurface soil were identified as potentially complete pathways for human receptors only. Due to the detection of lead above background values in surface and subsurface soil at MRS 2, both soil pathways are complete for human receptors. The surface soil pathway is also complete for ecological receptors. There were no exceedances of human health screening values in surface or subsurface soil therefore no COPCs were identified. Maximum concentrations of lead at MRS 2 exceeded the associated ecological screening criteria, and lead was identified as a COPEC; however, based on the WOE evaluation, potential exposures are unlikely to pose an unacceptable risk to ecological receptors. No explosive MC were detected groundwater samples, therefore, the groundwater pathway is incomplete for MRS 2.

The metallic MC of concern identified at MRS 3 (Demonstration Bombing Range) includes the metals antimony, iron, lead, and zinc, which are constituents of the practice bombs used at the MRS. Explosive MC included nitroglycerine NG, DNT and DNT breakdown products. Surface soil was identified as a medium with a potentially complete exposure pathway for human and ecological receptors in MRS 3. Subsurface soil was identified as potentially complete pathway for human receptors only. Due to the detection of iron, lead and zinc above background concentrations in surface soil and iron in subsurface soil both soil pathways are complete for human receptors. The surface soil pathway is also complete for ecological receptors. Iron was detected at concentrations exceeding the human health screening value in surface soil only and was selected as COPC. Maximum concentrations of lead and zinc at MRS 3 exceeded the ecological screening criteria and lead was identified as COPECs for surface soil. Based on the WOE evaluation for the COPC and COPECs in surface soil at MRS 3, no unacceptable risks to ecological or human receptors were identified.

As stated previously no environmental samples were collected within MRS 4 (Machine Gun Range) due to construction activities completed within the MRS since military use of the FUDS ceased in 1961. At the TPP meeting, stakeholders agreed that no sampling should be performed within MRS 4.

Metallic MC of concern identified at MRS 6 (Unknown Mortar Range) includes the metals aluminum and iron which are associated with 60mm and 81mm mortar bodies. Explosive MC included nitroglycerine NG, DNT and DNT breakdown products. Surface soil was identified as a medium with a potentially complete exposure pathway for human and ecological receptors in MRS 6. Subsurface soil was identified as potentially complete pathway for human receptors only. Due to the detection of aluminum and iron above background concentrations in surface and subsurface soil both soil pathways are complete for human receptors. The surface soil pathway is

also complete for ecological receptors. Aluminum and iron were detected at concentrations exceeding the human health screening values in surface soil only and were selected as COPCs. Based on the WOE evaluation for the COPCs in surface soil at MRS 6, no unacceptable risks to human receptors were identified.

ES.11 **Recommendations. MRS 1 (Landscape 1000-inch Range)** and **MRS 2 (Skeet Range**) – A No Department of Defense Action Indicated (NDAI) designation is recommended at MRS 1 and MRS 2. No MEC or MD has been observed at these MRSs historically (inclusive of the 1993 USACE site visit) or during this SI. Only small arms (.22 and .50 caliber) munitions were known to be used at MRS 1 and shotgun shells at MRS 2. An MEC screening level risk assessment indicates that the overall explosive hazard for both MRS 1 and MRS 2 are low to nonexistent. No explosives or explosive residues were detected in surface or subsurface soil samples. Although iron was identified as a COPC at MRS 1 in surface soil, iron was not determined to present an unacceptable human health risk. Lead was detected above background values and screening criteria and was identified as a COPEC for surface soil at MRS 1 and MRS 2; however, based on the WOE evaluation, exposure to lead is unlikely to pose an unacceptable risk to ecological receptors.

MRS 3 (Demonstration Bombing Range) - An NDAI designation is recommended at MRS 3. Although, suspected practice bombs were found at the FUDS by Nassau County employees in the 1960's during the construction of Nassau Community College no MEC or MD was observed at the MRS during the 1993 USACE site visit or during 2009 SI field event. Additionally, much of MRS 3 has undergone extensive soil re-working, excavation and redevelopment since the initial construction of the college and no MEC/MD were discovered during this subsequent redevelopment. An MEC screening level risk assessment indicates that an explosive source is unlikely to be present at MRS 3 and if present access to these items by the public would be limited by pavement, building footprints and roads. Therefore, the overall explosive hazard for MRS 3 is low. Although iron was identified as a COPC at MRS 3 in surface soil, this MC was not determined to present an unacceptable human health risk. Lead and zinc were detected above background values and screening criteria and were identified as COPECs for surface soil at MRS 3; however, based on the WOE evaluation, exposure to these two MC are unlikely to pose an unacceptable risk to ecological receptors.

MRS 4 (Firing-In Butt) - An NDAI designation is recommended at MRS 4. No MEC has been observed at the FUDS historically (inclusive of the 1993 USACE site visit) or during this SI. The former target butt consisted of a berm constructed in front of an aircraft that was parked on a concrete taxiway. No military structures related to this Firing-in Butt currently are present at the

MRS. MRS 4 has been entirely redeveloped the former range is now occupied almost entirely by parking lots, light industrial buildings, warehouses, roads, educational facilities and residential properties. The historical firing point has been redeveloped into large warehouses and parking lots. The MEC screening level risk assessment indicates that an explosive source is unlikely to be present at MRS 4. Therefore, the overall explosive hazard for this area is low. No environmental samples were collected within MRS 4 given the absence of the sample medium (i.e. soil). At the TPP meeting, stakeholders agreed that no sampling was required.

MRS 5 (Machine Gun Range) - An NDAI designation is recommended at MRS 5. No MEC has been observed at these MRSs historically (inclusive of the 1993 USACE site visit) or during this SI. An unspecified number of shell casings (MD) reportedly were found near the historic firing point by Nassau County Parks Department employees in the 1990's during the construction of athletic fields. This material is considered MD and does not pose an explosive risk. Only small arms munitions were known to be used at MRS 5. The MEC screening level risk assessment indicates that the overall explosive hazard for MRS 5 is low to nonexistent since small arms do not contain a significant quantity of explosive material. No explosives or explosive residues were detected in surface or subsurface soil samples. Although iron was identified as a COPC at MRS 5 in surface soil, this MC does not pose an unacceptable human health risk. Lead was detected above background values and screening criteria and was identified as a COPEC for surface soil; however, based on the WOE evaluation, exposure to lead is unlikely to pose an unacceptable risk to ecological receptors.

MRS 6 (Unknown Mortar Range) - An NDAI designation is recommended at MRS 6. Suspected 60mm and 81mm mortars were found at the MRS during the road construction activities in 1980 and 1982. It is also possible that the mortars were misidentified and actually may have been practice bombs (MK-23 or MK-43) which were known to have been used at Mitchel Field. The items were removed and no further evidence of munitions was found in these areas. No MEC or MD was observed at the MRS during the 1993 USACE site visit or during 2009 SI field event. Additionally, the majority of MRS 6 is currently either under asphalt parking lots, building footprints or other impervious surfaces. The MEC screening level risk assessment indicates that although an explosive source may be present at MRS 6 access to these items by the public would be extremely limited due to pavement, building footprints and roads. Therefore, the overall explosive hazard for MRS 6 is low. No explosives or explosive residues were detected in surface or subsurface soil samples. There were no exceedances of ecological screening values in surface or subsurface soil; therefore, no COPECs were identified. Aluminum and iron were detected at concentrations exceeding the human health screening values in surface soil only and

were selected as COPCs. Based on the WOE evaluation for the COPCs in surface soil at MRS 6, no unacceptable risks to human receptors were identified.

Neither a TCRA nor a non-TCRA is recommended at any of the MRSs (Table ES-1).

Table ES-1 Summary of Site Recommendations for Mitchel Field (FUDS Project No. C01NY064503)

MRS	Recommendation	Basis for Recommendation	
		MEC	**MC**
MRS 1 Landscape 1000-inch Range	NDAI designation TCRA/NTCRA not recommended	MEC Assessment: Low risk Historically, Small arms (CTT01) No MEC/MD observed during USACE site visit in 1993 or during the 2009 SI field work.	*Risk Screening Assessment:* No unacceptable risks to human or ecological receptors identified. **Surface Soils**. No explosives analytes were detected in surface soil samples. Iron exceeded screening criterion and background;therefore , iron is a COPC. No unacceptable risk to human receptors based on WOE. Lead exceeded ecological screening values and was identified as a COPEC in surface soil. Based on the WOE evaluation exposure to surface soil was not determined to represent unacceptable risks to biota. **Subsurface Soil.** No explosives analytes were detected in subsurface soil samples. No MCs were detected at levels exceeding the screening criteria identified for human receptors, and no COPCs were identified for subsurface soils. **Groundwater.** No explosives were detected in the groundwater sample for the MRS; therefore, no COPCs were identified at the FUDS.
MRS 2 Skeet Range	NDAI designation TCRA/NTCRA not recommended	MEC Assessment: Low risk Historically, Small arms (CTT01) No MEC/MD observed during USACE site visit in 1993 or during the 2009 SI field work.	*Risk Screening Assessment:* No unacceptable risks to human or ecological receptors identified. **Surface Soils**. No explosives analytes were detected in surface soil samples. No MCs were detected at levels exceeding the screening criteria identified for human receptors, and therefore, no COPCs were identified. Lead exceeded

Table ES-1 Summary of Site Recommendations for Mitchel Field (FUDS Project No. C01NY064503)

MRS	Recommendation	Basis for Recommendation	
		MEC	**MC**
			ecological screening values and was identified as a COPEC in surface soil. Based on the WOE evaluation exposure to surface soil was not determined to represent unacceptable risks to biota. **Subsurface Soil.** No explosives analytes were detected in subsurface soil samples. No MCs were detected at levels exceeding the screening criteria identified for human receptors, and no COPCs were identified for subsurface soils. **Groundwater.** No explosives were detected in the groundwater sample for the MRS; therefore, no COPCs were identified at the FUDS.
MRS 3 Demonstration Bombing Range	NDAI designation TCRA/NTCRA not recommended	MEC Assessment: Low risk Historically, Practice Bombs (CTT10) No MEC/MD observed during USACE site visit in 1993 or during the 2009 SI field work.	*Risk Screening Assessment:* No unacceptable risks to human or ecological receptors identified. **Surface Soils**. No explosives analytes were detected in surface soil samples. Iron exceeded screening criterion and background and is therefore a COPC. No unacceptable risk to human receptors based on WOE. Lead and zinc exceeded ecological screening levels and were identified as COPECs in surface soil. Based on the WOE evaluation exposure to surface soil was not determined to represent unacceptable risks to biota. **Subsurface Soil.** No explosives analytes were detected in subsurface soil samples. No MCs were detected at levels exceeding the screening criteria identified for human receptors, and no COPCs were identified for subsurface soils.

Table ES-1 Summary of Site Recommendations for Mitchel Field
(FUDS Project No. C01NY064503)

MRS	Recommendation	Basis for Recommendation	
		MEC	**MC**
MRS 4 Firing-in Butt	NDAI designation TCRA/NTCRA not recommended	MEC Assessment: Not evaluated in accordance with stakeholder agreements and the Final SS-WP. Historically, small arms (CTT01), practice medium caliber (CTT16), HE medium caliber (CTT17), practice large caliber (CTT21) No MEC/MD observed during USACE site visit in 1993.	*Risk Screening Assessment:* No samples were collected in accordance with stakeholder agreements during the TPP and the Final SS-WP. MRS 4 is thoroughly redeveloped (buildings, parking lots etc.) No sampling media (soil, sediment) is present at MRS 4.
MRS 5 Machine Gun Range	NDAI designation TCRA/NTCRA not recommended	MEC Assessment: Low risk Historically, Small arms (CTT01). In the 1990's Nassau County Parks and Recreation employees found an unknown quantity of shell casings near the firing point of MRS 5. The Shell casings were removed. No MEC/MD observed during USACE site visit in 1993 or during the SI field work.	*Risk Screening Assessment:* No unacceptable risks to human or ecological receptors identified. **Surface Soils**. No explosives analytes were detected in surface soil samples. Iron exceeded screening criterion and background and is therefore a COPC. No unacceptable risk to human receptors based on WOE. Lead concentrations exceeded ecological screening levels and was identified as a COPEC in surface soil. Based on the WOE evaluation exposure to surface soil was not determined to represent unacceptable risks to biota. **Subsurface Soil.** No explosives analytes were detected in subsurface soil samples. No MCs were detected at levels exceeding the screening criteria identified for human receptors, and no COPCs were identified for subsurface soils.
MRS 6 - Unknown Mortar Range	NDAI designation TCRA/NTCRA not recommended	MEC Assessment: Moderate risk Historically, the site may have been used as a mortar range; practice mortars (CTT46) and HE mortars (CTT22). Construction crews observed what were suspected to be 60mm or 81mm mortars during road construction activities in 1980 and 1982. No MEC/MD observed during USACE site visit in 1993 or during the SI field work.	*Risk Screening Assessment:* No unacceptable risks to human or ecological receptors identified. **Surface Soils**. No explosives analytes were detected in surface soil samples. Aluminum and iron exceeded screening criterion and background and are therefore COPCs. No unacceptable risk to human receptors based on WOE. No MCs were detected at levels exceeding ecological screening

Table ES-1 Summary of Site Recommendations for Mitchel Field
(FUDS Project No. C01NY064503)

MRS	Recommendation	Basis for Recommendation	
		MEC	**MC**
			criteria identified for ecological receptors, and no COPECs were identified for surface soils. **Subsurface Soil.** No explosives analytes were detected in subsurface soil samples. No MCs were detected at levels exceeding the screening criteria identified for human receptors, and no COPCs were identified for subsurface soils

COPC – Chemical of Potential Concern COPEC – Chemical of Ecological Potential Concern CTT – Closed, Transferring, and Transferred FUDS – Formerly Used Defense Site\ HE – High Explosive MC – Munitions Constituents MD – Munitions Debris MEC – munitions and explosives of concern	MRS – Munitions Response Site NDAI – No DoD Action Indicated NTCRA – Non-Time Critical Removal Action SS-WP – Site Specific Work Plan TCRA – Time Critical Removal Action TPP – Technical Project Planning WOE – Weight of Evidence

1. INTRODUCTION

1.0.1 This report documents the findings of the Military Munitions Response Program (MMRP) Site Inspection (SI) performed at the Mitchel Field Formerly Used Defense Site (FUDS) located within Garden City, Nassau County, New York with the MMRP Project No. C01NY064503. Alion Science and Technology Corporation (Alion), along with its subcontractors (Environmental Data Services, Inc. [EDS]; Integral Consulting Inc.; and GPL Laboratories, LLLP [GPL]); prepared this report under contract to the United States Army Engineering and Support Center, Huntsville (USAESCH). This work is being performed in accordance with Contract No. W912DY-04-D-0017, Task Order 00170001 for FUDS in the Northeast Region of the Continental United States. USAESCH transferred management of the contract to the Corps of Engineers North Atlantic Baltimore (CENAB). CENAB is working with Corps of Engineers North Atlantic New York District (CENAN) and its contractor, Alion, on the completion of this project in accordance with the SI Performance Work Statement (Appendix A).

1.0.2 The technical approach to this SI is based on the *Programmatic Work Plan for Formerly Used Defense Sites Military Munitions Response Program Site Inspections at Multiple Sites the Northeast Region* (Alion 2005) and the *Final Site-Specific Work Plan* (SS-WP) *Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Mitchel Field* (Alion 2009).

1.1 Project Authorization

1.1.1 The Department of Defense (DoD) has established the 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 the FUDS for the Army, as DoD's Executive Agent for the FUDS program.

1.1.2 Pursuant to USACE's Engineer Regulation 200-3-1 (USACE 2004b) and the *Management Guidance for the Defense Environmental Response Program (DERP)* (DoD 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 Section 9620), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations Part 300). As such, USACE is conducting SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

1.1.3 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 Project Scope and Objectives

1.2.1 The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under CERCLA. The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA); and (iii) collects data, as appropriate, to characterize the hazardous substance release for effective and rapid initiation of the remedial investigation/feasibility study (RI/FS). An additional objective of the MMRP SI is to collect additional data necessary to evaluate munitions response sites (MRSs) using the Munitions Response Site Prioritization Protocol (MRSPP).

1.2.2 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of this FUDS prior to property transfer. The evaluation is performed through records review, qualitative site reconnaissance to assess MEC presence/absence, and sampling where MC might be expected based on the conceptual site model (CSM). Evaluation of potential releases of hazardous, toxic, and radioactive waste (HTRW) is not within the scope of this SI.

1.3 Project Location

1.3.1 The Mitchel Field FUDS is located within Garden City, Nassau County, New York. The North American Datum 1983 zone 18N coordinates for the central part of the property are Universal Transverse Mercator (UTM) easting (X) and northing (Y) 618521.9 meters (m) and 4509239.5 m, respectively. This FUDS falls under the geographical jurisdiction of USACE New York District (CENAN). This SI is being completed under DERP-FUDS Project No. C01NY064503 to address potential MMRP hazards remaining at the FUDS (USACE 2004a).

1.4 Munitions Response Site Prioritization Protocol

1.4.1 This SI Report includes a draft MRSPP ranking which applies to MRS 1 -Landscape 1000-inch Range, MRS 2 -Skeet Range, MRS 3 - Demonstration Bombing Range, MRS 4 - Firing-in Butt, MRS 5 - Machine Gun Range and MRS 6 - Unknown Mortar Range [Appendix K]. The MRSPP scoring will be updated on an annual basis, or when necessary, to incorporate new information, as appropriate.

2. SITE DESCRIPTION

2.1 Site Description and History

2.1.1 Mitchel Field was comprised of approximately 1,436 acres in Nassau County, New York (Figure 2-1). At the time of the Revolutionary War, Mitchel Field was known as Hempstead Plains, an Army enlistment center. During the War of 1812 and the Mexican War, the property was used as an infantry training center. Mitchel Field was alternatively named Camp Black during the Spanish American War. In 1917, the property was known as Camp Mills and the land was formally leased by the Government in July as an Aeronautical General Supply Depot. In 1918, the area was renamed for Major J.P. Mitchel and became an active flying field. During the 1930's and World War II, the installation was used as a training base, training facilities included small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. The firing range and gas chamber were constructed in the southeast corner of the FUDS, the gas chambers were used to fit test soldier's gas masks. At the southwest corner of the FUDS, a pistol and machine gun range was constructed and then abandoned during runway construction. In 1938, a practice and demonstration bombing target was constructed in the center of the FUDS. A skeet range was located on the eastern side of Mitchel Field. The site was also used as a base for anti-sub patrol missions operated by Army Air Force planes. After WWII, Mitchel Field became the site for the Air Defense Command (ADC). After the Korean War, the site became an Air Force Reserve base for the 2233rd Air Reserve Flying Center, the 514th Troop Carrier Wing, as well as other Reserve organizations. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993).

2.1.2 Since the Mitchel Field was closed, the land was deeded out to different organizations such as the Hofstra University, Nassau Community College, the New Yorker Islander Coliseum, and various residential homes (USACE 1993).

2.1.3 During the operation of Mitchel Field multiple areas were used for military purposes. However, after the 1993 USACE visit to inspect and evaluate these areas for potential ordnance hazards, six areas were identified in the range inventory and designated as MRSs including MRS 1- Landscape 1000-inch Range; MRS 2- Skeet Range; MRS 3- Demonstration Bombing Range, MRS 4- Firing-in Butt, MRS 5- Machine Gun Range, and MRS 6- Unknown Mortar Range (Figure 2-2). No evidence that chemical warfare materiel was used or stored at the FUDS was found during the archives research (USACE 1993).

2.2 Munitions Response Site Identification and Munitions Information

2.2.1 The Archives Search Report (ASR) Supplement identified Landscape 1000-inch Range (MRS 1), Skeet Range (MRS 2), Demonstration Bombing Range (MRS 3), Firing-in Butt (MRS 4), Machine Gun Range (MRS 5), and Unknown Mortar Range (MRS 6) as the only areas of interest at the Mitchel Field FUDS (USACE 2004a) (Table 2-1 and Figure 2-3).

2.2.2 According to the ASR Supplement (USACE 2004a), MRS 1 is comprised of approximately 260 acres of land. MRS 2 is comprised of approximately 30 acres of land, MRS 3 is approximately 72 acres of land, MRS 4 is approximately 1043 acres of land, MRS 5 is approximately 891 acres of land and MRS 6 is approximately 3 acres of land.

2.3 Physical Setting

2.3.0.1 The following sections provide a physical description of the FUDS property with respect to relief, vegetation, and climate as well as the local demographic and land uses.

2.3.1 Topography and Vegetation

2.3.1.1 The Mitchel Field FUDS is located in an area that has a relatively even surface with occasional shallow valleys that interrupt the surface. The FUDS has elevations that range from approximately 92 feet above mean sea level (msl) in the northern portion of the site to 75 feet msl in the southern portion of the site (ESRI 2007). The regional topography is gently rolling hills with southward sloping plains (USACE 1993).

2.3.1.2 Mitchel Field has been redeveloped and the vegetation that is present is common to urban and developed settings. The area is comprised predominantly of landscaped trees, shrubs, bushes, and maintained grass (USACE 1993).

2.3.2 Climate

2.3.2.1 The Mitchel Field is in the Northeastern United States and has an average yearly rainfall of 42 inches. Tropical Storms are capable of producing heavy rain and wind in the summer and fall months. During the winter the average snowfall is about 27 inches and the majority of the snow falls between December and March caused by coastal low pressure systems. The summertime average is 72 degrees Fahrenheit (˚F), and a winter average temperature of 33 ˚F. The wind speed is highest, up to 14 miles per hour, in the spring (USACE 1993).

2.3.3 Local Demographics

2.3.3.1 Since the Mitchel Field was closed in 1961, the FUDS property was deeded out to different organizations and private land owners, including Hofstra University, Nassau Community College, the New York Islanders Coliseum, and various residential homes (USACE 1993).

2.3.3.2 Mitchel Field is located in Garden City, Nassau County, New York. The population density of Nassau County is 4,650 people per square mile (mi^2). The 2000 Census indicates that there were 1,334,544 people and 447,387 households in Nassau County, New York. The population of East Garden City is 979 people and has 275 households (U.S. Census Bureau 2000). Based on current aerial images, more than 26 inhabited structures are present within a two mile radius (Google Earth 2009).

2.3.4 Current and Future Land Use

2.3.4.1 The Mitchel Field FUDS is heavily developed and used for a variety of purposes (i.e., commercial, industrial, educational, residential and recreational uses). The primary stakeholders are Hofstra University, Nassau Community College, the New York Islanders Coliseum, various residential homes in the eastern portion of the FUDS, and the Mitchel Sports Complex for amateur athletics. The property is also used for highway/parkway and the rest is open to public access (USACE 1993). During the TPP meeting, stakeholders brought to Alion's attention that there would be further development at Nassau Community College. The development would include a science building to be constructed in the northern portion of the campus (Alion 2008).

2.3.5 Geologic Setting

2.3.5.1 The entire FUDS is located within the glaciated part of the Atlantic Coastal Plain physiographic province. There are two terminal moraines located north of Mitchel Field. South of the moraines topography is characteristic of a glacial outwash plain. The outwash plain slopes gently to the south towards the Atlantic Ocean. The area is underlain by crystalline bedrock that dips in a southeastern direction. Late Cretaceous and Pleistocene sands, gravels, and clays (glacial deposits) cover the bedrock and have a combined thickness of approximately 1700 feet (ft.). The oldest unit overlying the local bedrock is the Lloyd Sand, a member of the Raritan formation, which is composed of gray and white sand and gravel ranging in size from fine to coarse. The Lloyd sand unit increases in thickness to the southeast from 150 ft. to 300 ft. Overlying the Lloyd sand is a clay member of the Raritan Formation. The clay member consists of silt and clay and in some parts sand, sandy clay, and sand and gravel. The consistency of the clay varies within the member. The thickness of the clay member near Long Island Sound is

approximately 100 ft. and increases to 300 ft. along the southern coast of Long Island. The Magothy Formation is Late Cretaceous in age and is composed of alternating beds of sand and clay. The sand is predominantly gray or tan, fine to medium grained quartz particles. The clays are white, shades of gray, yellow, tan or black and composed of predominantly muscovite and quartz. The Magothy Formation overlies the sand and clay members of the Raritan Formation and is increasingly thicker towards the southeast. The Late Cretaceous Magothy Formation is a non-marine sequence of complexly intercalated beds and lenses of sand and clay. The quartzes sands are typically gray or tan and fine to medium grained. The clay units are white, light and dark gray, yellow, tan or black in color. Upper Pleistocene deposits unconformably overlie the Magothy Formation and thicken to the north to a maximum thickens of 120 ft. The Pleistocene deposits are predominantly stratified sand and gravel deposited as glacial outwash. The outwash is yellow, brown, and gray; the sand and gravel consist of mainly iron-stained quartz (USACE 1993).

2.3.5.2 The surface soil in many places has been covered or reworked by development and buildings and is now considered urban land by the U.S. Department of Agriculture (USDA) soil survey. The soils located at the SI sampling locations are from two units, the Hempstead silt loam and the Mineola complex. The Hempstead silt loam was derived from a silty mantle overlying highly siliceous stratified sandy and gravelly glaciofluvial deposits. The typical soil profile is silt loam from 0 to 29 inches (in.), very gravelly loamy sand from 29 to 33 in., and stratified very gravelly sand from 33 to 60 in. The Hempstead soil is well-drained with no flooding or ponding frequency. The available water capacity is moderate (approximately 7.7 in) and the depth to the water table is more than 80 in. The Mineola complex soil was derived from a similar parent material as the Hempstead soil, but with greater loam content. The typical profile is sandy loam from the surface to 11 in., very gravelly loamy sand from 11 to 18 in., and stratified very gravelly sand from 18 to 60 in. The soil is moderately well drained with no frequency of flooding or ponding. The available water capacity is low (~3.4 in.) and the depth to the water table is approximately 24 to 48 in. (USACE 1993 and USDA 2008).

2.3.6 Hydrogeologic Setting

2.3.6.1 There are two terminal moraines north of the FUDS. South of the moraines, outwash plains slope south to tidal marshes, mud flats and partly interconnected shallow bays. Streams drain the area and carry runoff to the estuaries of the south shore. The permanent streams in the area are Valley Stream, Mill River, East Meadow Brook, Bellmore Creek, Massapequa Creek, Hook Creek, Motts Creek, Powel Creek, and Seafood Creek (USACE 1993).

2.3.6.2 The groundwater at Mitchel Field moves through different geological units composed of unconsolidated gravel, clay, and sand from the Late Cretaceous and Pleistocene age. The underlying crystalline basement rocks typically do not act as aquifers. Downward leaking from confined water in the northern parts of the area and underflow from the north recharge deep artesian aquifers in the area (USACE 1993). Depth to groundwater in the FUDS vicinity ranges from 25 feet to 35 ft. below ground surface (USGS 2000).

2.3.7 Area Water Supply/Groundwater Use

2.3.7.1 The entire FUDS property lies over both the Upper Glacial aquifer and Magothy aquifer (USGS 1982). The Upper Glacial aquifer is not known to be used as a potable water supply in the vicinity of the Mitchel Field FUDS. The main water source for human consumption is extracted from the deep Magothy aquifer (Alion 2008). The location of drinking water supply wells is not publically available information in New York State.

2.3.8 Sensitive Environments

2.3.8.0.1 The following subsections discuss the sensitive environments associated with the FUDS and the process used to determine the necessity for completing an ecological risk assessment at the FUDS.

2.3.8.1 Army Checklist for Important Ecological Places

2.3.8.1.1 In accordance with USACE guidance, the Army Checklist for Important Ecological Places (USACE 2006 and 2007a) is completed (Table 2-3) to determine if a FUDS requires a screening-level ecological risk assessment. In the case of the former Mitchel Field, the property contains wetland areas and is not located within the New York Coastal Zone. According to the ASR and threatened and endangered species consultation responses, the habitat for or the presence of federally rare, threatened, or endangered species may be present in the vicinity of the former Mitchel Field (NYSDEC 2009).

2.3.8.2 Wetlands

2.3.8.2.1 According to the U.S. Department of the Interior there is a small freshwater forested/shrub wetland present on the eastern portion of the Mitchel Field FUDS within the eastern portion of MRS 1 and MRS 5 (USFWS 1998). The field sampling activities proposed during this SI were considered to be minimally intrusive in nature and had no impact on the wetland areas at Mitchel Field.

2.3.8.3 Coastal Zones

2.3.8.3.1 The former Mitchel Field is not situated within the New York Coastal Zone. The FUDS is located approximately five miles from the coast and not within the 1,000 foot inland coastal zone boundary (NOAA 2009).

2.4 Previous Investigations for Munitions Constituents and Munitions and Explosives of Concern

2.4.0.1 A summary of previous historical investigations and related discoveries of MC and MEC is provided in the following subsections.

2.4.1 Inventory Project Report

2.4.1.1 USACE issued the Inventory Project Report (INPR) for the Mitchel Field FUDS in 1992. The INPR demonstrated that the present condition of the project site was the result of prior DoD ownership, utilization, or activity. Moreover, the INPR determined that an environmental restoration project is an appropriate undertaking within the purview of the DERP for FUDS.

2.4.2 Archives Search Report (ASR)

2.4.2.1 The USACE St. Louis District prepared the Archives Search Report (ASR) Findings for Mitchel Field FUDS in October 1993. The ASR investigation included previous investigations at the site, property description and physical characteristics of the site, the historical property ownership summary, an evaluation of ordnance presence at the site, property MEC/ Recovered Chemical Warfare Materiel (RCWM) technical data, and recommendations. Also included in this report were interviews that commented on munitions related incidents or finds reported at Mitchel Field. An interview with Mr. John Waltz, Acting Commissioner of Public Works for Nassau County, indicated that munitions were found since the closure of Mitchel Field. He mentioned that there was a rumor that in 1960s some unidentified bombs were found during campus construction though there is no documentation to confirm this find (USACE 1993).

2.4.2.2 During the 1930's and 1940's, chemical warfare simulants were shipped and used for training purposes at Mitchel Field, the materials used were chemical weapon simulants such as chloroacetophenone (CN) tear gas grenades, gas identification kits, sulfur trioxide-chlorsulfonic acid mixture (FS) smoke agents, smoke pots, smoke producing materials (petroleum wax) and irritant smoke used for gas training exercises. Consistent with current USACE guidance (DA 2009), and as noted below (Section 2.4.2.3), these latter materials are not considered chemical warfare materiel (CWM). These materials were dispersed and/or expended during training

exercises. Excess material would have been shipped off base to an appropriate facility for disposal. There is nothing in the records that would indicate any CWM contamination of the FUDS from any of the operations conducted at the Mitchel Field FUDS (USACE 1993).

2.4.2.3 A clarification of the definition has recently been promulgated by the USACE. CWM is defined as an item configured as a munitions item containing a substance that is intended to kill, seriously injure or incapacitate a person through its physiological effects. CWM also includes V- and G- series nerve agent. Due to their hazards, prevalence, and military-unique application, chemical agent identification sets (CAIS) are also considered CWM. CWM does not include riot control agents, chemical herbicides, smoke and flame producing items; or soil, water, debris or other media contaminated with chemical agent (DA 2009).

2.4.2.4 Unsubstantiated reports indicate that between 1980 and 1982 four suspected mortars were found at Mitchel Field; three 81mm mortar shells and one 60mm mortar round all believed to be inert (USACE 1993). According to the ASR Supplement the mortar rounds may have been misidentified and may have been be 3-lb miniature practice bombs (USACE 2004a). Small practice bombs such as MK-23 and MK-43 were known to have been used at the Demonstration Bombing Range (MRS 3).

2.4.3 2004 Archive Search Report Supplement

2.4.3.1 The ASR Supplement was prepared for the FUDS in 2004 (USACE 2004a). RAC score indicates the level of ME risk associated with the area. RAC scores range from 1, being the highest category of risk, to 5, being the lowest. The ASR Supplement designated six MRSs including the Landscape 1000-inch Range, Skeet Range, Demonstration Bombing Range, Firing-in Butt, Machine Gun Range, and Unknown Mortar Range. MRS 1 – the Landscape 1000-inch Range has a RAC score of 5; MRS 2 – Skeet Range has a RAC score of 5; MRS 3 – Demonstration Bombing Range has a RAC score of 4; MRS 4 – Firing-in Butt has a RAC score of 3; MRS 5 – Machine Gun Range has a RAC score of 5, and MRS 6 – Unknown Mortar Range has a RAC score of 3 (USACE 2004a). A RAC score of 3 was assigned to the Mitchel Field FUDS. The ASR Supplement also provided information on munitions found between 1980 and 1982 while the area was being developed. Four suspected mortars were found at the Mitchel Field FUDS; three 81mm mortar shell and one 60mm mortar round (inert) (USACE 1993). According to the ASR Supplement the munitions may have been misidentified as mortars and were actually 3-lb. miniature practice bombs (USACE 2004a).

2.5 Citizen Reports of Munitions and Explosives of Concern

2.5.1 As discussed in Sections 2.4.2 and 2.4.3, since military use of the FUDS ceased, a limited number of munitions related objects have been observed at the FUDS including suspected practice bombs in the 1960's, suspected 60mm to 81mm mortars in the early 1980's and shell casings in the mid 1990's. There is the possibility that the 60mm and 81mm mortars were misidentified (USACE 2004a). Physical similarities exist between the 60mm and 81mm mortars and the 3-lb MK-23 or MK-43 practice bombs. The dimensions, specifically the length, of the MK-23 and MK-43 practice bombs are similar to that of the mortars. No MEC or MD was observed during the 1993 USACE ASR site visit or during the 2009 SI field activities.

2.6 Non-Department of Defense Contamination

2.6.1 There is no evidence, based on historical review and stakeholder comments, of activities occurring prior to or after DoD use of the area which would contribute to potential MEC, MD, or MC presence.(USACE 1993 and Alion 2008).

Table 2-1. Range Inventory (USACE 2004a)				
Site Name	**Range Name**	**RMIS Range Number**	**RAC Score**	**Acreage**
Mitchel Field	MRS 1 – Landscape 1000-inch Range	C02NY064503R01	5	260
	MRS 2 – Skeet Range	C02NY064503R02	5	30
	MRS 3 – Demonstration Bombing Range	C02NY064503R03	4	72
	MRS 4 – Firing-in Butt	C02NY064503R04	3	1043
	MRS 5 – Machine Gun Range	C02NY064503R05	5	891
	MRS 6 – Unknown Mortar Range	C02NY064503R06	3	3

MRS = Munitions Response Site
RMIS = Range Management Information System
RAC = Risk Assessment Code Score. The RAC allows a score of 1 (highest risk) to 5 (lowest risk).

Table 2-2. Military Munitions Type and Composition (USACE 1993 and other sources)

Range ID (MRS)/ Sub-range	Munitions ID	Munitions Type	Composition (explosives and metallic components)	Associated MC Analysis
MRS 1- Landscape 1000-inch Range	Small Arms (CTT01)	Small Arms, General (.22 and .50 caliber)	***Projectile:*** Small arms and .50 caliber (ball): lead, antimony, cupro-nickel, and soft steel (iron) ***Propellant:*** Single- or double-base smokeless powder (nitrocellulose[2], nitroglycerine [NG], dinitrotoluene [DNT], potassium sulfate, graphite) ***Tracer (unlikely to have been used):*** strontium nitrate, potassium perchlorate, calcium resinate, strontium oxalate, magnesium	Explosives: - DNT[1] - NG Metals: - Antimony - Copper - Iron[5] - Lead - Nickel Note: The MRS 1 area has been partially redeveloped; therefore, it is impossible to distinguish the firing point and impact area. As a conservative measure, metals and explosives will be analyzed for in all samples
MRS 2 – Skeet Range	Small Arms (CTT01)	Small Arms, General	***Projectile:*** Lead-antimony shot or lead shot ***Propellant:*** Single- or double-base smokeless powder (nitrocellulose[2], NG, DNT, potassium sulfate, graphite) ***Primer***[3]***:*** Lead Styphnate, barium nitrate, antimony sulfide, aluminum powder, PETN, tetracene	Explosives: - DNT[1] - NG Metals: - Antimony - Lead Note: The skeet range area has most likely been re-graded; therefore, it is impossible to distinguish the firing point and impact area. As a conservative measure, metals and explosives will be analyzed for in all samples.

MRS 3 – Demonstration Bombing Range	Bomb, Practice (CTT10)	AN-MK 5, AN-MK 23, AN-MK 43	***Body:*** AN-MK 43 lead-antimony alloy; AN-MK 23- cast iron; AN-MK 5 zinc alloy with steel ***Filler:*** none ***Signal:*** 3 grams black powder[4] (sodium nitrate or potassium nitrate plus charcoal and sulfur) or 3 grams smokeless powder (nitrocellulose[2], NG, DNT, potassium sulfate, graphite)	Explosives: - DNT[1] - NG Metals: - Antimony - Iron [5] - Lead - Zinc
MRS 4 – Firing-in Butt	Small Arms (CTT01)	.50 Caliber Machine Gun, Small Arms General	***Projectile:*** .50 cal: Lead, antimony, cupro-nickel, and soft steel (iron) ***Propellant:*** Single or double-base smokeless powder (nitrocellulose[2], NG, DNT, potassium sulfate, graphite) ***Tracer (Not likely to have been used at a Firing-In Butt):*** Magnesium-aluminum alloy, potassium perchlorate, calcium resinate	Note: As discussed during the TPP meeting, the land in vicinity of MRS 4 is completely developed and the land is either currently in the footprint of a building or under a paved parking lot. Per stakeholder agreement, no samples will be collected at MRS 4 due to the absence of sample media (e.g., soil). Additionally, historically there have not been any munitions finds at MRS 4. Explosive (Firing Point): - DNT[1] - NG Metals (Impact Area): - Antimony[5] - Iron[5] - Lead - Nickel
	Medium Caliber (20mm, 25mm, 30mm), HE (CTT16)	20mm HEI, MKI	***Projectile:*** Steel (no HE filler when used at Firing-in Butt range) ***Propellant:*** IMR 4895 (Nitrocellulose smokeless powder); nitrocellulose[2], DNT, diphenylamine, potassium sulfate, graphite ***Primer[3]:*** Potassium chlorate, lead thiocyanate, antimony sulfide, PETN	
	Medium Caliber (20mm, 25mm, 30mm), Practice (CTT17)	20mm, Ball, MKI	***Projectile:*** Steel (iron and carbon) ***Propellant:*** IMR 4895 (Nitrocellulose smokeless powder); nitrocellulose[2], DNT, diphenylamine, potassium sulfate, graphite ***Primer[3]:*** Potassium chlorate, lead thiocyanate, antimony sulfide, PETN	
	Large Caliber (37mm and larger), practice (CTT21)	37mm, TP, M63	***Projectile:*** Steel ***Propellant:*** Nitrocellulose[2], NG, barium nitrate, potassium nitrate, ethyl centralite, graphite or flashless non-hygroscopic (FNH) nitrocellulose ***Primer[3]:*** Potassium chlorate, lead thiocyanate, TNT, antimony sulfide, gum solution, black powder (sodium nitrate or potassium nitrate plus charcoal and sulfur)	

MRS 5 – Machine Gun Range	Small Arms (CTT01)	Small Arms, General	***Projectile:*** Small arms and .50 caliber (ball): Lead, antimony, cupro-nickel, and soft steel (iron) ***Propellant:*** Single or double-base powders (nitrocellulose[2], NG, DNT, potassium sulfate, graphite) ***Tracer (unlikely to have been used):*** strontium nitrate, potassium perchlorate, calcium resinate, strontium oxalate, magnesium	Explosives: - DNT[1] - NG Metals: - Antimony - Copper - Lead - Iron[5] - Nickel Note: The area around MRS 5 has been re-graded and redeveloped into an athletic field. Therefore, the firing point and impact area can not be identified. As a conservative measure, metals and explosives will be analyzed at all sample locations.
MRS 6 - Unknown Mortar Range	Mortars HE (CTT22) Practice Ordnance (without spotting charges) (CTT46)	60mm, 81mm, HE, M49, M43 60mm, Training, M69	***Body:*** Aluminum and Steel ***Filler:*** 60mm (TNT), 81mm (TNT)- unlikely to have been used due to training nature of facility. Most likely practice (sand or inert filler) ***Booster:*** Tetryl ***Propellant:*** 60 mm and 81mm (nitrocellulose[2], NG, diethylphhalate, potassium nitrate, ethyl centralite) ***Practice Spotting Charges:*** 60mm/81mm black powder (sodium nitrate or potassium nitrate, charcoal and sulfur) and/or possibly NG, DNT.	Noted: As discussed during the TPP meeting as well as in Section 2.6.1, the munitions finds at MRS 6 are presumed to have been misidentified as mortars and likely to have been practice bombs (MK-23 or MK-43). Furthermore, mortars were not known to have been used at Mitchel Field. Explosives: - NG - DNT[1] Metals: - Aluminum - Iron[5]

AN= Army and Navy CTT=Closed, Transferring, and Transferred DNT=dinitrotoluene FNH= flashless non-hygroscopic HE = High Explosive IMR= Improved Military Rifle MC= Munitions Constituents MK=Mark	M=Model MRS=Munitions Response Site NG = nitroglycerine PETN= Pentaerythritol tetranitrate Tetryl = Methyl-2,4,6-trinitrophenylnitramine TNT = Trinitrotoluene TP = Training Practice

[1] DNT Breakdown products include: 2,4- and 2,6-dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2- and 3-nitrotoluene; 4-Amno-2,6-dinitrotoluene; 4-nitrotoluene.

[2] Simple single-based nitrocellulose readily breaks down in the environment and is not expected to persist while more complex nitrocellulose may persist longer in the environment (Journal of Waste Management 1994). Nitrocellulose is not considered toxic, and consequently no risk-based screening values have been developed for the compound. Furthermore, there are no chemical analysis techniques that quantify nitrocellulose separately from the natural common essential nutrient nitrate. Based on this rationale, no sampling for nitrocellulose was conducted during the SI .

[3] Primer comprises 5% or less of the total ammunition weight, also it is combusted when fired and expended while in flight. MC related to the primer was not analyzed in soil samples.

[4] Black powder is a rapidly burning material that, when fired, leaves little residue as either decomposition products or un-combusted compounds and the constituents of black powder are not expected to persist in the environment above background concentrations for a significant period of time after initial exposure. Black powder is not anticipated to be present or detected after the operations ceased over 50 years ago, therefore, no constituents of black powder were analyzed. (Interstate Technology and Regulatory Council [ITRC] 2003).

[5] Chemicals that are not CERCLA hazardous substances (e.g., aluminum, barium, iron) can be reported in the SI; however, the SI risk evaluation and conclusions will include a discussion of the limitations of the FUDS program to respond to such chemicals. Non-CERCLA chemical concentrations will not provide the basis for a RI/FS recommendation for MC in the SI report.

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
1.	Locally important ecological place identified by the Integrated Natural Resource Management Plan, Base Realignment and Closure Act Cleanup Plan or Redevelopment Plan, or other official land management plans.		No	
2.	Critical habitat for Federally designated endangered or threatened species. See No. 12 below.		No	There is no evidence of critical habitat for federally endangered and/or threatened species within the Mitchel Field FUDS (Appendix L T&E Letters).
3.	Marine Sanctuary		No	
4.	National Park		No	
5.	Designated Federal Wilderness Area		No	
6.	Areas identified under the Coastal Zone Management Act		No	Mitchel Field is located five miles from the coast and is outside the 1,000 foot Coastal Zone Boundary (NOAA 2009).
7.	Sensitive Areas identified under the National Estuary Program or Near Coastal Waters Program		No	
8.	Critical areas identified under the Clean Lakes Program		No	
9.	National Monument		No	
10.	National Seashore Recreational Area		No	
11.	National Lakeshore Recreational Area		No	
12.	Habitat known to be used by Federally designated or proposed endangered or threatened species	Yes		A single Federally listed species (sandplain gerardia) may be present within or in the vicinity of the Mitchel Field FUDS (Appendix L T&E Letters).
13.	National preserve		No	
14.	National or State Wildlife Refuge		No	
15.	Unit of Coastal Barrier Resources System		No	
16.	Coastal Barrier (undeveloped)		No	
17.	Federal land designated for protection of natural ecosystems		No	

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
18.	Administratively Proposed Federal Wilderness Area		No	
19.	Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters		No	
20.	Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time		No	
21.	Terrestrial areas utilized for breeding by large or dense aggregations of animals		No	
22.	National river reach designated as Recreational		No	
23.	Habitat known to be used by state designated endangered or threatened species	Yes		There are several state listed sensitive plant and animal species within Mitchel Field FUDS (Appendix L, T&E response letters).
24.	Habitat known to be used by species under review as to its Federal endangered or threatened status		No	
25.	Coastal Barrier (partially developed)		No	
26.	Federally designated Scenic or Wild River		No	
27.	State land designated for wildlife or game management		No	
28.	State-designated Scenic or Wild River		No	
29.	State-designated Natural Areas		No	
30.	Particular areas, relatively small in size, important to maintenance of unique biotic communities		No	
31.	State-designated areas for protection or maintenance of aquatic life		No	
32.	Wetlands	Yes		Wetlands have been identified within the Mitchel Field FUDS boundary (USFWS 1998, Figure 2-4).
33.	Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes		No	

Mitchel Field

Garden City, New York
Nassau County

Legend

FUDS Boundary

Imagery Source: NYS
GIS Clearinghouse (2004)

N
W E
S

Feet
0 750 1,500 3,000

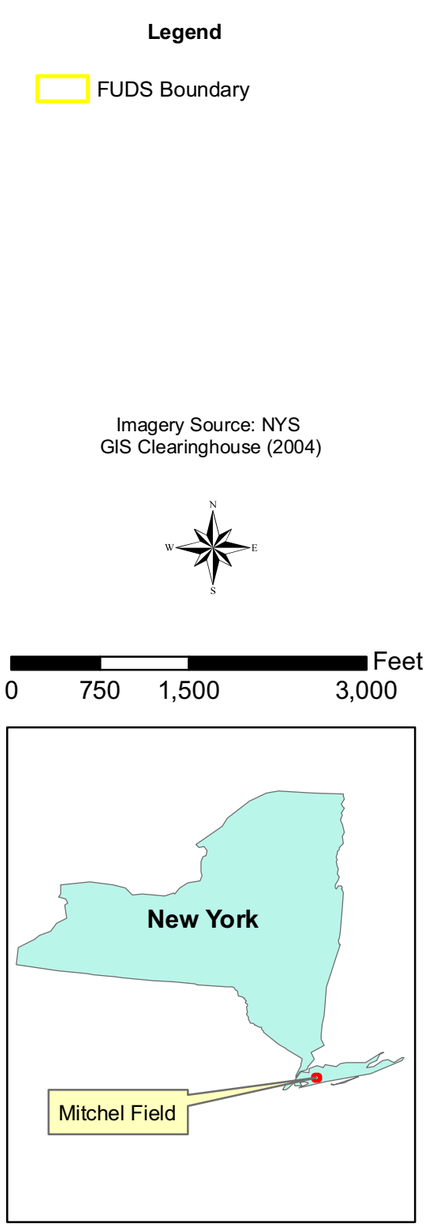

Figure 2-1. Historic Site Layout

Mitchel Field

Garden City, New York
Nassau County

Legend

- MRS 1 - Landscape 1000"
- MRS 2 - Skeet Range
- MRS 3 - Demonstration Bombing Range
- MRS 4 - Firing-in Butt
- MRS 5 - Machine Gun Range
- MRS 6 - Approximate Location of 60mm or 81mm Mortar Find
- FUDS Boundary

Imagery Source: NYS GIS Clearinghouse (2004)

N
W E
S

0 750 1,500 3,000 Feet

Figure 2-2. Munitions Response Site Boundary and Impact Areas

Figure 2-3. General Site Location and Impact Area

Mitchel Field

Garden City, New York
Nassau County

Legend

- MRS 1 - Landscape 1000"
- MRS 2 - Skeet Range
- MRS 3 - Demonstration Bombing Range
- MRS 4 - Firing-in Butt
- MRS 5 - Machine Gun Range
- MRS 6 - Approximate Location of 60mm or 81mm Mortar Find
- FUDS Boundary
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Other

Imagery Source: ESRI
NGS Topo US 2D

Wetland Information: United States Department of Interior - Fish and Wildlife Service (1998)

0 800 1,600 3,200 Feet

Figure 2-4. Site Location, Topography and Wetlands.

3. SITE INSPECTION ACTIVITIES

3.1 Technical Project Planning

3.1.1 The first TPP Meeting for Mitchel Field was conducted on 17 July 2008 at Nassau Community College, Garden City, Nassau County, New York. The Final TPP Memorandum documenting the meeting was issued in August 2008 (Alion 2008). The meeting participants included representatives from the New York State Department of Environmental Conservation, USACE New York District, USACE Baltimore, Nassau County Parks and Recreation, Nassau County Department of Health, Nassau Community College, Cradle of Aviation Museum, Hofstra University, Nassau Coliseum, and Alion Science and Technology participated in this meeting. The participants in the TPP meeting discussed the results of previous investigations, historical aerial photographs, the CSM, and Data Quality Objectives (DQOs). The second TPP meeting was held on 16 December 2009 via conference call.

3.1.2 **DQO 1 – Determine if the site requires additional investigation through an RI/FS or if the site may be recommended for No DoD Action Indicated (NDAI) designation based on the presence or absence of MEC and MC.** The basis of an RI/FS recommendation, detailed in the DQO of Appendix B, includes evaluation of all evidence (e.g., historic data, field data, etc.), such as the data noted below, to make a final decision for an NDAI designation or RI/FS recommendation (e.g., presence of MD alone will not justify an RI/FS recommendation)

- Historic data that indicate the presence of MEC or MD
- Visual evidence or anomalies which are classified as MEC or MD
- One or more anomalies in a target area near historic or current MEC/MD finds or within an impact crater
- Physical evidence indicating the presence of MEC (e.g., distressed vegetation, stained soil, ground scarring, bomb craters, burial pits)

3.1.2.1 The basis for an RI/FS recommendation related to the presence/absence of MC includes:

- Maximum concentrations at the FUDS exceed USEPA Regional Screening Values based on current and future land use.

- Maximum concentrations at the FUDS exceed USEPA interim ecological risk screening values.

- Maximum concentrations at the FUDS exceed site-specific background levels.

- Data indicating the presence or absence (less than Method Detection Limits [MDL] for metals and less than the Reporting Limit [RL] for explosives)[1] of analytes for which no screening criteria are available are to be used to support the weight-of-evidence (WOE) evaluation of MC at the FUDS.

3.1.2.2 In each of these instances, all lines of evidence (e.g., historic data, field data) are to be used to make a final recommendation for a NDAI designation or RI/FS. If none of the above scenarios occur, then the recommendation for NDAI designation for MEC/MC is a possible option.

3.1.3 **DQO 2 – Determine the potential need for a Time Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.** The basis for recommendations is specified below:

- A TCRA **–** If there is a complete pathway between source and receptor and the MEC/MC and the situation are viewed as an imminent danger posed by the release or threat of a release. Cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment.

- A non-TCRA (NTCRA) – If a release or threat of release that poses a risk where more than six months planning time is available.

[1] Future SI Reports (i.e., all FUDS in FY 09 and beyond) will report non-detections to the RL for both metals and explosives.

3.1.3.1 In each of these instances, all lines of evidence (e.g., historic data, field data) are to be used to make a final recommendation for a TCRA or NTCRA.

3.1.4 **DQO 3 – Collect or develop additional data, as appropriate, to support potential Hazard Ranking System scoring by USEPA.**

- Verification that data were collected in accordance with the Final SS-WP in the SI Report.

3.1.5 **DQO 4 – Collect the additional data necessary to complete the MRSPP.**

- Completion of the MRSPP for the MRS with all available data and documentation of any data gaps for future annual MRSPP updates.

3.1.6 The TPP meeting participants concurred with the DQOs and the general technical approach for the planned SI activities discussed during the TPP and as revised and subsequently documented in the Final SS-WP (Alion 2009). In summary, these agreements were to inspect the cited areas of concern and conduct sampling in accordance with the Final SS-WP and complete the assessment in accordance with the DQOs (Appendix B). As part of this SI Report, Alion evaluated the DQOs presented in the SS-WP (Alion 2009) and completed a DQO attainment verification worksheet to document completion of the DQOs (Appendix B).

3.2 Supplemental Records Review

3.2.0.1 State agencies were contacted regarding threatened and endangered species and cultural and ecological resources at the FUDS property.

3.2.1 Threatened and Endangered Species

3.2.1.1 One threatened or endangered (T&E) species may be present within the vicinity of the Mitchel Field FUDS. According T&E consultation letter response from the United States Fish and Wildlife Service (USFWS) the sandplain gerardia (*Agalinis acuta*) is the only federally listed species potentially present at the FUDS. Additionally the New York State Department of Environmental Conservation (NYSDEC) Division of Fish, Wildlife and Marine Resources were contacted and responded that there are numerous state listed sensitive species that are reported to exist within or in the vicinity of the FUDS including, but not limited to green milkweed (*Asclepias viridiflora*), flax-leaf whitetop (*Aster solidagineus*), Midland sedge (*Carex*

mesochorea) and field-dodder (*Cuscuta oentaeona*) as documented in the response letter provided in Appendix L of this SI Report (NYSDEC 2009).

3.2.2 Cultural and Archaeological Resources

3.2.2.1 There is little information in the ASR Findings regarding cultural or archaeological resources for the Mitchel Field FUDS property (USACE 1993). USACE/Alion consulted with the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) to ensure cultural, archaeological and water resources were not present at the Mitchel Field FUDS and/or would not be disturbed during field activities. No adjustments were required to the sampling design to avoid impacts with cultural resources (Appendix L, Section 106 Consultation Letters).

3.3 Site Inspection Fieldwork

3.3.1 Site Inspection Munitions and Explosives of Concern Field Observation

3.3.1.1 On 18 an 19 May 2009, the Alion field team visited the Mitchel Field FUDS to conduct SI field activities in accordance with the Programmatic Work Plan and the Final SS-WP (Alion 2005 and 2009). A qualitative magnetometer-assisted site reconnaissance for MEC and sample collection and analysis for possible MC contamination was completed. An estimated 2.94 acres of land were assessed using visual and qualitative reconnaissance during the field work. A total of 14 surface soil samples, 14 subsurface soil samples and two groundwater samples were collected. In addition, five background surface soil samples were collected (photos E.1 and E.2).

3.3.1.2 **MRS 1 – Landscape 1000-inch Range:** The Landscape 1000-inch Range (MRS 1) encompasses approximately 260 acres. The MRS has been redeveloped into roads and parks. Field activity was conducted at the suspected firing point of the range. Alion completed land reconnaissance of MRS 1 using a meandering path and used a ferrous metal geophysics detector (Schonstedt) at sample locations. Site reconnaissance findings are shown on Figure 3-1. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2 (photo E.14). Area observations are presented below.

- The majority of the MRS is easily accessible by the public on foot or by car. The western portion of MRS 1 is Meadowbrook State Parkway and the eastern portion of the MRS is a county park that is open to the public.
- No evidence of the former Landscape 1000-inch Range was observed during the field investigation.

- No surface or subsurface anomalies were detected.
- No MEC, MD, range-related debris was observed; however, cultural debris was identified.

3.3.1.3 **MRS 2 – Skeet Range:** The Skeet Range (MRS 2) encompasses approximately 30 acres of land. The MRS has been partially redeveloped though the majority of the MRS is an open field. Alion completed land reconnaissance of MRS 2 using a ferrous metal geophysics detector (Schonstedt) following a meandering path where possible due to terrain. Site reconnaissance findings are shown on Figure 3-1. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2 (photos E.3, E.4 and E.5). Area observations are presented below.

- This area is accessible by land via a paved road, James Doolittle Boulevard. The eastern portion of the MRS is fenced in with a locked gate; however, the eastern portion of the fence near the former firing point is poorly maintained.
- Vegetation occupies the majority of the MRS and there is a paved road in the northern part of the MRS.
- Two subsurface anomalies were detected in the southern portion of the MRS.
- No MEC, MD, or range-related debris was observed.

3.3.1.4 **MRS 3 – Demonstration Bombing Range:** The Demonstration Bombing Range (MRS 3) encompasses approximately 72 acres. The MRS has been redeveloped into parking lots and buildings for Nassau Community College. Alion completed land reconnaissance of MRS 3 using a ferrous metal geophysics detector (Schonstedt) following a meandering path where possible due to terrain. Site reconnaissance findings are shown on Figure 3-1. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2 (photos E.7 and E.8). Area observations are presented below.

- This area is easily accessible by the public on foot or by car. The northern portion of the MRS is a Nassau Community College parking lot and in the southern and eastern portions of the MRS there are some vegetative areas.
- Five subsurface anomalies were detected.
- Cultural debris (cans, trash, small appliances) was observed throughout the MRS.
- No MEC, MD or range-related debris was observed.

3.3.1.5 **MRS 4 – Firing-in Butt:** The Firing-in Butt (MRS 4) encompasses approximately 1,043 acres. According to the agreements reached at the TPP meeting and the SS-WP Alion did not

sample and did not completed land reconnaissance of MRS 4 since the area is completely redeveloped. MRS 4 was redeveloped into residential properties and the northern portion, the historical firing point has been redeveloped into buildings and parking lots.

3.3.1.6 **MRS 5 – Machine Gun Range:** The Machine Gun Range (MRS 5) encompasses approximately 891 acres. Majority of MRS 5 has been redeveloped into residential properties and the rest is part of Hofstra University campus. Field activities were conducted at the suspected firing point at the northwest corner of the site, on Hofstra University athletic fields. Alion completed land reconnaissance of MRS 5 using a ferrous metal geophysics detector (Schonstedt) following a meandering path where possible due to terrain. Site reconnaissance findings are shown on Figure 3-1. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2 (photos E.9 and E.10). Area observations are presented below.

- The firing area is easily accessible by the public by foot or by car. Northern portion is University fields, parking lots and buildings and the southern part of the MRS is residential houses.
- No surface or subsurface anomalies were detected.
- No MEC, MD or range-related debris were observed.

3.3.1.7 **MRS 6 – Unknown Mortar Range:** The Unknown Mortar Range (MRS 6) encompasses approximately 3 acres. The MRS is divided into four individual areas, three in the western part of the FUDS and one in the eastern portion. Field activity occurred in two areas within MRS 4 that have not been fully redeveloped or paved. Alion completed land reconnaissance of MRS 6 using a ferrous metal geophysics detector (Schonstedt) following a meandering path where possible due to terrain. Site reconnaissance findings are shown on Figure 3-1. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2 (photos E.11, E.12, and E13). Area observations are presented below.

- There are four separate mortar ranges that make up MRS 6. All of the four areas are easily accessible by paved roads. The Unknown Mortar Range in the southeastern portion of the FUDS is fenced in. Access to the remaining three areas is not restricted though the majority of two of the four areas (northern and eastern) are paved over or developed.
- Surface or subsurface anomalies were detected.
- No MEC, MD or range-related debris was observed.

3.3.2 Site Inspection Munitions Constituents Samples Collected

3.3.2.1 A total of 14 surface soil samples, 14 subsurface soil samples, and two groundwater samples were collected. Additionally to these samples, five background samples were collected; however, two out of the five samples were mishandled by the laboratory and were not analyzed. Only three of the proposed five background samples were analyzed.

3.3.2.2 **MRS 1 – Landscape 1000-inch Range:** A total of two surface soil samples and two subsurface soil samples were collected successfully at MRS 1. All of the samples were collected at the suspected firing point. One groundwater sample was collected from an existing monitoring well within MRS 1, but was collected to represent the overall FUDS site groundwater.

3.3.2.3 **MRS 2 – Skeet Range:** A total of four surface soil samples and four subsurface soil samples were collected successfully at MRS 2. The samples were collected on the eastern side of the MRS. Two of the surface soil samples and two of the subsurface soil samples were collected in front of the firing point and the other samples were collected in the south-eastern corner of the MRS. One groundwater sample was collected from an existing monitoring well adjacent to MRS 2, but was collected to represent the overall FUDS site groundwater.

3.3.2.4 **MRS 3 – Demonstration Bombing Range:** A total of three surface soil samples and three subsurface soil samples were collected successfully at MRS 3. The six soil samples were collected in the southeastern portion of the MRS, the rest of the MRS has been redeveloped into parking lots and buildings.

3.3.2.5 **MRS 5 – Machine Gun Range:** A total of three surface soil samples and three subsurface soil samples were collected successfully at MRS 5. All of the samples were collected at the suspected firing point in the northwest portion of the MRS, at the Hofstra University athletic fields.

3.3.2.6 **MRS 6 – Unknown Mortar Range:** A total of two surface soil samples and two subsurface soil samples were collected successfully at MRS 6. One sample was collected in the eastern portion of the FUDS and the other one was collected in the western portion of the FUDS west of MRS 5.

3.3.2.7 **Overall Site Groundwater Samples:** Two groundwater samples were collected, one of the samples was collected adjacent to MRS 2 and the other samples was collected within MRS 1. A photo of one of the monitoring wells is shown in Appendix E (Photo E.6).

3.3.2.8 **Background Samples:** There were five surface soil samples collected north of MRS 2 and MRS 1. No MEC, MD, or cultural Debris was observed at these locations. The background samples were analyzed for metals only (only three out of the five samples were analyzed since two were mishandled and could not be analyzed). Photos of the general area where background samples were collected are shown in Appendix E (Photos E.1 and E.2).

3.3.2.9 MEC screening level risk assessment and reconnaissance findings are discussed in Sections 4. MC samples results are discussed in Section 5. As-collected sample locations, sample designations, sampling rationale, and field observations are summarized in Table 3-1. Sampling locations are depicted on Figure 3-1. Additional information pertaining to the field activities, including field notes, forms, and chain of custodies, are provided in Appendix D. A photo documentation log from the SI is included in Appendix E.

3.4 Work Plan Deviations and Field Determinations

3.4.1 Deviations from the Final SS-WP (Alion 2009) occurred with respect to sample locations. Samples were moved slightly due to the site conditions (e.g., change in site conditions, topography, inaccessibility) and to areas where surface soil or other sampling media were present in adequate quantities for sampling. These deviations were minor in nature and did not affect the quality of data collected. Groundwater sample location MF-OS-GW-00-01 was collected from a well within MRS 1 instead of near MRS 3 because the preexisting well near MRS 3 could not be located. As previously discussed two of the proposed five background soil samples were mishandled by the laboratory and were not analyzed for metals. However, three background samples were analyzed and the resulting background data are sufficient to compare site specific soil samples to naturally occurring background levels. Refer to the DQO Verification Worksheet included in Appendix B.

3.5 Site Inspection Laboratory Data Quality Indicators

3.5.1 This section summarizes the data quality assessment for the Mitchel Field SI analytical data. Data were generated by GPL under the 2006 DoD Quality Systems Manual (QSM) Version III[2] (DoD 2006) and validated by a third-party validator (EDS) using USEPA Region II Functional Guidelines. The detailed GPL and EDS reports are contained in Appendixes F and G, respectively. The data were also analyzed using the Automated Data Review Version 8.1 based on the DoD QSM Version III guidelines, and these results are included in the environmental

[2] The latest version of the DoD QSM, Version 4.1, was issued in April 2009; however, this version was not available during the generation of the data for this SI. Note also that this version of the QSM took effect in October 2009.

document management systems (EDMS) database. Data Quality Indicators (DQIs) include precision, accuracy, representativeness, completeness, and comparability as well as sensitivity. At Mitchel Field, no quality assurance split samples were collected in accordance with USACE direction. Therefore, the USACE Memorandum for Record-CQAR of Quality Assurance Split Samples is not applicable to this Draft SI Report. However, USACE-NAB will provide a Chemical Data Quality Assessment Report (CDQAR) for inclusion in the Final Appendix G.

3.5.2 Precision is a measure of the reproducibility of repetitive measurements of the same process under similar conditions. Precision is determined by measuring the agreement among individual measurements of the same property, under similar conditions, and is calculated as an absolute value. The degree of agreement was expressed as the relative percent difference between the separate measurements (usually matrix spike/matrix spike duplicate [MS/MSD] pairs) and the observed relative percent difference compared to acceptable values. Any differences between MS/MSD pairs for the Mitchel Field data were examined and any affected sample results qualified as discussed in the Region II Functional Guidelines. The MS/MSD samples achieved acceptable values, and these samples were qualified appropriately (Appendix G). Field precision is measured by the comparison of field duplicate samples, which is also discussed as appropriate in Appendix G.

3.5.3 Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Accuracy measures the bias or systematic error of the entire data collection process. To determine accuracy, a sample that has been spiked with a known concentration is analyzed by the laboratory as the MS, MSD, surrogate and blank spikes, or Laboratory Control Spike. EDS assessed accuracy according to Region II Functional Guidelines and assigned qualifiers as appropriate (Appendix G).

3.5.4 Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is achieved through proper development of the field sampling program during the TPP and work plan development. Deviations from the Final SS-WP were minor: sample locations were moved slightly due to site-specific conditions. As discussed in Section 3.4.1 groundwater sample location MF-OS-GW-00-01 was relocated to MRS 1 from MRS3. The representative DQI was achieved for Mitchel Field.

3.5.5 Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Data are complete and valid if the data achieve all acceptance criteria including accuracy, precision,

and any other criteria specified by the particular analytical method being used. None of the 395 total analyte results associated with this sample effort was rejected; therefore, the completeness indicator is 100 percent, and the Mitchel Field data meet the completeness data quality indicator.

3.5.6 Comparability expresses the confidence with which one data set can be compared to another. There are no previous analyses of MC at Mitchel Field for comparison of reported concentrations from this project. The comparability DQI; therefore, was evaluated with respect to the comparability of sampling results within the data set based on analytical and data validation procedures prescribed in the DQOs. The comparability DQI, therefore, was evaluated with respect to the comparability of sampling results within the data set based on analytical and data validation procedures prescribed in the DQOs. Standard methods for sampling and analyses were followed as documented in the SS-WP; therefore, the comparability DQI was achieved.

3.5.7 Sensitivity is a measure of the screening criteria as they compare to detection limits. If screening criteria are below detection limits (i.e., RL for organics and MDL for inorganics), the certainty of the "non-detected" data to indicate that MCs are present at levels at which no unacceptable risks may occur is called into question.

The laboratory reported to the RL for organics (which represents the lowest concentration at which calibration standards were assessed) and the MDL for inorganics (which represents the minimum concentration of metal that can be measured and reported with 99% confidence that the analyte concentration is greater than zero). Consequently, if sensitivity Measurement Quality Objectives (MQOs) were achieved for MCs, the RLs (organics) and MDLs (inorganics) are adequate to detect risks at levels of concern for the identified receptor. In this instance, non-detected data sufficiently indicates that no unacceptable risk to receptors is present from the sample or group of samples.

The MQO for sensitivity was achieved for most analyte/receptor/matrix combinations with the exception of NG in soil. In addition, no ecological soil screening values were available for NG or iron. Uncertainties associated with the single case in which the MQO for sensitivity was not met, and with the absence of screening values, are discussed within the context of analytical sample results in Section 5. This discussion indicates that for this particular FUDS, the absence of screening values does not undermine the certainty with which the determinations of risk for human and ecological receptors can be made.

3.6 Second Technical Project Planning Meeting

3.6.1 The second TPP meeting was held on 16 December 2009 at via conference call. Participants included personnel from NYSDEC, Hofstra University, Nassau Community College, Nassau County Department of Health, USACE New York and Baltimore Districts as well as Alion Science and Technology. During the TPP # 2 the Alion team discussed the field work conducted at the site, conclusions/recommendations and the results of the MRSPP for each MRS. The TPP # 1 and TPP # 2 memorandums are presented in Appendix B.

Table 3-1. Mitchel Field Sample Location Descriptions

Location	Sampling ID	Coordinates (NAD 83 UTM Zone 18N)		Rationale of Sampling Locations
		Easting(m)	Northing(m)	
MRS 1 – Landscape – 1000-inch Range	MF-LDSP-SS-01-01	619923.710	4508563.044	At the suspected firing point
	MF-LDSP-SS-01-02	619921.213	4508478.832	At the suspected firing point
	MF-LDSP-SB-02-01	619923.710	4508563.044	At the suspected firing point
	MF-LDSP-SB-02-02	619921.213	4508478.832	At the suspected firing point
MRS 2 – Skeet Range	MF-SR-SS-01-01	619387.841	4509263.718	At the center of the MRS in front of the suspected firing point
	MF-SR-SS-01-02	619460.565	4509207.209	Near the suspected firing point
	MF-SR-SS-01-03	619448.541	4509048.708	Southern portion of the MRS
	MF-SR-SS-01-04	619538.881	4509077.024	South of the suspected firing point
	MF-SR-SB-02-01	619387.841	4509263.718	At the center of the MRS in front of the suspected firing point
	MF-SR-SB-02-02	619460.565	4509207.209	Near the suspected firing point
	MF-SR-SB-02-03	619448.541	4509048.708	Southern portion of the MRS
	MF-SR-SB-02-04	619538.881	4509077.024	South of the suspected firing point
MRS 3 – Demonstration Bombing Range	MF-DBR-SS-01-01	618953.271	4509300.891	Southeastern portion of the MRS, area that has not been redeveloped into a building or a parking lot
	MF-DBR-SS-01-02	618973.460	4509361.453	Southeastern portion of the MRS, area that has not been redeveloped into a building or a parking lot
	MF-DBR-SS-01-03	618818.254	4509345.554	Southeastern portion of the MRS, area that has not been redeveloped into a building or a parking lot
	MF-DBR-SB-02-01	618953.271	4509300.891	Southeastern portion of the MRS, area that has not been redeveloped into a building or a parking lot
	MF-DBR-SB-02-02	618973.460	4509361.453	Southeastern portion of the MRS, area that has not been redeveloped into a building or a parking lot
	MF-DBR-SB-02-03	618818.254	4509345.554	Southeastern portion of the MRS, area that has not been redeveloped into a building or a parking lot
MRS 5 – Machine Gun Range	MF-MGR-SS-01-01	618190.733	4508657.003	At the suspected firing point
	MF-MGR-SS-01-02	618162.763	4508614.545	At the suspected firing point
	MF-MGR-SS-01-03	618219.831	4508633.330	At the suspected firing point

Table 3-1. Mitchel Field Sample Location Descriptions

		Coordinates (NAD 83 UTM Zone 18N)		
	MF-MGR-SB-02-01	618190.733	4508657.003	At the suspected firing point
	MF-MGR-SB-02-02	618162.763	4508614.545	At the suspected firing point
	MF-MGR-SB-02-03	618219.831	4508633.330	At the suspected firing point
MRS 6 – Unknown Mortar Range	MF-UKM-SS-01-01	618101.561	4508526.027	At the MRS located in the western portion of the FUDS
	MF-UKM-SS-01-02	619314.048	4508470.714	At the MRS located in the eastern portion of the FUDS
	MF-UKM-SB-02-01	618101.561	4508526.027	At the MRS located in the western portion of the FUDS
	MF-UKM-SB-02-02	619314.048	4508470.714	At the MRS located in the eastern portion of the FUDS
Groundwater	MF-OS-GW-00-01	619861.468	4509152.644	Monitoring well located adjacent to MRS 2
	MF-OS-GW-00-02	619509.194	4509214.868	Monitoring well located within MRS 1
Background	MF-BG-SS-01-01	619340.928	4509588.568	Located outside the MRS boundaries
	MF-BG-SS-01-04	619436.274	4509609.324	Located outside the MRS boundaries
	MF-BG-SS-01-05	619526.150	4509743.816	Located outside the MRS boundaries

DBR= Demonstration Bombing Range
ID= Identification
LDSP= Landscape 1000-inch Range
m= meter
MF= Mitchel Field
MGR= Machine Gun Range
MRS= Munitions Response Site
NAD= North American Datum
OS= Overall Site
SB= Subsurface Sample
SR= Skeet Range
SS= Surface Soil
UKM= Unknown Mortar Range
UTM= Universal Transverse Mercator

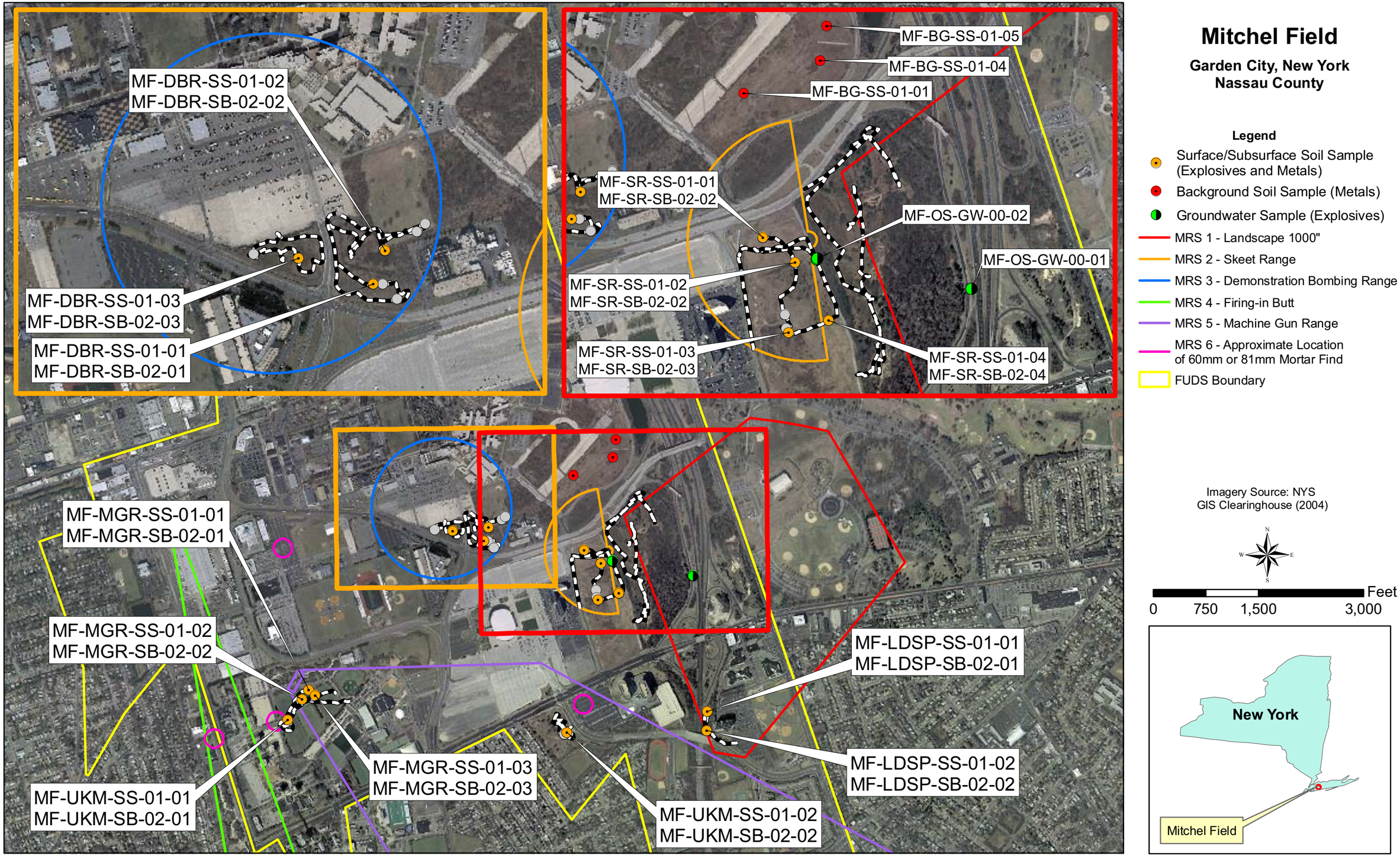

Figure 3-1. Sample Locations and Geophysical Reconnaissance Findings.

Mitchel Field

Garden City, New York
Nassau County

Legend

- Photo Locations
- MRS 1 - Landscape 1000"
- MRS 2 - Skeet Range
- MRS 3 - Demonstration Bombing Range
- MRS 4 - Firing-in Butt
- MRS 5 - Machine Gun Range
- MRS 6 - Approximate Location of 60mm or 81mm Mortar Find
- FUDS Boundary

Imagery Source: NYS GIS Clearinghouse (2004)

N
W E
S

0 900 1,800 3,600 Feet

Figure 3-2. Site Inspection Photograph Locations

4. MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING LEVEL RISK ASSESSMENT

4.1 Munitions and Explosives of Concern Risk Assessment

4.1.0.1 A qualitative MEC Screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the ASR, and ASR Supplement (USACE 1993 and 2004a). A qualitative risk evaluation assesses the potential explosive safety risk at the FUDS and communicates the hazard that may exist at the FUDS and the potential cause of this hazard (USAESCH 2001).

4.1.0.2 An explosive safety risk is the probability for an MEC item to detonate and potentially cause harm as a result of human activities. An explosive safety risk exists if a person comes near or in contact with MEC and acts on it to cause a detonation. The potential for an explosive safety risk depends on the presence of three elements (USAESCH 2001):

- Ordnance and Explosive Factors - a source (presence of MEC)
- Site Characteristics Factors – accessibility and stability
- Human Factors – a receptor (person) and interaction (e.g., touching or picking up an item).

Each of these primary risk factors was used to evaluate the field and historic data to generate an overall hazard assessment rating of either low, moderate, or high (Table 4-1). The CSM for MRS 1, 2, 3, 4, 5, and 6 reflect this MEC assessment strategy (Appendix J).

4.1.0.3 The MEC source is based on the MEC type, sensitivity, density and depth distribution (Table 4-1). The type of MEC dictates the likelihood and severity of exposure, and thereby injury, if the MEC functions when encountered. MEC sensitivity affects the likelihood of an MEC item functioning as designed when encountered by a receptor (e.g. pressure from stepping on the item, fuze activation from moving the item, etc.). MEC quantity/density and depth are generally unknown during the SI and are evaluated during follow on studies (RI/FS).

4.1.0.4 Site characteristics refer to the physical conditions of the site and natural events that occur at a site (Table 4-1). Site accessibility affects the likelihood of receptor contact with MEC and include man-made (e.g., walls or fences) or natural barriers (e.g., terrain, topography, vegetation) that may prevent access to the site. An MEC item tends to remain in place unless disturbed through human or natural forces (e.g., frost heaving, erosion, tidal or wave action). If

MEC movement occurs, the probability of direct human contact may increase, but not necessarily result in direct contact or exposure.

4.1.0.5 Human interaction includes the type of activities that exist at the site, the population of people that may have access, and the frequency of that access (Table 4-1). Activities are generally classified as recreational (hiking, camping, etc.) and occupational (farming, industrial, etc.). Activities at a site generate an exposure route for an MEC receptor. The MEC exposure route is typically direct contact with an MEC item on the surface or through subsurface activities (e.g., digging during construction). The area population and frequency of use determines the likelihood of a receptor to encounter MEC. The risk to the surrounding population is based on the type and location of the site, access restrictions, natural and/or man-made barriers, and the surrounding population.

Based on these criteria, low, moderate, and high MEC risks are defined as follows in Table 4-1.

Table 4-1. MEC Risk Assessment Catagories

Risk	MEC Type	MEC Sensitivity	Site Access	Site Stability	Human Interaction
High	MEC that will cause an individual's death if detonated by an individual's activities	Very sensitive - Handling or movement may cause detonation	No Restriction - No man-made barriers, gentle slopeing terrain, no vegetation that restricts access, no water that restricts access	Site Unstable - MEC most likely will be exposed by natural events	High potential for and frequency of contact (e.g., general public has open and frequent access, high potential for surface/subsurface intrusive activity)
Moderate	MEC that will cause major injury to an individual if detonated by an individual's activities	Less sensitive - Fuzed but may be moved safely if identified as such by a UXO Technician	Limited Restriction - Man-made barriers, vegetation that restricts access, water, snow or ice cover, and/or terrain restricts access	Moderately Stable - MEC may be exposed by natural events	Moderate potential for and frequency of contact (e.g., a limited number of the general public has open and somewhat frequent access, few site uses, surface/subsurface intrusive activity possible)
Low	MEC that will cause minor injury to an individual if detonated by an individual's activities	May have functioned correctly or is unfuzed but has a residual risk	All points of entry are controlled (man-made/natural barriers)	Stable Site - MEC should not be exposed by natural events	Low potential for and frequency of contact (e.g., no general public access, infrequent site access primarily by site personnel, no subsurface activity)
None	Inert MEC or scrap (MD), will cause no injury	Inert MEC or scrap (MD), will cause no injury			

4.2 Munitions and Explosives of Concern Hazard Assessment

4.2.1 MRS 1 – Landscape 1000-inch Range

4.2.1.1 As discussed in Section 2.4.2 and 2.5, to date, no MEC or MD has been found at MRS 1 by local residents/employees or during the 2009 Alion SI. Additionally, the only munitions related materials that would be expected to be present at MRS 1 are small arms. Although, unexpended, complete small arms rounds do pose a potential explosive hazard no such items have been observed at MRS 1. Expended small arms rounds do not contain explosive material and therefore do not pose an explosive hazard. The overall MEC hazard is low to nonexistent and is summarized in Table 4-2 and reflected as such in the CSM (Appendix J).

Table 4-2. MRS 1 – Landscape 1000-inch Range Hazard Impact Assessment

	Historical Observations	Alion Site Inspection Observations	Qualitative Site Hazard
MEC Type and Sensitivity			
Munitions Type	Small arms, rifle practice. No MEC/MD finds.	No MEC/MD finds.	None
MEC Sensitivity	Insensitive/None	Insensitive/None	None
Site Access and Stability			
Accessibility	Unrestricted. Non-DoD control. Much of MRS 1 has been developed (roads, office buildings etc.)	Unrestricted.	Low
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is less than a mile away from East Meadow, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS.	Moderate
Overall Site Hazard Ranking	No Hazard		

4.2.2 MRS 2 – Skeet Range

4.2.2.1 As discussed in Section 2.4.2 and 2.5, to date, no MEC has been found at MRS 2 by USACE, local residents/employees or during the 2009 SI. Additionally, the only munitions related materials that would be expected to be present at MRS 2 are related to shotgun shells (inert shotgun shot). Although, unexpended, complete small arms rounds do pose a potential explosive hazard no such items have been observed at MRS 1. Expended small arms rounds do not contain explosive material and therefore do not pose an explosive hazard. The overall MEC hazard is low to nonexistent and is summarized in Table 4-3 and reflected as such in the CSM (Appendix J).

Table 4-3. MRS 2 – Skeet Range Hazard Impact Assessment

	Historical Observations	**Alion Site Inspection Observations**	**Qualitative Site Hazard**
MEC Type and Sensitivity			
Munitions Type	Small arms. No MEC/MD finds.	No MEC/MD finds.	None
MEC Sensitivity	Insensitive/None	Insensitive/None	None
Site Access and Stability			
Accessibility	Unrestricted. Non-DoD control. Much of MRS 2 is currently unpaved and undeveloped.	Limited restriction – A large portion of the MRS is fenced in, but there are some areas of the fence that are poorly maintained.	Moderate
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is less than a mile away from East Meadow, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS.	Moderate
Overall Site Hazard Ranking	No Hazard		

4.2.3 MRS 3 – Demonstration Bombing Range

4.2.3.1 As discussed in Sections 2.4.2 and 2.5, to date, no MEC or MD has been found at MRS 3 by USACE, local residents/employees or during the 2009 Alion SI. Although, suspected practice bombs were found by Nassau County in the 1960's an exact location could not be determined. Additionally, the only munitions related material that would be expected to be present at MRS 3 is related to practice bomb spotting charges. The overall MEC hazard is low and is summarized in Table 4-4 and reflected as such in the CSM (Appendix J).

Table 4-4. MRS 3 – Demonstration Bombing Range Hazard Impact Assessment

	Historical Observations	Alion Site Inspection Observations	Qualitative Site Hazard
MEC Type and Sensitivity			
Munitions Type	Practice Bombs. No MEC/MD finds attributable to this MRS.	No MEC/MD finds.	None
MEC Sensitivity	Inert/Insensitive	Inert/Insensitive	None
Site Access and Stability			
Accessibility	Unrestricted. Non-DoD control. MRS 3 is predominantly developed (parking lots, buildings, athletic fields etc.)	Unrestricted.	Low
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is less than a mile away from East Meadow, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS.	Moderate
Overall Site Hazard Ranking	Low Hazard		

4.2.4 MRS 4 – Firing-in Butt

4.2.4.1 As discussed in Sections 2.4.2 and 2.5, to date, no MEC or MD has been found at MRS 4 by USACE, or by local residents/employees. As agreed upon during the TPP meeting sampling and reconnaissance was not conducted at MRS 4. The MRS has been heavily redeveloped and

the area currently is under paved parking lots or building footprints. The overall MEC hazard is low and is summarized in Table 4-5 and reflected as such in the CSM (Appendix J).

Table 4-5. MRS 4 Firing-in Butt Hazard Impact Assessment

	Historical Observations	Alion Site Inspection Observations	Qualitative Site Hazard
MEC Type and Sensitivity			
Munitions Type	Small arms, medium and large caliber munitions. No MEC/MD finds.	No MEC/MD finds.	None
MEC Sensitivity	Insensitive/None	Insensitive/None	None
Site Access and Stability			
Accessibility	Unrestricted. Non-DoD control. The majority of MRS 4 has been developed (parking lots, under buildings, roads etc.)	Unrestricted.	Low
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is less than a mile away from East Meadow, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS.	Moderate
Overall Site Hazard Ranking	Low Hazard		

4.2.5 MRS 5 – Machine Gun Range

4.2.5.1 As discussed in Sections 2.4.2 and 2.5, to date, no MEC has been found at MRS 5 by USACE, local residents/employees or during the 2009 Alion SI. An unknown quantity of shell casings reportedly were found during the construction of the athletic fields, this material is classified as MD and does not pose an explosive hazard. The overall MEC hazard is low and is summarized in Table 4-6 and reflected as such in the CSM (Appendix J).

Table 4-6. MRS 5 Machine Gun Range Hazard Impact Assessment			
	Historical Observations	**Alion Site Inspection Observations**	**Qualitative Site Hazard**
MEC Type and Sensitivity			
Munitions Type	Small arms. No MEC/MD finds.	No MEC/MD finds.	None
MEC Sensitivity	Inert	Inert	None
Site Access and Stability			
Accessibility	Unrestricted. Non-DoD control. Much of MRS 4 has been redeveloped (parking lots, buildings, athletic fields etc.)	Unrestricted.	Low
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is less than a mile away from East Meadow, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS.	Moderate
Overall Site Hazard Ranking	Low Hazard		

4.2.6 MRS 6 – Unknown Mortar Range

4.2.6.1 As discussed in Sections 2.4.2 and 2.5, there have been reports of mortar rounds being found in the early 1980's during road construction activities. No MEC or MD were found during the 2009 Alion SI. Munitions related materials that would be expected to be present at MRS 6 are related to practice ordnance and possibly HE mortars. MRS 6 has undergone extensive redevelopment and it is relatively unlikely additional MEC/MD material exists at the MRS. The overall MEC hazard is low and is summarized in Table 4-7 and reflected as such in the CSM (Appendix J).

Table 4-7. MRS 6 Unknown Mortar Range Hazard Impact Assessment			
	Historical Observations	**Alion Site Inspection Observations**	**Qualitative Site Hazard**
MEC Type and Sensitivity			
Munitions Type	HE Mortar and/or Practice Ordnance 60mm and 81mm. Reports of MEC/MD being found during excavations (1980's).	No MEC/MD finds.	Moderate
MEC Sensitivity	No sensitive fuzes	Insensitive/Inert	Low
Site Access and Stability			
Accessibility	Unrestricted. Non-DoD control. The majority of MRS 6 is under pavement, roads, or building footprints.	Parts of the MRS is fenced in, other areas open to the public.	Low
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is less than a mile away from East Meadow, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS.	Moderate
Overall Site Hazard Ranking	Low Hazard		

4.3 Mitchel Field FUDS MEC Hazard Summary

4.3.1 Tables 4-2 through 4-7 summarize the qualitative MEC hazard at each MRS at the Mitchel Field FUDS. Based on this qualitative MEC risk evaluation, the hazard to human receptors via contact with MEC at the FUDS is low. Further evaluation of the MEC presence at this FUDS is not recommended.

5. MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS

5.0.1 A screening level human health risk assessment (HHRA) and screening level ecological risk assessment (SLERA) were conducted to determine whether MC in environmental media at Mitchel Field may warrant a more detailed assessment of potential risk to current or future human and ecological receptors. The screening methodology, CSM, analytical results for the MC sampling, and results of the screening assessment are presented below.

5.1 Data Evaluation Methodology

5.1.0.1 The following sections present the process used to evaluate the MC data collected for the Mitchel Field FUDS. The methodology is designed to evaluate data for relevant MCs in the HHRA and SLERA using the appropriate screening criteria. The methodology also provides a means to evaluate uncertainty in the screening HHRA and SLERA process and provide context for the risk conclusions. This process is consistent with the decision rules outlined in Section 3.1 (TPP) of this report, and is described in more detail in the following sections.

5.1.1 Refinement of Munitions Constituents

5.1.1.1 During the SI process, Alion evaluated MCs potentially associated with Mitchel Field. MCs were identified based on knowledge of munitions historically used at the FUDS. Information on historic use was obtained from munitions data sheets, historical documents, and other munitions reference documents.

5.1.1.2 The list of MCs for evaluation for six MRSs identified at Mitchel Field is provided below and presented in further detail in Table 2-2.

Landscape 1000-inch Range (MRS 1)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, and NG)
- Metals (antimony, copper, iron[3], lead, and nickel)

[3] Aluminum and iron are not classified as hazardous substances under CERCLA. As per USACE guidance regarding non-CERCLA hazardous substances the screening results for aluminum and iron will not be used as the sole basis for determining a RI/FS recommendation for the site

Skeet Range (MRS 2)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, and NG)
- Metals (antimony and lead)

Demonstration Bombing Range (MRS 3)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, and NG)
- Metals (antimony, iron[3], lead, and zinc)

Firing-in Butt (MRS 4)

- None[4]

Machine Gun Range (MRS 5)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, and NG)
- Metals (antimony, copper, iron[3], lead, and nickel)

Unknown Mortar Range (MRS 6)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, and NG)
- Metals (aluminum[3], iron[3])

5.1.2 Data Quality

5.1.2.1 Only validated data were used in the screening process. The validated data were composed of the following samples:

1. Fourteen surface soil samples (collected 0-6 inches bgs)
2. Two duplicate[5] surface soil samples
3. Fourteen subsurface soil samples (collected 6-12 inches bgs)
4. Two duplicate subsurface soil samples
5. Three background [6] surface soil samples[7]

[4] The land in the vicinity of this MRS is completely developed and is either currently in the footprint of a building or under a paved parking lot. Per stakeholder agreement, no samples were collected in MRS 4 due to the absence of sampling media (soil).

6. Two groundwater samples
7. One duplicate groundwater sample

5.1.2.2 The first step in the screening risk assessments was the evaluation of the analytical data. Inclusion or exclusion of data on the basis of analytical qualifiers was performed in accordance with USEPA guidance (USEPA 1989). The following provides a listing of the qualifiers in the validated analytical data and their treatment in the risk assessments:

- Analytical results bearing the U qualifier (indicating that the analyte was not detected at the given detection limit) were retained in the data set. One of two detection limit types was used for this purpose, depending on the chemical class. For inorganics, the method detection limit (MDL) was used for non-detected samples. For organics, the reporting limit (RL) was used for non-detected samples.
- Analytical results bearing the UJ qualifier (indicating that the analyte was not detected and the quantitation limits may be inaccurate or imprecise) were retained in the dataset. In the analysis for MCs at this FUDS, only inorganic results bore this qualifier. The MDL was used for non-detected samples.
- Analytical results bearing the J qualifier (indicating that the reported value was estimated) were retained. The estimated concentration provided by the laboratory was used in the risk screening.

5.1.3 Screening Values

5.1.3.1 Screening concentrations were used in the HHRA and SLERA to support risk-based conclusions and recommendations regarding the FUDS property. Maximum property concentrations for relevant MCs were compared to the risk-based concentrations as part of the selection process for chemicals of potential concern (COPCs) and chemicals of potential environmental concern (COPECs).

5.1.3.2 For the HHRA, USEPA regional screening levels (SLs) for residential soil and industrial soil were selected as the screening criteria to select COPCs in soil (USEPA 2009). The SLs are

[5] Duplicate samples were treated as discrete samples; duplicates were not averaged for the purpose of this risk screening.

[6] Geologic conditions of the surface and subsurface soils are similar at the FUDS; therefore, background surface soil samples were used in background comparisons for both surface and subsurface soils.

[7] As previously mentioned two of the proposed five background soil samples were mishandled by the laboratory and were not analyzed.

referred to as "regional SLs" throughout the remainder of this section. The regional SLs are developed from toxicity values and standard exposure factors to estimate contaminant concentrations that are protective of humans, including sensitive subgroups, over a lifetime. The regional SLs for residential and industrial soils consider exposures through direct contact (e.g., incidental ingestion, dermal contact, and inhalation of particulates and vapors). Incidental ingestion, dermal contact, and inhalation are identified as exposure pathways that could occur at the FUDS (i.e., potentially complete pathways) (Alion 2009). Because the potentially complete pathways for surface and subsurface soils are limited to the pathways considered in the regional SLs, the regional SLs are appropriate screening tools for the HHRA. Regional tap water SLs available for screening groundwater reflect potential exposures via ingestion of drinking water and inhalation of volatile organic chemicals released during use of contaminated groundwater. Potentially complete pathways identified for MCs in groundwater in the SS-WP for human receptors included incidental ingestion and dermal contact. While the SLs do not consider potential exposures via dermal contact and incidental ingestion, they do include potential exposure via drinking water (a pathway that is not defined as potentially complete at the FUDS). In the calculation of the regional SL ingestion of drinking water constitutes the most significant exposure pathway; exposures via this pathway which are calculated using an ingestion rate of 2 liters of drinking water a day would exceed exposure that might result from the pathways considered complete for the human receptors at the FUDS. The regional tap water SL for screening groundwater is therefore considered an appropriate and conservative screening value the HHRA.

5.1.3.3 In some cases, SLs are based on the toxicity, or relative toxicity of related compounds. The regional SLs for 2-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity information for 2,4-DNT. Because the amino-DNT isomers may behave differently from 2,4-DNT, the use of the regional SLs for these MCs may result in some uncertainty in the risk assessment.

5.1.3.4 The regional SLs for direct contact with soil and tap water correspond to typical risk thresholds of a one-in-one million (1E-06) cancer risk or a non-carcinogenic hazard quotient (HQ) of 1.0. The HHRA screening levels for explosives 2,4-DNT, 2-nitrotoluene, and 4-nitrotoluene, are based on carcinogenic endpoints. The HHRA screening levels for the explosives 2,6-DNT, 2-amino-4,6-DNT, 3-nitrotoluene, 4-amino-2,6-DNT, and NG, and the metals aluminum, antimony, copper, iron, lead, nickel, and zinc are based on non-carcinogenic endpoints.

5.1.3.5 As discussed in the SS-WP Addendum (Alion 2009) the screening levels derived from non-carcinogenic endpoints were divided by ten to provide a means to account for potential

occurrence of adverse non-carcinogenic health effects due to exposure to multiple non-carcinogens. The exception to this adjustment is for lead. In the case of lead, regional SLs for soil are based on a blood lead level rather than a chronic daily intake as is used for other chemicals and therefore no adjustments were made to lead SLs. The application of HHRA screening values is described in Sections 5.1.3.9 and 5.1.3.10. Results of the HHRA are discussed in Sections 5.3 through 5.8, and presented in Table 5-1 and 5-2.

5.1.3.6 Screening for ecological-based COPECs was conducted by calculating an HQ, which represents the ratio of the maximum detected chemical concentration in environmental media to a medium specific ecological screening level. Screening levels derived from studies in specific medium and environmentally similar conditions to those at the FUDS are the most relevant and appropriate for screening. In cases where screening values derived from environmentally specific testing environments are not available, alternative screening values may offer a sufficient screening tool.

5.1.3.7 Ecological soil screening levels (eco-SSLs) were used to screen for COPECs in soil. Eco-SSLs are screening level benchmark concentrations for contaminants in soil that have been determined to be protective of terrestrial-based ecological receptors that commonly come into contact with soil or ingest biota that live in or on the soil. These benchmark concentrations are generally used for screening-level purposes to identify COPECs in upland soils that may require further evaluation. Eco-SSLs are derived using information on toxicity and estimated ingestion exposure doses for terrestrial ecological receptors. As described in the SS-WP Addendum CSM diagram for Mitchel Field, potentially complete transfer pathways for surface soils to ecological receptors at the FUDS are ingestion, inhalation, and dermal contact. USEPA guidance (2005a) states that because dermal and inhalation pathways are generally less significant compared to ingestion, they do not warrant inclusion in the derivation of eco-SSLs. Therefore, the eco-SSLs derived using exposure assumptions for ingestion only, are determined to be adequate for the purposes of the SLERA.

5.1.3.8 Eco-SSLs developed by USEPA were used for screening the metals aluminum, antimony, copper, lead, nickel, and zinc. No eco-SSLs were available from USEPA for any of the explosives being evaluated. Consistent with previous SLERAs completed under this program, screening values were obtained from Talmage et al. (1999) for these MCs. Some of the screening values are based on surrogates; the eco-SSLs of 30 mg/kg for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on toxicity data for 2,4,6-TNT. There is no conclusive evidence on the dominant process by which 2,4,6-TNT is reduced in soil. One study indicated bacterial degradation of 2,4,6-TNT to 2- and 4- amino-DNT occurs under aerobic and

anaerobic conditions (Vorbeck et al. 1998). An *in vitro* study completed in a *Psuedomonas bacterium* species suggests that 2,4,6-TNT breaks down to 2,4-DNT (Haidour and Ramos 1996). Laboratory studies support the observations of Haidour and Ramos (1996) that bacteria strains can generate 2,4-DNT from TNT (Martin et al. 1997). These findings provide some support for the use of TNT as a surrogate for DNT and DNT breakdown products. In addition the eco-SSL of 80 mg/kg for 2-amino-4,6-DNT is based on data for the chemical isomer, 4-amino-2,6-DNT. There is some uncertainty associated with adopting surrogate screening values for the MCs from 2,4,6-TNT and 4-amino-2,6-DNT. Some screening values are based on limited data; a limited amount of data were available for the derivation of the eco-SSL for 2-amino-4,6-DNT. This eco-SSL was derived using data from a single study in plants. Eco-SSLs were not available for the explosive NG and the metal iron. No suitable surrogates were available for these MCs. The application of the ecological screening values is described in Sections 5.1.3.9 and 5.1.3.11. Results of the SLERA are discussed in Sections 5.3 through 5.8, and presented in Table 5-1.

5.1.3.9 In accordance with USEPA Guidance, the following screening process is utilized.

1. The maximum concentration of each chemical detected in each medium is identified.

2. If a chemical was detected in at least one sample in a specific medium, it is retained for consideration in the screening of COPCs/COPECs.

3. If the concentration of a specific chemical exceeds its screening value and is above the maximum and/or mean background concentration, the chemical is retained as a COPC/COPEC.

4. If a screening concentration is not available for a specific chemical in a particular medium, the screening concentration for a structurally similar compound is used, if warranted. The screening tables list any surrogates that are used.

5. An analyte is eliminated from the list of COPCs/COPECs if it is an essential nutrient of low toxicity, and its reported maximum concentration is unlikely to be associated with adverse health impacts.

5.1.3.10 For the HHRA, the maximum detected concentration of all detected MCs was compared to the screening criteria determined for use in the HHRA. If the maximum concentration was less than the screening value, the target analyte was eliminated from consideration. If the maximum concentration exceeded the screening value, the analyte was retained as a COPC.

5.1.3.11 Under the SLERA, an HQ analysis was completed for each detected analyte. A HQ is defined as the measured concentration divided by the screening criteria. If the maximum concentration was less than the screening value (HQ < 1.0), the analyte was eliminated from consideration as a COPEC. If the maximum concentration exceeded the screening value (HQ > 1.0), the analyte was retained as a COPEC.

5.1.3.12 For both the HHRA and SLERA, in cases in which no screening criteria are available, any available information regarding the potential for the MC to present a risk to receptors is presented.

5.1.4 Comparison of Screening Levels with Detection Limits for Never-Detected Analytes

5.1.4.1 The usability of the analytical data for making conclusions regarding risk was evaluated by comparing the RLs for explosives and MDLs for metals never-detected to their respective screening values used for human health (Table 5-3) and ecological (Table 5-4) risk screening. If a chemical was never detected, but the detection limit (i.e., RL for explosives and MDL for metals) was higher than the screening value, then the MQO for sensitivity was not met. Such non-detects are not usable for determining whether contamination is greater or less than the decision limit. Where no screening values are available, no conclusions can be drawn regarding the adequacy of the detection limits for screening risk, and as a result, uncertainty is introduced into the risk assessment. In these instances, a weight of evidence approach is used in making risk-based decisions.

5.1.4.2 Table 5-3 shows a comparison of the detection limits and human health screening values for all analytes never detected in soil or groundwater at any MRS by media. In surface and subsurface soils all of the explosives analyzed, and antimony, were never detected above their respective RLs. With the exception of NG, the RLs for all never-detected explosives were lower than the respective soil screening criteria adopted for the HHRA. In addition, the maximum MDL and RL (2.2 mg/kg) for antimony were below the screening values of 3.1 mg/kg, and 41 mg/kg selected for the HHRA. The RL of 4 mg/kg for NG exceeds the residential soil screening value of 0.61 mg/kg. The MQO for sensitivity for NG was not met and any reported non-detects (<RL) do not demonstrate that NG contamination is less than the selected screening criterion. However, as described in Section 5.1.3.5, the residential screening value used in the HHRA is adjusted to account for the potential cumulative effect of simultaneous exposure to multiple non-carcinogens. Under the methodology employed in the HHRA for cumulative non-carcinogenic

risk, ten chemicals are assumed to elicit toxic effects on the same target organ. At Mitchel Field, a maximum of thirteen MCs were identified at any one MRS. Each of these MCs is not anticipated to act by the same non-carcinogenic mode of action or at the same target organ. Further, seven of these MCs were organics that were never detected with RLs more than ten times lower than their respective screening value. Considering these factors the RL for NG is determined to be adequate for the HHRA screening at Mitchel Field. Additionally, the industrial screening criteria for NG is 6.2 mg/kg which is above the RL for NG. As described in Section 5.1.3.3, the regional SLs for 2,-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity information for 2,4-DNT. The RLs of 0.04 mg/kg in soil for the amino-DNT isomers are well below the residential and industrial screening criteria developed from regional SLs for use in the HHRA (15 and 200 mg/kg, 2-amino-4,6-DNT; 15 and 190 mg/kg, 4-amino-2,6-DNT). Any uncertainties in the application of these screening levels to the risk assessment are; therefore, determined not to be significant for the HHRA.

5.1.4.3 In groundwater, none of the explosives analyzed were detected above their respective RLs. Of these never-detected analytes, 2-nitrotoluene and NG were the only MCs that had an RL that exceeded the screening criterion adopted for the HHRA (i.e., 2-nitrotoluene, RL = 0.4 ug/L, screening criteria = 0.31 ug/L; NG RL = 20 ug/L, screening criteria, 0.37 ug/L). Because the RL is above the HHRA screening value selected for these two MCs, the MQO for sensitivity was not met and any reported non-detects do not demonstrate that contamination is less than the selected screening criterion. The disparity between the RL and screening criterion for 2-nitrotoluene was small and therefore, the 2-nitrotoluene RL is considered adequate for the HHRA. For NG, as was the case for the screening criteria in soil, the regional SL was reduced to a factor of ten to account for potential exposure to multiple non-carcinogens. The adjustment results in a conservative screening level for NG; however, even if no adjustment was made to account for the potential for simultaneous non-carcinogenic exposures, the NG RL exceeds the regional tap water SL. Therefore, some uncertainty associated regarding the ability to detect risk significant concentrations for human receptors exposed to NG via groundwater is introduced into the HHRA. As described in Section 5.1.3.3, the regional SLs for 2-amino-4,6-DNT and 4-amino-2,6-DNT isomers selected as MCs for the FUDS are based on toxicity information for 2,4-DNT. The RLs of 0.2 ug/L for the MCs are below screening criteria developed from regional SLs for use in the HHRA (7.3 ug/L, 2-amino-4,6-DNT and 4-amino-2,6-DNT), and therefore any uncertainties regarding the application of these screening levels to the HRRA are determined not to be significant.

5.1.4.4 Table 5-4 shows a comparison of the detection limits and ecological screening values for analytes never detected in surface soil at any MRS. All of the explosives analyzed, and

antimony, were never detected above their respective RLs. The RLs for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene, and the MDL for antimony were below their respective ecological screening values adopted for the SLERA. While antimony was never detected above its MDL, the RLs for antimony (1.4 mg/kg to 2.2 mg/kg) did exceed the eco-SSL (0.27 mg/kg). However, because the maximum MDL for antimony was less than the selected screening criterion, the MQO for sensitivity was met. As described in Section 5.1.3.8 the use of surrogate values for screening values introduces some uncertainty into the risk assessment. The eco-SSL for 2,4,6-TNT was adopted for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene. The RLs of 0.04 mg/kg for 2,4-DNT and 2,6-DNT and 0.08 mg/kg for 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are well below the soil screening value of 30 mg/kg adopted for these MC in the SLERA. In addition the eco-SSL for 2-amino-4,6-DNT was adopted for 4-amino-2,6-DNT. The RL for 4-amino-2,6-DNT of 0.04 mg/kg is well below the soil screening value of 80 mg/kg adopted for this MC in the SLERA. Therefore, any uncertainties associated with the use of 2,4,6-TNT and 2-amino-4,6-DNT as surrogates for the explosive MCs are determined not to be significant for the SLERA. No ecological screening value was available for NG in soil; therefore, no conclusion regarding the adequacy of the RLs obtained for this MC can be made.

5.2 Conceptual Site Model

5.2.0.1 The CSM diagram for Mitchel Field is provided in Appendix J. The CSM defines the source(s) (e.g., the secondary source/media), interaction (e.g., secondary release mechanism, tertiary source, exposure route), and receptors at the FUDS and provides an overview of complete and potentially complete pathways. The CSM is limited to those areas potentially impacted by MEC and/or MCs based on the site use and history. These areas are shown in Figure 2-2. In this SI Report, the CSM has been revised from the version presented in the SS-WP Addendum to reflect the results of the human and ecological risk screening.

5.2.0.2 Current and future potential human receptors for the Mitchel Field FUDS are expected to be visitors/students/trespassers, employees, and construction workers. In the HHRA the soil screening values for the visitors/students/trespassers were based on regional SLs for direct contact with residential soil. The screening values used for employees and construction workers were based on the regional SLs for direct contact with industrial soil. Additionally, screening values for groundwater for the construction worker were based on the regional SLs for tap water. The ecological receptors of concern at the FUDS are plants, benthic invertebrates, terrestrial-feeding mammals, and terrestrial-feeding birds. Screening values selected for the SLERA were

applied uniformly to all ecological receptors. As described in the SS-WP Addendum for Mitchel Field, despite the presence of surface water adjacent to MRS 1, the surface topography is unlikely to transport potential MC to the water body. For this reason surface water and sediment were not considered to be media of concern (Alion 2009).

5.2.0.3 Potentially complete pathways for human and ecological receptors are based on the presence of MEC/MC and interactions including transport and release mechanisms and receptor use patterns.

5.2.0.4 A pathway is complete if all of the following conditions are present:

1. Source and mechanism of chemical release (e.g. a munitions-related organic chemical is detected or a munitions related inorganic chemical is detected at levels exceeding background concentrations).

2. Transfer mechanisms (e.g. overland flow of contaminants into an adjacent stream, advection of contaminants with groundwater flow).

3. Point of contact (exposure point, e.g., drinking water, soil).

4. Exposure route to receptor (e.g., ingestion, inhalation, etc.).

5.2.0.5 Once it has been determined that complete pathways exist between media and receptors comparisons of maximum detected site concentrations to risk-based screening values are used to determine if the MC is a COPC or COPEC, depending on the risk screening being conducted (human health and ecological respectively). Using a weight of evidence approach, a RI/FS may be recommended for MC where COPC and/or COPEC are identified. An NDAI designation may be recommended for MC if no COPCs or COPECs are identified through the risk screening process or if the weight-of-evidence evaluation indicates that COPCs/COPECs do not pose an unacceptable risk to the exposed receptor.

5.2.0.6 In conclusion, pathway completeness will result in an RI/FS recommendation for MC only in the instance where risk screening criteria exceedances occur. A pathway can be complete but an RI/FS is not recommended if there are no exceedances of risk screening criteria or if identified risks are determined to be at acceptable risk levels. When a pathway is incomplete, an RI/FS recommendation is not made.

5.3 Background Data Evaluation

5.3.0.1 During the SI field activities, three background surface soil samples were obtained from the area north of the MRS 2 and west of the MRS 1 boundary. Background subsurface soil samples were not collected, however due to the similar geologic conditions present between the surface and subsurface soils within the FUDS the background samples obtained were used for background comparisons for both surface and subsurface soil. Comparisons of concentrations of metals in background soil to on-site soil are shown in Tables 5-5 through 5-9.

5.3.0.2 In surface soil, all metals evaluated with the exception of antimony (all MRSs) and iron (MRS 1) exhibited maximum and mean concentrations that were greater than the respective maximum and mean concentrations in background (MRS 1, copper, lead, and nickel; MRS 2, lead; MRS 3 iron, lead, and zinc; MRS 5 copper, iron, lead, and nickel; MRS 6, aluminum and iron). Antimony was not detected in site or background surface soil samples, and therefore the background comparison for antimony in surface soil is not meaningful for the SI evaluation.

5.3.0.3 In subsurface soil, copper, lead, and nickel at MRS 1; lead at MRS 2; iron at MRS 3; copper, iron, lead, and nickel at MRS 5; and aluminum and iron at MRS 6 had elevated maximum and/or mean concentrations compared to respective maximum/mean concentrations in background. Antimony was not detected in any site or background subsurface soil samples, and therefore the background comparison for antimony in subsurface soil is not meaningful for the SI evaluation.

5.4 Landscape 1000-inch Range (MRS 1)

5.4.0.1 As presented in Section 5.1.1 the explosives DNT and DNT breakdown products, and NG and the metals antimony, copper, iron, lead, and nickel were identified as MCs at MRS 1. Surface soil, subsurface soil, and groundwater were identified as media of concern for this area. Table 5-1 presents results of the screening level analysis in surface and subsurface soil. Table 5-2 presents results of the screening level analysis in groundwater.

5.4.1 Soil Pathway and Screening Results

5.4.1.1 Potentially complete exposure pathways in surface soil were identified for human and ecological receptors. For subsurface soil, potentially complete pathways were identified for a subset of human receptors. A total of five soil samples were collected from MRS 1; two surface soil samples, two subsurface soil samples, and one duplicate subsurface soil sample. All five of

the samples were analyzed for the explosives DNT and DNT breakdown products and NG, and the metals antimony, copper, iron, lead, and nickel. All of the samples were analyzed for the explosives DNT and DNT breakdown products and NG, and the metals antimony, copper, iron, lead, and nickel. Table 5-1 presents the analytical results for surface and subsurface soil along with the human health and ecological screening values described previously in Section 5.1.3.

5.4.1.2 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer mechanisms for MCs in surface soils to visitors/students/trespassers, employees, and construction workers. Ingestion, inhalation, and dermal contact were identified as potential transfer mechanisms for MCs in surface soils to ecological receptors. Two surface soil samples were collected from MRS 1 in areas that are most likely to be impacted by MC.

5.4.1.3 **Human Health Screening:** No explosives were detected in concentrations above their respective RLs in surface soil at MRS 1. With the exception of NG, the RLs for all explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques employed to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. Because the RL for NG is above the NG screening value of 0.61 mg/kg, the MQO for sensitivity was not met and any reported non-detects for NG do not demonstrate that NG contamination is less than the selected screening criteria. However, as described in Section 5.1.4.2 the RL for NG is determined to be adequate for the HHRA screening at Mitchel Field. No explosive COPCs were identified in surface soils at MRS 1.

5.4.1.4 With the exception of antimony all of the other metals analyzed (copper, iron, lead, and nickel) were detected in surface soil at MRS 1. Antimony was never detected and as described in Section 5.4.1.2, the maximum MDL and RL for the MC were below the screening criteria selected for screening antimony in the HHRA. This confirms the ability of the analytical techniques used to detect the antimony at levels sufficient to screen for unacceptable risk to human receptors. As described in Section 5.3.0.2 maximum and mean concentrations of the detected metals (copper, iron, lead, and nickel) were greater than their respective maximum and mean concentrations in background. The maximum concentration of iron exceeded the screening criterion used for the visitor/student/trespasser in the HHRA. Therefore, iron is designated as a COPC for surface soil at MRS 1. As described in Section 5.3.0.2 site iron at MRS 1 did not exceed the concentrations in background. Therefore, no additional risk to human receptors from exposure to iron in subsurface soil was identified based on site use.

5.4.1.5 **Ecological Screening:** As described above in Section 5.4.1.3, no explosive MCs were detected in the soil at MRS 1. The RLs for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the screening criteria selected for the SLERA, and confirm the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to ecological receptors.

5.4.1.6 No eco-SSL was available for NG, and it is, therefore, not possible to make similar comparisons for this MC. NG has a relatively low octanol-water partitioning coefficients (K_{ow} < 2) [U.S. NLM 2008]. In general, K_{ow} in this range indicate inefficient partitioning into the lipid component of organisms and a low ability to bioconcentrate or biomagnify up the food chain (USEPA 2005a, and USEPA 2008). In addition, NG is readily biodegradable, a characteristic which also makes food chain exposures unlikely (USACHPPM 2007). Based on the fact that NG was not detected above its analytical RL, and considering fate and transport characteristics, NG was not identified as a COPEC in MRS 1. The decision is not expected to introduce an unacceptable level of uncertainty into the SLERA. No explosive COPECs were identified in surface soils at MRS 1.

5.4.1.7 As described in Section 5.4.1.4, copper, iron, lead, and nickel were detected in surface soil at MRS 1. Antimony was never detected and as described in Section 5.1.4.3, its maximum MDL was below the eco-SLL, confirming the ability of the analytical techniques used to detect the MC at levels sufficient to screen for unacceptable risk. As described in Section 5.3.0.2, maximum and mean concentrations of copper, iron, lead, and nickel exceeded their respective maximum and mean concentrations in background. Lead was detected in three of three surface soil samples at MRS 1 at a concentration exceeding the eco-SSL of 11 mg/kg (HQ = 6.9-18.5). Therefore, lead is identified as a COPEC for surface soil at MRS 1. The following factors were considered as part of the weight of evidence evaluation for determining the risk significance of lead in surface soil at MRS 1.

- Three of the three surface soil samples exceeded the ecological screening value (maximum HQ = 18.5).
- Three of the three surface soil background concentration exceeded ecological screening value (maximum HQ = 4.0).
- Three of the three site surface soil samples exceeded the maximum background concentration.
- Three of the three site surface soil samples exceeded the mean background concentration.

Lead was detected in all three site surface soil samples at a concentration exceeding the eco-SSL

(max HQ = 18.5). While lead at MRS 1 was detected at concentrations exceeding background, three of the three background lead samples also exceeded the eco-SSL. The eco-SSL used in the SLERA for lead is derived from a robust dataset including plants, soil invertebrates, and avian and mammalian wildlife. The screening value of 11 mg/kg is based on toxicological effects to the most sensitive of the avian receptors evaluated (i.e., woodcock) and represents the most conservative value relative to other potential site receptor groups (mammalian wildlife = 56 mg/kg, plants = 120 mg/kg, and soil invertebrates = 1,700 mg/kg) [USEPA, 2005b]. The next lowest eco-SSL in the dataset of 46 mg/kg for doves is more relevant to the type of ecological receptors that could occur at MRS 1, where much of the land is developed. Use of the eco-SSL value for doves would yield a maximum HQ of 4.4 at MRS 1, and the two remaining samples would be reduced to a HQ of less than 2.0 (1.6 and 1.7). In addition the soil samples at MRS 1 were collected from areas that were determined as most likely to be impacted by MC. While lead is a COPEC for MRS 1, based on the conservative nature of the screening evaluation, the weight of evidence concludes that exposure to surface soil does not result in unacceptable risks to ecological receptors at MRS 1.

5.4.1.8 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer mechanisms for MCs in subsurface soils to employees and construction workers. Two subsurface soil samples and one duplicate subsurface sample were collected from MRS 1 in areas that are most likely to be impacted by MC.

5.4.1.9 No explosives were detected at concentrations above their respective RLs in subsurface soil at MRS 1. The RLs for all explosives were below the screening criteria selected for the employee and construction workers in HHRA (Table 5-3), confirming the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. No explosive COPCs were identified in subsurface soils at MRS 1.

5.4.1.10 With the exception of antimony all of the inorganics analyzed (copper, iron, lead, and nickel) were detected in subsurface soil at MRS 1. As described in Section 5.4.1.2, the maximum MDL and RL for the never-detected antimony were below the screening criteria selected for the MC in the HHRA, confirming the ability of the analytical techniques used to detect the MC at levels sufficient to screen for unacceptable risk to human receptors. As described in Section 5.3.0.3 maximum and/or mean concentrations of copper lead, and nickel in subsurface soil were detected above respective mean and maximum concentrations in background soil. The subsurface soil pathway is therefore complete for human receptors. The maximum concentrations for copper, iron, lead, and nickel were below their respective screening levels

selected in the HHRA for employees and construction workers. No inorganic COPCs were identified in subsurface soil at MRS 1.

5.4.2 Groundwater Pathway and Screening Results

5.4.2.1 Groundwater was identified as a medium with a potentially complete pathway for construction workers. Incidental ingestion and dermal contact were identified as potentially complete transfer mechanisms for MCs in groundwater to the receptor group in the SS-WP Addendum. Two groundwater samples and one duplicate groundwater sample were collected from preexisting groundwater monitoring wells within MRS 1 and near MRS 2. The three samples were analyzed for DNT and DNT breakdown products and NG.

5.4.2.2 No explosives were detected in concentrations above their respective RLs in groundwater samples collected within the FUDS boundaries. With the exception of 2-nitrotoluene and NG the RLs for the explosive MCs were below their respective HHRA screening levels, confirming the ability of the analytical techniques used to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. Because the RLs are above the HHRA screening value for 2-nitrotoluene and NG, the MQOs for sensitivity were not met and any reported non-detects do not demonstrate that contamination is less than the selected screening criteria. As described in Section 5.1.4.2, the RL for 2-nitrotoluene is considered adequate for the HHRA. For NG, as described in Section 5.1.3.5 the USEPA regional tap water SL was scaled to a factor of ten to account for potential exposure to multiple non-carcinogens, however, the NG RL of 20 µg/L exceeds even the unadjusted USEPA regional residential tap water concentration of 3.7 µg/L. However given that NG was not detected at risk significant levels in the soil it is unlikely to be present at risk significant levels for humans exposed to groundwater at the MRS. No explosives were identified as COPCs in groundwater at the Mitchel Field FUDS.

5.5 Skeet Range (MRS 2)

5.5.0.1 As presented in Section 5.1.1 the explosives DNT and DNT breakdown products and NG and the metals antimony and lead were identified as MCs at MRS 2. Surface soil, subsurface soil, and groundwater were identified as media of concern for this area. Table 5-1 presents results of the screening level analysis in surface and subsurface soil. Table 5-2 presents results of the screening level analysis in groundwater.

5.5.1 Soil Pathway and Screening Results

5.5.1.1 Potentially complete exposure pathways in surface soil were identified for human and ecological receptors. For subsurface soil, potentially complete pathways were identified for a subset of human receptors. A total of eight soil samples were collected from MRS 2; four surface soil samples, and four subsurface soil samples. All eight samples were analyzed for the explosives DNT and DNT breakdown products and NG, and the metals antimony and lead. Table 5-1 presents the analytical results for surface and subsurface soil along with the human health and ecological screening values described previously in Section 5.1.3.

5.5.1.2 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer pathways for MCs in surface soils to visitors/students/trespassers, employees, and construction workers. Ingestion, inhalation, and dermal contact were identified as potential transfer mechanisms for MCs in surface soils to ecological receptors. Four surface soil samples were collected from the skeet range in MRS 2.

5.5.1.3 **Human Health Screening:** No explosives were detected in concentrations above their respective RLs in surface soil samples collected at MRS 2. With the exception of NG, the RLs for all explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques employed to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. Because the RL is above the NG screening value of 0.61 mg/kg, the MQO for sensitivity was not met and any reported non-detects for NG do not demonstrate that NG contamination is less than the selected screening criterion. As described in Section 5.1.4.2 the RL for NG is determined to be adequate for the HHRA screening at Mitchel Field. No explosive COPCs were identified in surface soils at MRS 2.

5.5.1.4 Lead was the only metal detected in surface soil at MRS 2. Antimony was never detected in surface soils and as described in Section 5.4.1.2 both the maximum MDL and RL were below the screening levels applied in the HHRA. As described in Section 5.3.0.2 site lead was elevated above background concentrations. The maximum concentration for lead was below its screening levels used in the HHRA and therefore no inorganic COPCs were identified in surface soils at MRS 2.

5.5.1.5 Although no COPCs were identified for surface soil at MRS 2, the surface soil pathway is considered complete for human receptors at MRS 2 due to the exceedence of lead in surface soils compared to background, as well as the fact that the MQO for sensitivity was not met for NG.

5.5.1.6 **Ecological Screening:** As described above in Section 5.5.1.3, no explosive MCs were detected in surface soil at MRS 2. The RLs for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the screening criteria selected for the SLERA, and confirm the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to ecological receptors.

5.5.1.7 No eco-SSL was available for NG, and it is, therefore, not possible to make similar comparisons for this MC. As described in Section 5.4.1.6, NG is unlikely to bioconcentrate or biomagnify, and is degraded in soils. Based on the fact that NG was not detected above its analytical RL, and considering fate and transport characteristics, NG was not identified as a COPEC in MRS 2. The decision is not expected to introduce an unacceptable level of uncertainty into the SLERA. No explosive COPECs were identified in surface soils at MRS 2.

5.5.1.8 As described in Section 5.5.1.4, lead was the only metal detected in surface soils Antimony was never detected and as described in Section 5.1.4.2, the maximum MDL was below the eco-SLL, confirming the ability of the analytical techniques used to detect the MC at levels sufficient to screen for unacceptable risk. Lead was detected in four of four surface soil samples at MRS 2 at a concentration exceeding the eco-SSL of 11 mg/kg (HQ = 4.1-14.1). Lead is identified as a COPEC for surface soil at MRS 2. The following factors were considered as part of the weight of evidence evaluation to determining the risk significance for lead in surface soil at MRS 2.

- Four of the four surface soil samples exceeded the ecological screening value (maximum HQ = 14.1).
- Three of the three surface soil background concentrations exceeded the ecological screening value (maximum HQ = 4.0).
- Four of the four site surface soil samples exceeded the maximum background concentration.
- Four of the four site surface soil samples exceeded the mean background concentration.

Lead was detected in all four site surface soil samples at a concentration exceeding the eco-SSL (max HQ = 14.1). While lead was detected at MRS 2 at concentrations exceeding background, three of the three background lead samples also had concentrations that exceeded the eco-SSL. The eco-SSL used in the SLERA for lead is derived from a robust dataset including plants, soil invertebrates, and avian and mammalian wildlife. The screening value of 11 mg/kg is based on toxicological effects to the most sensitive of the avian receptors evaluated (i.e., woodcock) and represents the most conservative value relative to other potential site receptor groups

(mammalian wildlife = 56 mg/kg, plants = 120 mg/kg, and soil invertebrates = 1,700 mg/kg) [USEPA, 2005b]. The next lowest eco-SSL in the dataset of 46 mg/kg for doves is more relevant to the type of ecological receptors that could occur at MRS 2, where much of the land is developed. Use of the eco-SSL value for doves would yield a maximum HQ of 3.2 at MRS 2, and two of the remaining three samples would be reduced to a HQ close to one (1.0 and 1.2). While lead is a COPEC for MRS 2, based on the conservative nature of the screening evaluation, the weight of evidence evaluation concluded that exposure to surface soil does not present unacceptable risks to ecological receptors at MRS 2.

5.5.1.9 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer mechanisms for MCs in subsurface soils to employees and construction workers. Four subsurface samples were collected from the skeet range area in MRS 2.

5.5.1.10 No explosives were detected at concentrations above their respective RLs in subsurface soil at MRS 2. The RLs for all explosives were below the screening criteria selected for the employee and construction workers in HHRA (Table 5-3), which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. No explosive COPCs were identified in subsurface soils at MRS 2.

5.5.1.11 Lead was the only inorganic detected in subsurface soil at MRS 2. Antimony was never detected in subsurface soils, and because the maximum MDL and RL for the MC were below the screening criterion selected for the HHRA, the ability of the analytical techniques used to detect the MC at levels sufficient to screen for risks to human receptors is confirmed. As described in Section 5.3.0.3 maximum and mean concentrations of lead in subsurface soils at MRS 2 exceeded respective maximum and mean concentrations in background soils. Therefore the subsurface soil pathway is complete for human receptors. The maximum concentration of lead was below the screening level used in the HHRA for employees and construction workers, and therefore no inorganic COPCs were identified in subsurface soil at MRS 2.

5.5.2 Groundwater Pathway and Screening Results

5.5.2.1. Groundwater was identified as a medium with a potentially complete pathway for construction workers. Incidental ingestion and dermal contact were identified as potentially complete transfer mechanisms for MCs in groundwater to the receptor group in the SS-WP Addendum. As described in Section 5.4.2.1, two groundwater samples and one duplicate

groundwater sample were collected from preexisting groundwater monitoring wells within MRS 1 and near MRS 2 as representative samples for the FUDS. The three samples were analyzed for DNT and DNT breakdown products and NG.

5.5.2.2 As described in Section 5.4.2.2 based on the results of the site groundwater samples no explosives were identified as COPCs in groundwater at the Mitchel Field FUDS.

5.6 Demonstration Bombing Range (MRS 3)

5.6.0.1 As presented in Section 5.1.1 the explosives DNT and DNT breakdown products and NG, and the metals antimony, iron, lead, and zinc were identified as MCs at MRS 3. Surface soil and subsurface soil were identified as media of concern for this area. Table 5-1 presents results of the screening level analysis in surface and subsurface soil.

5.6.1 Soil Pathway and Screening Results

5.6.1.1 Potentially complete exposure pathways in surface soil were identified for human and ecological receptors. For subsurface soil, potentially complete pathways were identified for a subset of human receptors. A total of seven soil samples were collected from MRS 3; three surface soil samples, three subsurface soil samples, and one duplicate subsurface soil sample. All seven were analyzed for the explosives DNT and DNT breakdown products and NG, and the metals antimony, iron, lead, and zinc. Table 5-1 presents the analytical results for surface and subsurface soil along with the human health and ecological screening values described previously in Section 5.1.3.

5.6.1.2 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer pathways for MCs in surface soils to visitors/students/trespassers, employees, and construction workers. Ingestion, inhalation, and dermal contact were identified as potential transfer mechanisms for MCs in surface soils to ecological receptors. Three surface soil samples were collected from the least developed areas within MRS 3.

5.6.1.3 **Human Health Screening:** No explosives were detected in concentrations above their respective RLs in surface soil samples collected at MRS 3. With the exception of NG, the RLs for all explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques used to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. Because the RL is above the NG screening value of 0.61 mg/kg, the MQO for sensitivity was not met for NG and any reported non-detects for NG do not

demonstrate that contamination is less than the selected screening criterion. However, as described in Section 5.1.4.2 the RL for NG is determined to be adequate for the HHRA screening at Mitchel Field. No explosive COPCs were identified in surface soils at MRS 3.

5.6.1.4 With the exception of antimony all of the inorganics analyzed (iron, lead, and zinc) were detected in surface soil at MRS 3. Antimony was never detected in surface soil at MRS 3, and because the maximum MDL and RL for the MC were below the screening criteria selected the HHRA, the ability of the analytical techniques used to detect the MC at levels sufficient to screen for risks to human receptors is confirmed. As described in Section 5.3.0.2 maximum and mean concentrations of iron, lead, and zinc at MRS 3 exceeded respective maximum and mean background concentrations. The maximum concentration of iron exceeded the screening level used in the HHRA for the visitor/student/trespasser. Therefore iron is designated as a COPC for surface soil at MRS 3. The following factors were considered as part of the weight of evidence evaluation for to determine the risk significance for iron in surface soil at MRS 3:

- Three of the three site surface soil samples exceeded the HHRA screening criterion selected for visitors/students/trespassers (site samples – 12,200 mg/kg, 13,200 mg/kg, 11,300 mg/kg; screening value – 5,500 mg/kg).
- None of the three surface soil samples exceeded the HHRA screening criterion selected for employees and construction workers.
- Two of the three background soil samples exceeded the screening criterion selected for visitors/students/trespassers (background samples – 7,900 mg/kg, 6,720 mg/kg; screening value – 5,500 mg/kg).
- None of the three background soil samples exceeded the screening criterion selected for employees and construction workers.
- Three of the three site surface soil samples exceeded the maximum background concentration.
- Three of three site surface soil samples exceeded the mean background concentration.
- Iron is not defined as a hazardous substance under CERCLA.

As described in Section 5.1.3.5 the HHRA screening value for visitors/students/trespassers for iron was derived by dividing the USEPA regional SL for residential soil by ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. The resulting screening value (5,500 mg/kg) is a conservative value for screening risks to human receptors at MRS 3 given that only three MCs are detected in the surface soils. None of the site iron concentrations exceed the unadjusted iron USEPA regional SL (55,000 mg/kg) for residential soil. In addition, iron is not defined as a hazardous substance under CERCLA. Therefore while

iron is a COPC for surface soil at MRS 3, based on the weight of evidence evaluation, site surface soil is not considered to represent an unacceptable risk to human receptors.

5.6.1.5 **Ecological Screening:** As described above in Section 5.6.1.3, no explosive MCs were detected in surface soil at MRS 3. The RLs for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the screening criteria selected for the SLERA, and confirm the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to ecological receptors.

5.6.1.6 No eco-SSL was available for NG, and it is, therefore, not possible to make similar comparisons for this MC. As described in Section 5.4.1.6, NG is unlikely to bioconcentrate or biomagnify, and is degradable in soils. Based on the fact that NG was not detected above its analytical RL, and considering fate and transport characteristics, NG was not identified as a COPEC in MRS 3. This decision is not expected to introduce an unacceptable level of uncertainty into the SLERA. No explosive COPECs were identified in surface soils at MRS 3.

5.6.1.7 As described in Section 5.6.1.4, iron, lead, and zinc were detected at surface soils at MRS 3. Antimony was never detected and as described in Section 5.1.4.2, the maximum MDL for antimony was below the eco-SLL, confirming the ability of the analytical techniques used to detect the MC at levels sufficient to screen for unacceptable risk. As described in Section 5.3.0.2 maximum and mean iron, lead, and zinc were elevated in surface soils above respective maximum and mean background concentrations. Lead was detected in three of three surface soil samples collected at MRS 3 at a concentration exceeding the eco-SSL of 11 mg/kg (HQ = 3.2-7.6). In addition the maximum detected concentration of zinc (46.4 mg/kg) exceeding the eco-SSL of 46 mg/kg (HQ=1). Lead and zinc are identified as COPECs for surface soil at MRS 3. The following factors were considered as part of the weight-of-evidence evaluation for developing future actions related to ecological risks associated with MCs at MRS 3:

- Lead
    - Three of the three surface soil samples exceeded the ecological screening value (maximum HQ = 7.6).
    - Three of the three surface soil background concentration exceeded ecological screening value (maximum HQ = 4.0).
    - Two of the three site surface soil samples exceeded the maximum background concentration.
    - Two of the three site surface soil samples exceeded the mean background concentration.

- Zinc
    - One of the three surface soil samples exceeded the ecological screening value (maximum HQ = 1.008).
    - None of three surface soil background concentrations exceeded the ecological screening value.
    - One of the three site surface soil samples exceeded the maximum background concentration.
    - Three of the three site surface soil samples exceeded the mean background concentration.

Lead was detected in all three site surface soil samples at a concentration exceeding the eco-SSL (max HQ = 7.6). While lead was detected at concentrations at MRS 3 which exceeded background concentrations, all three of the background lead samples also exceeded the eco-SSL. The eco-SSL used in the SLERA for lead is derived from a robust dataset including plants, soil invertebrates, and avian and mammalian wildlife. The screening value of 11 mg/kg is based on toxicological effects to the most sensitive of the avian receptors evaluated (i.e., woodcock) and represents the most conservative value relative to other potential site receptor groups (mammalian wildlife = 56 mg/kg, plants = 120 mg/kg, and soil invertebrates = 1,700 mg/kg) [USEPA, 2005b]. The next lowest eco-SSL in the dataset of 46 mg/kg for doves is more relevant to the type of ecological receptors that could occur at this MRS, where much of the land is developed. Use of the eco-SSL value for doves would yield a maximum HQ of 1.8 at MRS 3. The HQ for the remaining two samples would be 1.2 and 0.8. Zinc was detected in all three site surface soil samples, however, only one sample concentration exceeds the eco-SSL for zinc, and the exceedence is minimal (max HQ = 1.008). While lead and zinc are COPECs for MRS 3, based on the conservative nature of the screening evaluation, the weight of evidence evaluation concluded that exposure to surface soils does not result in unacceptable risks to ecological receptors at MRS 3.

5.6.1.8 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer pathways for MCs in subsurface soils to employees and construction workers. Three subsurface samples and one duplicate sample were collected from the least developed areas in MRS 3.

5.6.1.9 No explosives were detected in concentrations above their respective RLs in subsurface soil at MRS 3. The RLs for all explosives were below the screening criteria selected for the

employee and construction workers in HHRA (Table 5-3), which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. No explosive COPCs were identified in subsurface soils at MRS 3.

5.6.1.10 With the exception of antimony all of the inorganics analyzed (iron, lead, and zinc) were detected in subsurface soil at MRS 3. Antimony was never detected in subsurface soils, and because the maximum MDL and RL for the MC were below the screening criterion selected for the HHRA, the ability of the analytical techniques used to detect the MC at levels sufficient to screen for risks to human receptors is confirmed. As described in Section 5.3.0.3 maximum and mean concentrations of iron in subsurface soils at MRS 3 exceeded respective maximum and mean concentrations in background. The subsurface soil pathway is therefore complete for human receptors. The maximum concentrations all detected MCs were below their respective screening levels used in the HHRA for employees and construction workers, therefore no inorganic COPCs were identified in subsurface soil at MRS 3.

5.7 Machine Gun Range (MRS 5)

5.7.0.1 As presented in Section 5.1.1 the explosives DNT and DNT breakdown products, NG and the metals antimony, copper, iron, lead, and nickel were identified as MCs at MRS 5. Surface soil and subsurface soil were identified as media of concern for this area. Table 5-1 presents results of the screening level analysis in surface and subsurface soil.

5.7.1 Soil Pathway and Screening Results

5.7.1.1 Potentially complete exposure pathways in surface soil were identified for human and ecological receptors. For subsurface soil, potentially complete pathways were identified for a subset of human receptors. A total of seven soil samples were collected from MRS 5; three surface soil samples, one duplicate surface sample, and three subsurface soil samples. All seven samples were analyzed for the explosives DNT and DNT breakdown products and NG, and the metals antimony, copper, iron, lead, and nickel. Table 5-1 presents the analytical results for surface and subsurface soil along with the human health and ecological screening values described previously in Section 5.1.3.

5.7.1.2 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer pathways for MCs in surface soils to visitors/students/trespassers, employees, and construction workers. Ingestion, inhalation, and dermal contact were identified as potential transfer mechanisms for MCs in surface soil to

ecological receptors. Three surface soil samples and one duplicate surface soil sample were collected from MRS 5.

5.7.1.3 **Human Health Screening:** No explosives were detected in concentrations above their respective RLs in surface soil samples collected at MRS 5. With the exception of NG, the RLs for all explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. Because the RL is above the NG screening value of 0.61 mg/kg, the MQO for sensitivity was not met and any reported non-detects for NG do not demonstrate NG contamination is less than the selected screening criterion. However, as described in Section 5.1.4.2 the RL for NG is determined to be adequate for the HHRA screening at Mitchel Field. No explosive COPCs were identified in surface soils at MRS 5.

5.7.1.4 With the exception of antimony all of the inorganics analyzed (copper, iron, lead, and nickel) were detected in surface soil at MRS 5. Antimony was never detected in surface soils and both the MDL and RL were below the HHRA screening levels. As presented in Section 5.3.0.2 each of the detected metals was present at maximum and mean concentrations that exceeded their maximum and mean concentrations in background, respectively. The maximum concentration of iron exceeded the screening level used for the visitor/student/trespasser in the HHRA, and therefore iron is designated as a COPC for surface soil at MRS 5. The following factors were considered as part of the weight of evidence approach to determine the risk significance of iron in surface soil at MRS 5:

- Four of the four site surface soil samples exceeded the HHRA screening criterion selected for visitors/students/trespassers (site samples – 10,200 mg/kg, 10,300 mg/kg, 11,000 mg/kg, 11,100 mg/kg; screening value – 5,500 mg/kg).
- None of the four surface soil samples exceeded the HHRA screening criterion selected for employees and construction workers.
- Two of the three background surface soil samples exceeded the screening criterion selected for visitors/students/trespassers (background samples – 7,900 mg/kg, 6,720 mg/kg; screening value – 5,500 mg/kg).
- None of the three background soil samples exceeded the screening criterion selected for employees and construction workers.
- Four of the four site surface soil samples exceeded the maximum background concentration.
- Four of the four site surface soil samples exceeded the mean background concentration
- Iron is not defined as a hazardous substance under CERCLA.

As described in Section 5.1.3.5 the HHRA screening value for iron was derived by dividing the USEPA regional SL for residential soil by ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. The resulting screening value (5,500 mg/kg) is a conservative screening value for MRS 5 given that only three MCs are detected in the surface soils. None of the site iron concentrations exceed the unadjusted iron USEPA regional SL (55,000 mg/kg) for residential soil. In addition, iron is not defined as a hazardous substance under CERCLA. Therefore, while iron is a COPC for surface soil at MRS 5, based on the weight of evidence evaluation, site surface soil is not considered to represent an unacceptable risk to human receptors.

5.7.1.5 **Ecological Screening:** As described above in Section 5.6.1.3, no explosive MCs were detected in the surface soil at MRS 5. The RLs for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the screening criteria selected for the SLERA, and confirm the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to ecological receptors.

5.7.1.6 No eco-SSL was available for NG, and it is, therefore, not possible to make similar comparisons for this MC. As described in Section 5.4.1.6, NG is unlikely to bioconcentrate or biomagnify, and is degraded in soils. Based on the fact that NG was not detected above its respective analytical RL, and considering fate and transport characteristics, NG was not identified as a COPEC in MRS 5. This decision is not expected to introduce an unacceptable level of uncertainty into the SLERA. No explosive COPECs were identified in surface soils at MRS 5.

5.7.1.7 As described in Section 5.7.1.4, copper, iron, lead, and nickel were detected in surface soils at MRS 5. Antimony was never detected and as described in Section 5.1.4.2, the maximum MDL for the MC was below the eco-SLL. Lead was detected in four of the four surface soil samples at MRS 5 at a concentration exceeding the eco-SSL of 11 mg/kg (HQ = 5.2-6.9). Lead is identified as a COPEC for surface soil at MRS 5. The following factors were considered as part of the weight of evidence approach for determining the risk significance of the COPC in surface soil at MRS 5:

- Four of the four surface soil samples exceeded the ecological screening value (maximum HQ = 6.9).
- Three of the three surface soil background concentration exceeded ecological screening criteria (maximum HQ = 4.0).

- Four of the four lead site surface soil samples exceeded the maximum background concentration.
- Four of the four site surface soil samples exceeded the mean background concentration.
- All site surface soils were estimated concentrations (J-qualified).

Lead was detected in all four site surface soil samples at estimated concentrations. While the estimated concentrations exceeded background concentrations, all three of the background lead samples also had concentrations of lead that exceeded the eco-SSL. The eco-SSL used in the SLERA for lead is derived from a robust dataset including plants, soil invertebrates, and avian and mammalian wildlife. The screening value of 11 mg/kg is based on toxicological effects to the most sensitive of the avian receptors evaluated (i.e., woodcock) and represents the most conservative value relative to other potential site receptor groups (mammalian wildlife = 56 mg/kg, plants = 120 mg/kg, and soil invertebrates = 1,700 mg/kg) [USEPA, 2005b]. The next lowest eco-SSL in the dataset of 46 mg/kg for doves is more relevant to the type of ecological receptors that could occur at this FUDS, where much of the land is developed. Use of the eco-SSL value for doves would yield an HQ of 1.2 to 1.6 for all of the soil samples at MRS 5. While lead is a COPEC for MRS 5, based on the conservative nature of the screening evaluation, the weight of evidence evaluation concluded that exposure to surface soils does not result in unacceptable risks to ecological receptors at MRS 5.

5.7.1.8 As described in the SS-WP Addendum for Mitchel Field ingestion, inhalation, and dermal contact were identified as potentially complete transfer mechanisms for MCs in subsurface soils to employees and construction workers. Three subsurface soil samples were collected from MRS 5.

5.7.1.9 No explosives were detected at concentrations above their respective RLs in subsurface soil at MRS 5. With the exception of NG, the RLs for all explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. As described in Section 5.1.4.2, the RL for NG was also deemed adequate to support the HHRA. No explosive COPCs were identified in subsurface soils at MRS 5.

5.7.1.10 With the exception of antimony all of the inorganics analyzed (copper iron, lead, and nickel) were detected in subsurface soil at MRS 5. As described in Section 5.4.1.2, the maximum MDL for never-detected antimony was below the screening criteria selected for the MC in the HHRA, confirming the ability of the analytical techniques used to detect the MC at levels sufficient to screen for unacceptable risk to human receptors. As described in Section 5.3.0.3 all

of the detected inorganics were elevated at concentrations exceeding background. The subsurface soil pathway is therefore complete for human receptors. However, the maximum concentrations for copper, iron, lead, and nickel were below their respective screening levels used in the HHRA for employees and construction workers. No inorganic COPCs were identified in subsurface soil at MRS 5.

5.8 Unknown Mortar Range (MRS 6)

5.8.0.1 As presented in Section 5.1.1 the explosives DNT and DNT breakdown products and NG, and the metals aluminum and iron were identified as MCs at MRS 6. Surface soil and subsurface soil were identified as media of concern for this area. Table 5-1 presents results of the screening level analysis in surface and subsurface soil.

5.8.1 Soil Pathway and Screening Results

5.8.1.1 Potentially complete exposure pathways in surface soil were identified for human and ecological receptors. For subsurface soil, potentially complete pathways were identified for a subset of human receptors. A total of five soil samples were collected from MRS 6; two surface soil samples, one duplicate surface soil sample, and two subsurface soil samples. All five of the samples were analyzed for the explosives DNT and DNT breakdown products and NG, and the metals aluminum and iron. Table 5-1 presents the analytical results for surface and subsurface soil along with the human health and ecological screening values described previously in Section 5.1.3.

5.8.1.2 As described in the SS-WP Addendum for Mitchel Field incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer pathways for MCs in surface soils to visitors/students/trespassers, employees, construction workers. Ingestion, inhalation, and dermal contact were identified as potential transfer mechanisms for MCs in surface soils to ecological receptors. Two surface soil samples and one duplicate surface soil sample were collected from the least developed areas within MRS 6.

5.8.1.3 **Human Health Screening:** No explosives were detected in concentrations above their respective RLs in surface soil samples collected at MRS 6. With the exception of NG, the RLs for all explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques used to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. Because the RL is above the NG screening value of 0.61 mg/kg, the MQO for sensitivity was not met and any reported non-detects for NG do not demonstrate NG contamination is less than the selected screening criterion. As described in

Section 5.1.4.2 the RL for NG is determined to be adequate for the HHRA screening at Mitchel Field. No explosive COPCs were identified in surface soils at MRS 6.

5.8.1.4 Both aluminum and iron were detected in surface soil at MRS 6. As described in Section 5.3.0.2 maximum and mean concentrations of aluminum and lead exceeded their respective maximum and mean background concentrations. The maximum detected concentration of aluminum and iron exceeded the screening levels used for the visitor/student/trespasser in the HHRA. Therefore aluminum and iron are designated as COPCs for surface soil at MRS 6. The following factors were considered as part of the weight of evidence approach to determine the risk significance of the COPCs in surface soil at MRS 6:

- Aluminum
    - One of the three site surface soil samples exceeded the HHRA screening criterion selected for visitors/students/trespassers (site samples – 11,600 mg/kg; screening value - 7,700 mg/kg).
    - None of the three surface soil samples exceeded the HHRA screening criterion selected for employees and construction workers.
    - None of the three background soil samples exceeded the screening criterion selected for visitors/students/trespassers.
    - None of the three background soil samples exceeded the screening criterion selected for employees and construction workers.
    - One of the three site surface soil samples exceeded the maximum background concentration.
    - One of the three site surface soil samples exceeded the mean background concentration.
    - Aluminum is not defined as hazardous substance under CERCLA.
    - The sample that exceeded the residential aluminum screening value was collected from sample MF-UKM-SS-01-01 was collected in an athletic field the soil sample was collected approximately 9-10 inches below the field surface. It is unlikely that most students playing on these fields would be exposed to this layer of soil.
    - None of the site antimony concentrations exceed the unadjusted aluminum USEPA regional SL (77,000 mg/kg) for residential soil.

- Iron
    - Three of the three site surface soil samples exceeded the HHRA screening

criterion selected for visitors/students/trespassers (site samples – 12,200 mg/kg, 12,900 mg/kg, 12,700 mg/kg; screening value – 5,500 mg/kg).

- None of the three surface soil samples exceeded the HHRA screening criterion selected for employees and construction workers.
- Two of the three background soil samples exceeded the screening criterion selected for visitors/students//trespassers (background samples – 7,900 mg/kg, 6,720 mg/kg; screening value – 5,500 mg/kg).
- None of the three background soil samples exceeded the screening criterion selected for employees and construction workers.
- Three of the three site surface soil samples exceeded the maximum background value.
- Three of the three site surface soil samples exceeded the mean background concentration.
- Iron is not defined as a hazardous substance under CERCLA.

Only one of three surface soil samples exceeded the aluminum screening value used for visitors/students/trespassers in the HHRA, and the exceedence was relatively small (less than 2 times the screening value). In addition, as described in Section 5.1.3.5 the HHRA screening value for aluminum for this receptor group was derived by dividing the USEPA regional SL for residential soil by a factor of ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. None of the site aluminum concentrations exceed the unadjusted antimony USEPA regional SL (77,000 mg/kg) for residential soil. A similar approach was used for deriving the HHRA screening value for iron for visitors/students/trespassers. Similar to antimony, none of the site iron concentrations exceed the unadjusted iron USEPA regional SL (55,000 mg/kg) for residential soil. The resulting screening values (antimony, 7,700 mg/kg; iron 5,500 mg/kg) are conservative screening values for MRS 6 given that only two MCs were detected in surface soils. In addition, aluminum and iron are not defined as a hazardous substance under CERCLA. Therefore while aluminum and iron are COPCs for surface soil at MRS 6, based on the weight of evidence evaluation, site surface soil is not determined to represent an unacceptable risk to human receptors.

5.8.1.5 **Ecological Screening:** As described above in Section 5.8.1.3, no explosive MCs were detected in surface soil at MRS 6. The RLs for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the screening criteria selected for the SLERA, and confirm the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to ecological receptors.

5.8.1.6 No eco-SSL was available for NG, and it is, therefore, not possible to make similar comparisons for this MC. As described in Section 5.4.1.6, NG is unlikely to bioconcentrate or biomagnify, and is readily biodegradable in soils. Based on the fact that NG was not detected above its analytical RL, and considering fate and transport characteristics, NG was not identified as a COPEC in MRS 6. This decision is not expected to introduce an unacceptable level of uncertainty into the SLERA. No explosive COPECs were identified in surface soils at MRS 6.

5.8.1.7 As described in Section 5.8.1.4, aluminum and iron were detected in surface soils at concentrations exceeding their respective maximum and mean background concentrations. The surface soil pathway for ecological receptors is therefore complete. Unlike many metals a threshold concentration is not recommended for screening aluminum; instead potential ecological risks associated with aluminum are identified based on the measured soil pH. This alternative is a suitable measure for determining potential toxicity because it allows for a prediction of soluble, bioavailable aluminum (the form associated with toxicity to ecological receptors) to be determined. Aluminum is identified as a COPC only at sites where the soil pH is less than 5.5 (USEPA 2003a). The pH of soils at MRS 6 is not known, and therefore some uncertainty regarding the potential risk that may be posed by aluminum in soil exists. On the whole, concentrations of aluminum at MRS 6 are relatively similar to background. The mean concentration in surface soil at MRS 6 is 6,280 mg/kg, while the mean concentration in background is 5,400 mg/kg, and only one of three onsite surface soil samples exceeds the maximum and mean concentration of aluminum in background. Therefore, the presence of aluminum on-site is not likely to be due to FUDS related activities. In addition, no eco-SSL was available for iron. Iron is required for synthesis processes in plant cells and a certain amount of iron is essential to plant growth. Iron concentrations in natural soils range from 20,000-550,000 mg/kg (USEPA 2003b). This range is well above the maximum site iron concentration of 12,700 mg/kg found in surface soil at MRS 6. Iron is not anticipated to pose an unacceptable risk to ecological receptors at MRS 6 based on the fact that it is present in this area at levels below the natural range in soils. The absence of pH specific information for MRS 6 and of a screening criterion for iron are not expected to introduce an unacceptable level of uncertainty into the SLERA No inorganic COPECs were identified in surface soils at MRS 6.

5.8.1.8 As described in the SS-WP Addendum for Mitchel Field, incidental ingestion, inhalation, and dermal contact were identified as potentially complete transfer mechanisms for MCs in subsurface soils to employees and construction workers. Two subsurface samples were collected in MRS 6 from the least developed land areas.

5.8.1.9 No explosives were detected in concentrations above their respective RLs in subsurface

soil samples collected at MRS 6. The RLs for all explosives were below the screening criteria selected for the employee and construction worker in HHRA (Table 5-3), which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for unacceptable risks to human receptors. No explosive COPCs were identified in subsurface soils at MRS 6.

5.8.1.10 Aluminum and iron were detected in subsurface soil at MRS 6. As described in Section 5.3.0.3 the maximum and mean concentrations of these MCs in subsurface soils were elevated compared to the respective maximum and mean concentrations in background. The subsurface soil pathway, therefore, is complete for human receptors. However, the maximum concentrations of aluminum and iron were below their respective screening levels used in the HHRA for employees and construction workers, and no inorganic COPCs were identified in subsurface soil at MRS 6.

Table 5-1 Summary of Soil Analytical Results

Analyte	CAS	Unit	Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco Screening Levels	MF-LDSP-SS-01-01	MF-LDSP-SS-01-02	MF-LDSP-SB-02-01	MF-LDSP-SB-02-02	MF-LDSP-SB-FD2 [k]	MF-SR-SS-01-01	MF-SR-SS-01-02	MF-SR-SS-01-03	MF-SR-SS-01-04	MF-SR-SB-02-01	MF-SR-SB-02-02	MF-SR-SB-02-03	MF-SR-SB-02-04	MF-DBR-SS-01-01	MF-DBR-SS-01-02
Sample Name:						MF-LDSP-SS-01-01	MF-LDSP-SS-01-02	MF-LDSP-SB-02-01	MF-LDSP-SB-02-02	MF-LDSP-SB-FD2 [k]	MF-SR-SS-01-01	MF-SR-SS-01-02	MF-SR-SS-01-03	MF-SR-SS-01-04	MF-SR-SB-02-01	MF-SR-SB-02-02	MF-SR-SB-02-03	MF-SR-SB-02-04	MF-DBR-SS-01-01	MF-DBR-SS-01-02
Sample Date:						5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009
Parent Name:										MF-LDSP-SB-02-02										
MRS:						MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 2	MRS 2	MRS 2	MRS 2	MRS 2	MRS 2	MRS 2	MRS 2	MRS 3	MRS 3
Explosives																				
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15 [c]	200 c	80 [e]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.04 U	0.08
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.04 U	0.08
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.04 U	0.08
NITROGLYCERIN	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	0.04 U	4.00
Metals																				
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.23 UJ	0.16 UJ	0.20 UJ	0.16 UJ	0.16 UJ	0.22 UJ	0.22 UJ	0.17 UJ	0.17 UJ	0.20 UJ	0.19 UJ	0.17 UJ	0.16 UJ	0.18 UJ	0.24
COPPER	7440-50-8	mg/kg	310	4,100	28 [g]	19.90	13.10 J	10.90	8.50 J	7.50 J	-	-	-	-	-	-	-	-	-	-
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**6,580.00**	5,390.00	4,430.00	5,820.00	4,940.00	-	-	-	-	-	-	-	-	**12,200.00**	**13,200.00**
LEAD	7439-92-1	mg/kg	400	800	11 [h]	*204.00*	*79.60 J*	63.10	66.50 J	54.40 J	*155.00*	*140.00*	*44.90*	*54.70*	35.40	98.50	41.70	2.60	*35.70*	*83.60*
NICKEL	7440-02-0	mg/kg	150	2,000	38 [i]	7.30 J	5.30	4.80 J	5.10	4.40	-	-	-	-	-	-	-	-	-	-
ZINC	7440-66-6	mg/kg	2,300	31,000	46 [j]	-	-	-	-	-	-	-	-	-	-	-	-	-	32.90	35.90

[a] Screening levels for residential and industrial soils are derived from USEPA 2009. USEPA. 2009. Regional Screening Levels. Available from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm. Accessed July 2009.
[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening level was divided by 10. No adjustment was made for carcinogens or lead.
[c] The USEPA screening levels for 2-amino-4,6-DNT and 4-amino-2,6-DNT is based on toxicity information for 2,4-DNT (from USEPA IRIS).
[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156.
Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT.
The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.
[e] EPA 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 15 July 2008.
[f] EPA 2005b. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed June 2009.
[g] EPA 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf
[h] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 15 July 2008.
[i] EPA 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 15 July 2008.
[j] EPA 2007c. Ecological Soil Screening Level for Zinc. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_zinc.pdf. Accessed 15 July 2008.
[k] Duplicate sample names were modified from names presented in EDD and DVSR. For the data table here MF-LDSP-SB-0-02P was replaced with MF-LDSP-SB-FD2, MF-DBR-SB-02-03P was replaced with MF-DBR-SB-FD1, MF-MGR-SS-01-01P was replaced with MF-MGR-DD-FD1, and MF-UKM-SS-01-02P was replaced with MF-UKM-SS-FD2.
[l] Due to an error in the initial sample names assigned, the sample name MF-LDSP-SS-01-03 presented in the EDD and DVSR was changed to MF-MGR-SS-01-03 in the data table here to properly reflect its sample location.

CAS = Chemical Abstract Service
J = Analyte present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram
MRS = Munitions Response Site
NSL = No screening level
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) . Exceptions for lead are noted in Section 5.1.2.2 of the text.
UJ = Not detected. The associated detection limit is an estimate and may be inacucurate or imprecise.
USEPA = United States Environmental Protection Agency
- = Not analyzed

Shaded and bold values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).
Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-1 Summary of Soil Analytical Results

Sample Name:			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco Screening Levels	MF-DBR-SS-01-02	MF-DBR-SS-01-03	MF-DBR-SB-02-01	MF-DBR-SB-02-02	MF-DBR-SB-02-03	MF-DBR-SB-FD1 [k]	MF-MGR-SS-01-01	MF-MGR-SS-FD1 [k]	MF-MGR-SS-01-02	MF-MGR-SS-01-03 [l]	MF-MGR-SB-02-01	MF-MGR-SB-02-02	MF-MGR-SB-02-03	MF-UKM-SS-01-01	MF-UKM-SS-01-02	MF-UKM-SS-FD2 [k]	MF-UKM-SB-02-01	MF-UKM-SB-02-02	MF-BG-SS-01-01	MF-BG-SS-01-04	MF-BG-SS-01-05
Sample Date:						5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/19/2009	5/18/2009	5/18/2009	5/18/2009
Parent Name:											MF-DBR-SB-02-03		MF-MGR-SS-01-01							MF-UKM-SS-01-02						
MRS:						MRS 3	MRS 3	MRS 3	MRS 3	MRS 3	MRS 3	MRS 5	MRS 5	MRS 5	MRS 5	MRS 5	MRS 5	MRS 5	MRS 6	MRS 6	MRS 6	MRS 6	MRS 6			
Analyte	**CAS**	**Unit**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**																					
Explosives																										
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [c]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	-	-	-
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [c]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	-	-	-
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15 [c]	200 c	80 [c]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	-	-	-
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [c]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	-	-	-
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [c]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	-	-	-
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [c]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	-	-	-
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [c]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	-	-	-
NITROGLYCERIN	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	-	-	-
Metals																										
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	-	-	-	-	-	-	-	-	-	-	-	-	-	**11,600.00**	3,700.00 J	3,550.00 J	13,500.00	2,240.00 J	3,240.00	6,910.00	6,060.00
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.24 UJ	0.16 UJ	0.16 UJ	0.19 UJ	0.16 UJ	0.15 UJ	0.16 UJ	0.15 UJ	0.16 UJ	0.15 UJ	0.15 UJ	0.16 UJ	0.16 UJ	-	-	-	-	-	0.16 UJ	0.15 UJ	0.15
COPPER	7440-50-8	mg/kg	310	4,100	28 [g]	-	-	-	-	-	-	13.50 J	14.40 J	10.70 J	11.20 J	11.10 J	9.50 J	9.60 J	-	-	-	-	-	5.30 J	7.90 J	7.80
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**13,200.00**	**11,300.00**	4,910.00	11,900.00	11,500.00	11,100.00	**10,200.00**	**10,300.00**	**11,000.00**	**11,100.00**	10,600.00	11,400.00	10,700.00	**12,200.00**	**12,900.00**	**12,700.00**	13,800.00	4,920.00	4,960.00	**7,900.00**	**6,720.00**
LEAD	7439-92-1	mg/kg	400	800	11 [h]	*83.60*	*58.60 J*	10.30	30.50	25.90 J	23.90 J	*57.00 J*	*60.30 J*	*59.20 J*	*75.70 J*	45.50 J	44.30 J	52.30 J	-	-	-	-		*24.50 J*	*40.30 J*	*44.50*
NICKEL	7440-02-0	mg/kg	150	2,000	38 [i]	-	-					7.10	7.60	6.80	7.00	7.10	7.10	6.50	-	-	-	-	-	4.00	5.30	4.90
ZINC	7440-66-6	mg/kg	2,300	31,000	46 [j]	35.90	*46.40*	13.10	26.10	25.90	24.80	-	-	-	-	-	-	-	-	-	-	-	-	38.40	16.70	23.90

[a] Screening levels for residential and industrial soils are derived from USEPA 2009. USEPA. 2009. Regional Screening Levels. Available from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm. Accessed July 2009.

[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening level was divided by 10. No adjustment was made for carcinogens or lead.

[c] The USEPA screening levels for 2-amino-4,6-DNT and 4-amino-2,6-DNT is based on toxicity information for 2,4-DNT (from USEPA IRIS).

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156.
Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT.
The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] EPA 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 15 July 2008.

[f] EPA 2005b. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed June 2009.

[g] EPA 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf

[h] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 15 July 2008.

[i] EPA 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 15 July 2008.

[j] EPA 2007c. Ecological Soil Screening Level for Zinc. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_zinc.pdf. Accessed 15 July 2008.

[k] Duplicate sample names were modified from names presented in EDD and DVSR. For the data table here MF-LDSP-SB-0-02P was replaced with MF-LDSP-SB-FD2, MF-DBR-SB-02-03P was replaced with MF-DBR-SB-FD1, MF-MGR-SS-01-01P was replaced with MF-MGR-DD-FD1, and MF-UKM-SS-01-02P was replaced with MF-UKM-SS-FD2.

[l] Due to an error in the initial sample names assigned, the sample name MF-LDSP-SS-01-03 presented in the EDD and DVSR was changed to MF-MGR-SS-01-03 in the data table here to properly reflect its sample location.

CAS = Chemical Abstract Service
J = Analyte present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram
MRS = Munitions Response Site
NSL = No screening level
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) . Exceptions for lead are noted in Section 5.1.2.2 of the text.
UJ = Not detected. The associated detection limit is an estimate and may be inaccurate or imprecise.
USEPA = United States Environmental Protection Agency
- = Not analyzed

Shaded and bold values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).
Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-2 Summary of Groundwater Analytical Results

			Screening Levels Tap water [a,b]			
		Sample Name:		MF-OS-GW-00-01	MF-OS-GW-00-01P	MF-OS-GW-00-02
		Sample Date:		5/19/2009	5/19/2009	5/19/2009
		Parent Name:			MF-OS-GW-00-01	
		MRS:		(d)		
Analyte	CAS	Unit	(µg/L)			
Explosives						
2,4-DINITROTOLUENE	121-14-2	µg/L	0.22	0.20 U	0.20 U	0.20 U
2,6-DINITROTOLUENE	606-20-2	µg/L	3.7	0.20 U	0.20 U	0.20 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	µg/L	7.3 [c]	0.20 U	0.20 U	0.20 U
2-NITROTOLUENE	88-72-2	µg/L	0.31	0.40 U	0.40 U	0.40 U
3-NITROTOLUENE	99-08-1	µg/L	73	0.40 U	0.40 U	0.40 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	µg/L	7.3 [c]	0.20 U	0.20 U	0.20 U
4-NITROTOLUENE	99-99-0	µg/L	4.2	0.40 U	0.40 U	0.40 U
NITROGLYCERIN	55-63-0	µg/L	0.37	20.00 U	20.00 U	20.00 U

[a] Screening levels for human health exposure to surface water are derived from USEPA 2009. Regional Screening Levels. Available from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm. Accessed August 2009.

[b] For non-carcinogens the tapwater screening level was divided by 10. No adjustment was made for carcinogens.

[c] The USEPA screening levels for 2-amino-4,6-DNT and 4-amino-2,6-DNT is based on toxicity information for 2,4-DNT (from USEPA IRIS).

[d] Samples were collected from wells located near MRS 2 and within MRS 1.

CAS = Chemical Abstract Service
U = Not detected. Values are reporting limits (RLs)
µg/L = Microgram per liter
DNT - Dinitrotoluene
IRIS = USEPA's Integrated Risk Information System
MRS = Munitions Response Site
USEPA = United States Environmental Protection Agency

Table 5-3
Non-Detection Concentrations and Screening Values for Ecological Receptors for Never-Detected Analytes

Table 5-3
Non-Detection Concentrations and Screening Values for Human Receptors for Never-Detected Analytes

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Screening Value - Trespasser/Student/ Visitor [b]	Screening Value - Employee; Construction Worker [b]
Surface Soil						
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	1.6	5.5
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	6.1	62
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	15	200
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	2.9	13
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	120	1,200
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	15	190
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30	110
NITROGLYCERIN	55-63-0	mg/kg	4	4	0.61	6.2
ANTIMONY	7440-36-0	mg/kg	0.2	0.2	3.1	41
Subsurface Soil						
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	NA	5.5
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	NA	62
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	NA	200
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	NA	13
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	NA	1,200
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	NA	190
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	NA	110
NITROGLYCERIN	55-63-0	mg/kg	4	4	NA	6.2
ANTIMONY	7440-36-0	mg/kg	0.2	0.2	NA	41
Groundwater						
2,4-DINITROTOLUENE	121-14-2	µg/L	0.2	0.2	NA	0.22
2,6-DINITROTOLUENE	606-20-2	µg/L	0.2	0.2	NA	3.7
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	µg/L	0.2	0.2	NA	7.3
2-NITROTOLUENE	88-72-2	µg/L	0.4	0.4	NA	0.31
3-NITROTOLUENE	99-08-1	µg/L	0.4	0.4	NA	73
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	µg/L	0.2	0.2	NA	7.3
4-NITROTOLUENE	99-99-0	µg/L	0.4	0.4	NA	4.2
NITROGLYCERIN	55-63-0	µg/L	20	20	NA	0.37

[a] Detection limits are reporting limits (RLs) for organics and method detection limits (MDLs) for inorganics.
[b] Sources and derivations of screening levels for all receptors and environmental media are detailed in Tables 5-1 and 5-2.

CAS = Chemical Abstract Service.
mg/kg = Milligram per kilogram.
NA = Not applicable; receptor group was not identified as having a potentially completed pathway for the listed environmental medium.
µg/L = Microgram per liter

Table 5-4
Non-Detection Concentrations and Screening Values for Ecological Receptors for Never-Detected Analytes

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Ecological Screening Value [b]
Surface Soil					
2,4-DINTROTOLUENE	121-14-2	mg/kg	0.04	0.04	30
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	30
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	80
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	30
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	30
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	80
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30
NITROGLYCERIN	55-63-0	mg/kg	4	4	NSL
ANTIMONY	7440-36-0	mg/kg	0.2	0.2	0.27

[a] Detection limits are reporting limits (RLs) for organics and method detection limits (MDLs) for inorganics.
[b] Sources and derivations of screening levels for all receptors and environmental media are detailed in Table 5-1.

CAS = Chemical Abstract Service.
mg/kg = Milligram per kilogram.
NSL = No screening level.

Table 5-5
Comparison of Onsite and Background Soil Concentrations for Metals at MRS 1

	Onsite: MRS 1				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soils										
ANTIMONY	0/2	ND	ND	0.10	0/3	ND	ND	0.08	-	-
COPPER	2/2	13.1 J	19.9	16.5	3/3	5.30 J	7.90 J	7.00	YES	YES
IRON	2/2	5,390	6,580	5,985	3/3	4,960	7,900	6,530	NO	NO
LEAD	2/2	79.6 J	204	142	3/3	24.5 J	44.5 J	36.4	YES	YES
NICKEL	2/2	5.30	7.30 J	6.30	3/3	4.00	5.30	4.73	YES	YES
Subsurface Soils										
ANTIMONY	0/3	ND	ND	0.09	0/3	ND	ND	0.08	-	-
COPPER	3/3	7.50 J	10.9	8.97	3/3	5.30 J	7.90 J	7.00	YES	YES
IRON	3/3	4,430	5,820	5,060	3/3	4,960	7,900	6,530	NO	NO
LEAD	3/3	54.4 J	66.5 J	61.3	3/3	24.5 J	44.5 J	36.4	YES	YES
NICKEL	3/3	4.40	5.10	4.77	3/3	4.00	5.30	4.73	NO	YES

[a] Minimum concentration of analyte detected.
[b] Non-detects are carried forth as 1/2 the method detection limit in the calculation of mean concentrations.

J = Estimated concentration
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND = No detected results
"-" = Chemical not detected in site or background samples, therefore comparison is not meaningful

Table 5-6
Comparison of Onsite and Background Soil Concentrations for Metals at MRS 2

	Onsite: MRS 2				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soils										
ANTIMONY	0/4	ND	ND	0.10	0/3	ND	ND	0.08	-	-
LEAD	4/4	44.9	155	98.7	3/3	24.5 J	44.5 J	36.4	YES	YES
Subsurface Soils										
ANTIMONY	0/4	ND	ND	0.09	0/3	ND	ND	0.08	-	-
LEAD	4/4	2.6	98.5	44.6	3/3	24.5 J	44.5 J	36.4	YES	YES

[a] Minimum concentration of analyte detected.
[b] Non-detects are carried forth as 1/2 the method detection limit in the calculation of mean concentrations.

J = Estimated concentration
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND = No detected results
"-" = Chemical not detected in site or background samples, therefore comparison is not meaningful

Table 5-7
Comparison of Onsite and Background Soil Concentrations for Metals at MRS 3

	Onsite: MRS 3				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soils										
ANTIMONY	0/3	ND	ND	0.10	0/3	ND	ND	0.08	-	-
IRON	3/3	11,300	13,200	12,200	3/3	4,960	7,900	6,530	YES	YES
LEAD	3/3	35.7	83.6	59.3	3/3	24.5 J	44.5 J	36.4	YES	YES
ZINC	3/3	32.9	46.4	38.4	3/3	16.7	38.40	26.3	YES	YES
Subsurface Soils										
ANTIMONY	0/4	ND	ND	0.08	0/3	ND	ND	0.08	-	-
IRON	4/4	4,910	11,900	9,850	3/3	4,960	7,900	6,530	YES	YES
LEAD	4/4	10.3	30.5	22.7	3/3	24.5 J	44.5 J	36.4	NO	NO
ZINC	4/4	13.1	26.1	22.5	3/3	16.7	38.40	26.3	NO	NO

[a] Minimum concentration of analyte detected.
[b] Non-detects are carried forth as 1/2 the method detection limit in the calculation of mean concentrations.

J = Estimated concentration
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND = No detected results
"-" = Chemical not detected in site or background samples, therefore comparison is not meaningful

Table 5-8
Comparison of Onsite and Background Soil Concentrations for Metals at MRS 5

	Onsite: MRS 5				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soils										
ANTIMONY	0/3	ND	ND	0.08	0/3	ND	ND	0.08	-	-
COPPER	3/3	10.7 J	14.4	12.9	3/3	5.30 J	7.90 J	7.00	YES	YES
IRON	3/3	10,200	11,000	10,500	3/3	4,960	7,900	6,530	YES	YES
LEAD	3/3	57.0 J	60.3 J	58.8	3/3	24.5 J	44.5 J	36.4	YES	YES
NICKEL	3/3	6.80	7.60	7.17	3/3	4.00	5.30	4.73	YES	YES
Subsurface Soils										
ANTIMONY	0/3	ND	ND	0.08	0/3	ND	ND	0.08	-	-
COPPER	3/3	9.50 J	11.1 J	10.1	3/3	5.30 J	7.90 J	7.00	YES	YES
IRON	3/3	10,600	11,400	10,900	3/3	4,960	7,900	6,530	YES	YES
LEAD	3/3	44.3 J	52.3 J	47.4	3/3	24.5 J	44.5 J	36.4	YES	YES
NICKEL	3/3	6.50	7.10	6.90	3/3	4.00	5.30	4.73	YES	YES

[a] Minimum concentration of analyte detected.

[b] Non-detects are carried forth as 1/2 the method detection limit in the calculation of mean concentrations.

J = Estimated concentration
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND = No detected results
"-" = not available, no detected values.

Table 5-9
Comparison of Onsite and Background Soil Concentrations for Metals at MRS 6

	Onsite: MRS 6				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg)	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg)	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soils										
ALUMINUM	3/3	3,550 J	11,600	6,280	3/3	3,240	6,910	5,400	YES	YES
IRON	3/3	12,200	12,900	12,600	3/3	4,960	7,900	6,530	YES	YES
Subsurface Soils										
ALUMINUM	2/2	2,240 J	13,500	7,870	3/3	3,240	6,910	5,400	YES	YES
IRON	2/2	4,920	13,800	9,360	3/3	4,960	7,900	6,530	YES	YES

[a] Minimum concentration of analyte detected.

J = Estimated concentration
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.

6. SUMMARY AND CONCLUSIONS

6.0.1 The Mitchel Field FUDS is located in Garden City, Nassau County, New York. The Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary war and continued to be used during each war the U.S. participated in through the Korean War. During the revolutionary war it was known as Hempstead Plains and used as an Army enlistment center. At the time of the War of 1812 and the Mexican Was, the property was used as an infantry training center. Mitchel Field has been known as Camp Black during the Spanish American War, Camp Mills in 1917, and the name finally changed to Mitchel Field in 1918 and became an active flying field. In the 1930's and during World War II (WWII) the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. The installation was also used as a base for anti-sub patrol missions operated by Army Air Force planes. After WWII the FUDS became the site for the Air Defense Command and then after the Korean War it became an Air Force Reserve Base. In April 1961, Mitchel Field was officially deactivated and released to private and public entities.

6.0.2 During the SI, six MRSs were identified in the Mitchel Field FUDS, as follows:

- MRS 1 – Landscape 1000-inch Range
- MRS 2 – Skeet Range
- MRS 3 – Demonstration Bombing Range
- MRS 4 – Firing-in Butt
- MRS 5 – Machine Gun Range
- MRS 6 – Unknown Mortar Range

Only MRS 1, MRS 2, MRS 3, MRS 5, and MRS 6 were evaluated under this SI. The absence of sample media in MRS 4 precluded an evaluation since the land in the vicinity of MRS 4 has been completely developed and is either currently in the footprint of a building or under a paved parking lot.

6.0.3 A summary of the results and conclusions is presented below, and is summarized in Table 6-1.

6.1 Landscape 1000-inch Range (MRS 1)

6.1.0.1 Potential human receptors for MRS 1 include visitors/students/trespassers, employees, and construction workers. Potential ecological receptors include benthic organisms, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.1.0.2 Since military use of Mitchel Field ceased no MEC or MD has been observed at this MRS historically (inclusive of the 1993 USACE site visit) or during this SI. Only small arms (.22 and .50 caliber) munitions were known to be used at MRS 1.

6.1.0.3 Soil, both surface and subsurface, and groundwater were media with potentially complete exposure pathways for human receptors in MRS 1. In addition surface soil was a medium with potentially complete pathways for ecological receptors in MRS 1. In surface soils the presence of several metals at concentrations exceeding background (as well as the fact that the MQO for sensitivity was not met for NG) resulted in the determination of a complete pathway for humans and biota. Iron was identified as a COPC in surface soil; however, because levels of iron on-site were lower than background, no additional risks to humans from exposure to iron from site use were identified. Lead was identified as a COPEC in surface soil. Based on the weight of evidence evaluation exposure to surface soil was not determined to represent unacceptable risks to biota.

6.1.0.4 For subsurface soils the only receptor populations with potentially complete pathways were employees and construction workers. The subsurface soil pathway is complete for these receptors based on the presence of copper, lead, and nickel at concentrations exceeding background. No MCs were detected at levels exceeding the screening criteria identified for employees and construction workers, and no COPCs were identified for subsurface soils.

6.1.0.5 Groundwater was identified as a medium with potentially complete pathways for construction workers. No MCs were detected in site samples of groundwater. Therefore there are no complete pathways for construction workers. No COPCs were identified in groundwater.

6.2 Skeet Range (MRS 2)

6.2.0.1 Potential human receptors for MRS 2 include visitors/students/trespassers, employees, and construction workers. Potential ecological receptors include benthic organisms, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.2.0.2 Since military use of Mitchel Field ceased no MEC or MD has been observed at this MRS (inclusive of the 1993 USACE site visit) or during this SI. Only small arms (shotgun shells) munitions were known to be used at MRS 2.

6.2.0.3 Soil, both surface and subsurface, and groundwater were media with potentially complete exposure pathways for human receptors in MRS 2. Surface soil was additionally identified as a medium with potentially complete pathways for ecological receptors in MRS 2. In surface soils the presence of lead at concentrations exceeding background (as well as the fact that the MQO for sensitivity was not met for NG) resulted in the determination of a complete pathway for humans and biota. No MCs exceeded the screening criteria selected for the HHRA, and no COPC were identified for surface soils at MRS 2. Lead was identified as a COPEC in surface soil, however based on the weight of evidence evaluation exposure to surface soil was not determined to represent unacceptable risks to biota.

6.2.0.4 For subsurface soils the only receptor populations with potentially complete pathways were employees and construction workers. The subsurface soil pathway is complete for these receptors based on the presence lead at concentrations exceeding background. No MCs were detected at levels exceeding the screening criteria identified for employees and construction workers. No COPCs were identified for subsurface soils.

6.2.0.5 Groundwater was identified as a medium with potentially complete pathways for construction workers. No MCs were detected in site samples of groundwater. Therefore there are no complete pathways for construction workers, and no COPCs were identified in groundwater.

6.3 Demonstration Bombing Range (MRS 3)

6.3.0.1 Potential human receptors for MRS 3 include visitors/students/trespassers, employees, and construction workers. Potential ecological receptors include benthic organisms, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.3.0.2 Since military use of Mitchel Field ceased suspected practice bombs were found at the FUDS by Nassau County employees in the 1960's during the construction of Nassau Community College no MEC or MD was observed at the MRS during the 1993 USACE site visit or during 2009 SI field event.

6.3.0.3 Soil, both surface and subsurface soil were media with potentially complete exposure pathways for human receptors in MRS 3. In addition surface soil was a medium with potentially

complete pathways for ecological receptors in MRS 3. In surface soils the presence of iron, lead, and zinc at concentrations exceeding background (as well as the fact that the MQO for sensitivity was not met for NG) resulted in the determination of a complete pathway for humans and biota. Iron was identified as a COPC in surface soil; however, based on a weight of evidence evaluation surface soil was not determined to represent an unacceptable risk to human receptors. Lead and zinc were identified as COPECs in surface soil. Based on the weight of evidence evaluation exposure to surface soil was not determined to represent unacceptable risks to biota.

6.3.0.4 Subsurface soil was a medium with potentially complete pathways for employees and construction workers. The subsurface soil pathway is complete for employees and construction workers based on the presence of iron at concentrations exceeding background. No MCs were detected at levels exceeding the screening criteria identified for employees and construction workers. No COPCs were identified for subsurface soils.

6.4 Machine Gun Range (MRS 5)

6.4.0.1 Potential human receptors for MRS 5 include visitors/students/trespassers, employees, and construction workers. Potential ecological receptors include benthic organisms, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.4.0.2 Since military use of Mitchel Field ceased in 1961 an unspecified number of shell casings (MD) were reportedly found near the historic firing point by Nassau County Parks Department employees in the 1990's during the construction of athletic fields.

6.4.0.3 Soil, both surface and subsurface soil were media with potentially complete exposure pathways for human receptors in MRS 5. In addition surface soil was a medium with potentially complete pathways for ecological receptors in this area. In surface soils the presence of copper, iron, lead, and zinc at concentrations exceeding background (as well as the fact that the MQO for sensitivity was not met for NG) resulted in the determination of a complete pathway for humans and biota. Iron was identified as a COPC in surface soil; however, based on a weight of evidence evaluation surface soil was not determined to represent an unacceptable risk to human receptors. Lead was identified as a COPEC in surface soil, however, based on the weight of evidence evaluation exposure to surface soil was not determined to represent unacceptable risks to biota.

6.4.0.4 Subsurface soil was a medium with potentially complete pathways for employees and construction workers. The subsurface soil pathway is complete for employees and construction workers based on the presence of several metals at concentrations exceeding background. No

MCs were detected at levels exceeding the screening criteria identified for employees and construction workers. No COPCs were identified for subsurface soils.

6.5 Unknown Mortar Range (MRS 6)

6.5.0.1 Potential human receptors for MRS 6 include visitors/students/trespassers, employees, and construction workers. Potential ecological receptors include benthic organisms, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.5.0.2 Since military use of Mitchel Field ceased there have been reports of mortar rounds being found in the 1980's during excavation work. No MEC or MD were found during the 2009 Alion SI.

6.5.0.3 Soil, both surface and subsurface soil were media with potentially complete exposure pathways for human receptors in MRS 6. In addition surface soil was a medium with potentially complete pathways for ecological receptors in this area. In surface soils the presence of aluminum and iron at concentrations exceeding background (as well as the fact that the MQO for sensitivity was not met for NG) resulted in the determination of a complete pathway for humans and biota. Aluminum and iron were identified as COPCs in surface soil; however, based on a weight of evidence evaluation surface soil was not determined to represent an unacceptable risk to human receptors. In addition, no COPECs were identified in surface soil.

6.5.0.4 Subsurface soil was a medium with potentially complete pathways for employees and construction workers. The subsurface soil pathway is complete for these receptors based on the presence of aluminum and iron at concentrations exceeding background. No MCs were detected at levels exceeding the screening criteria identified for employees and construction workers. No COPCs were identified for subsurface soils at MRS 6.

Table 6-1
Summary of Human Health and Ecological Screening Level Risk Assessment Results

	Human Health COPCs (HHRA) [a]			Ecological COPECs (SLERA) [a]		
MRS/ Medium of Concern	Surface Soil	Subsurface Soil	Groundwater	Surface Soil	Subsurface Soil	Groundwater
MRS 1 - Landscape 1000" Range	Iron exceeds screening criterion and background. COPC. No unacceptable risk determined based on WOE.	No exceedance of screening criteria. No COPCs.	No exceedance of screening criteria. No COPCs.	Lead exceeds screening criterion and background. COPEC. No unacceptable risk determined based on WOE.	-	-
MRS 2 - Skeet Range	No exceedance of screening criteria. No COPCs.	No exceedance of screening criteria. No COPCs.	No exceedance of screening criteria. No COPCs.	Lead exceeds screening criterion and background. COPEC. No unacceptable risk determined based on WOE.	-	-
MRS 3 - Demonstration Bombing Range	Iron exceeds screening criterion and background. COPC. No unacceptable risk determined based on WOE.	No exceedance of screening criteria. No COPCs.	-	Lead and zinc exceed screening criteria and background. COPECs. No unacceptable risk determined based on WOE.	-	-
MRS 5 - Machine Gun Range	Iron exceeds screening criterion and background. COPC. No unacceptable risk determined based on WOE.	No exceedance of screening criteria. No COPCs.	-	Lead exceeds screening criterion and background. COPEC. No unacceptable risk determined based on WOE.	-	-
MRS 6 - Unknown Mortar Range	Aluminum and iron exceed screening criteria and background. COPCs. No unacceptable risk determined based on WOE.	No exceedance of screening criteria. No COPCs.	-	No exceedance of screening criteria. No COPECs	-	-

[a] Sources and derivations of screening levels for all receptors and environmental media in the HHRA and SLERA are detailed in Tables 5-1 through 5-2. Chemicals for which no screening criteria are available are discussed in the text of Section 5.

COPC = Chemical of potential concern
COPEC = Chemical of potential environmental concern
HHRA = Human health risk assessment

7. RECOMMENDATIONS FOR FURTHER ACTION

7.0.1 Six MRS areas were identified at the Mitchel Field FUDS property.

7.0.2 Based on the results and conclusions of this SI, the following recommendations are provided:

MRS 1 (Landscape 1000-inch Range) and MRS 2 (Skeet Range) **-** An NDAI designation is recommended at MRS 1 and MRS 2. No MEC or MD has been observed at these MRSs historically (inclusive of the 1993 USACE site visit) or during this SI. Only small arms (.22 and .50 caliber) munitions were known to be used at MRS 1 and shotgun shells at MRS 2. An MEC screening level risk assessment indicates that the overall explosive hazard for both MRS 1 and MRS 2 are low to nonexistent. No explosives or explosive residues were detected in surface or subsurface soil samples. Although iron was identified as a COPC at MRS 1 in surface soil it was not determined to present an unacceptable human health risk. Lead was detected above background values and screening criteria and was identified as a COPEC for surface soil at MRS 1 and MRS 2; however, based on the weight-of-evidence evaluation it was determined that the exposure was unlikely to pose an unacceptable risk to ecological receptors.

MRS 3 (Demonstration Bombing Range) **-** An NDAI designation is recommended at MRS 3. Although, suspected practice bombs were found at the FUDS by Nassau County employees in the 1960's during the construction of Nassau Community College no MEC or MD was observed at the MRS during the 1993 USACE site visit or during 2009 SI field event. Additionally, much of MRS 3 has undergone extensive soil re-working, excavation and redevelopment since the initial construction of the college and no MEC/MD were discovered during this subsequent redevelopment. An MEC screening level risk assessment indicates that an explosive source is unlikely to be present at MRS 3 and if present access to these items by the public would be limited by pavement, building footprints and roads. Therefore the overall explosive hazard for MRS 3 is low. Although iron was identified as a COPC at MRS 1 in surface soil it was not determined to present an unacceptable human health risk. Lead and zinc were detected above background values and screening criteria and were identified as COPECs for surface soil at MRS 3; however, based on the weight-of-evidence evaluation it was determined that the exposure was unlikely to pose an unacceptable risk to ecological receptors.

MRS 4 (Firing-in Butt) – An NDAI designation is recommended at MRS 4. No MEC has been observed at the FUDS historically (inclusive of the 1993 USACE site visit) or during this SI. The former target butt consisted of a berm constructed in front of an aircraft that was parked on a concrete taxiway. No military structures related to this Firing-in Butt are currently present at the MRS. MRS 4 has been entirely redeveloped the former range is now occupied almost entirely by parking lots, light industrial buildings, warehouses, roads, educational facilities and residential properties. The historical firing point has been redeveloped into large warehouses and parking lots. An MEC screening level risk assessment indicates that an explosive source is unlikely to be present at MRS 4. Therefore the overall explosive hazard for this area is low. No environmental samples were collected within MRS 4 due to the lack of sample media (i.e. soil). The decision not perform sampling within MRS 4 was agreed to by stakeholders during the TPP meeting.

MRS 5 (Machine Gun Range) An NDAI designation is recommended at MRS 5. No MEC has been observed at these MRSs historically (inclusive of the 1993 USACE site visit) or during this SI. An unspecified number of shell casings (MD) were reportedly found near the historic firing point by Nassau County Parks Department employees in the 1990's during the construction of athletic fields. This material is considered MD and does not pose an explosive risk. Only small arms munitions were known to be used at MRS 5. An MEC screening level risk assessment indicates that the overall explosive hazard for MRS 5 is low to nonexistent since small arms do not contain a significant quantity of explosive material. No explosives or explosive residues were detected in surface or subsurface soil samples at MRS 5. Although iron was identified as a COPC at MRS 5 in surface soil it was not determined to present an unacceptable human health risk. Lead was detected above background values and screening criteria and was identified as a COPEC for surface soil; however, based on the weight-of-evidence evaluation it was determined that the exposure was unlikely to pose an unacceptable risk to ecological receptors.

MRS 6 (Unknown Mortar Range) An NDAI designation is recommended at MRS 6. Suspected 60mm and 81mm mortars were found at the MRS during the road construction activities in 1980 and 1982. It is also possible that the mortars were misidentified and actually may have been practice bombs (MK-23 or MK-43) which were known to have been used at Mitchel Field. The items were removed and no further evidence of munitions was found in these areas. No MEC or MD was observed at the MRS during the 1993 USACE site visit or during 2009 SI field event. Additionally, the majority of MRS 6 is currently either under asphalt parking lots, building footprints or other impervious

surfaces. An MEC screening level risk assessment indicates that although an explosive source may be present at MRS 6 access to these items by the public would be extremely limited due to pavement, building footprints and roads. Therefore the overall explosive hazard for MRS 6 is low. No explosives or explosive residues were detected in surface or subsurface soil samples. There were no exceedances of ecological screening values in surface or subsurface soil therefore no COPECs were identified. Aluminum and iron were detected at concentrations exceeding the human health screening values in surface soil only and were selected as COPCs. Based on the weight-of-evidence evaluation for the COPCs in surface soil at MRS 6, no unacceptable risks to human receptors were identified.

Neither a TCRA nor a NTCRA are recommended for MRS 1, MRS 2, MRS 3, MRS 4, MRS 5 or MRS 6 at Mitchel Field.

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APPENDIX A – SCOPE OF WORK

Located on CD.

APPENDIX B – TECHNICAL PROJECT PLANNING MEMORANDUM

- Technical Project Planning Memorandums #1 & #2 (Located on CD)
- Data Quality Objective Verification Worksheets

Data Quality Objective Verification Worksheet			
Site: **Mitchel Field, New York**			
Project: FUDS MMRP SI Project Number **C02NY064503**			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine if the site requires additional investigation through a remedial investigation/feasibility study (RI/FS) or if the site may be recommended for No Department of Defense Action Indicated (NDAI) based on the presence or absence of munitions and explosives of concern (MEC) and munitions constituents (MC).	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk - MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC	Yes ☑ No ☐	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	MEC and MC: Areas where military munition-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes ☑ No ☐	
Number of Samples Required	MEC: Analog geophysical and visual reconnaissance data, rather than discrete sampling data, will be collected to accomplish this objective. These data will be collected using a "meandering path" to and from the sampling points. The UXO Technician will collect data on an approximately 6-ft wide path using the geophysical equipment. The visual reach of observations is approximately 12 ft, and may be limited by the presence of vegetation. Once at the individual sampling point, the geophysical equipment will be used to assess an approximately 25 ft radius circle for anomalies around the sampling point as site conditions permit. In some areas, there may be limitations to the ability to complete geophysical and visual observations. The total estimated area on the paths to/from the sampling locations is approximately 72,500 ft², and the area around the sampling locations is approximately 5,400 ft². MC: A total of 14 subsurface soil samples and 14 surface soil samples will be collected. Two groundwater samples will be collected from existing wells and five background soil samples.	Yes ☑ No ☐	Analog geophysical reconnaisance was performed on 128,190 square feet (2.94 acres), therefore achieving the QR portion of the DQO. Two background soil samples were mishandled by the laboratory and were therefore not analzed. However, three background soil samples were collected, analyzed and used for comparison in the risk screening. These three background samples were sufficient to complete a site soil and background soil comparison assessment in the risk screening portion of the SI. No corrective actions were necesssary to satisfy the DQO.

Data Quality Objective Verification Worksheet			
Site: **Mitchel Field**			
Project: FUDS MMRP SI Project Number **C02NY064503**			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Reference Concentration of Interest or Other Performance Criteria	MEC: If historic data indicate the presence of MEC and one anomaly classified as MPPEH, or confirmed MEC are found with the magnetometer, or if physical evidence indicating the presence of MEC are found during the visual inspection, then an RI/FS may be recommended. If no anomalies, MPPEH, or confirmed MEC are found, or if the UXO Technician indicates that there is no potential hazard from past use of munitions or MEC discoveries, then an NDAI designation may be recommended. In each of these instances, all lines of evidence (e.g., historic data, field data, etc.) will be used to make a final decision for an NDAI designation or RI/FS recommendation. In both instances (RI/FS or NDAI), all lines of evidence (e.g., historic data, field data etc. for both MEC and MC) will be used to make a final decision for an NDAI or RI/FS.	Yes ☑ No ☐	
	MC: If the maximum concentrations measured at the site exceed EPA Regional Screening Levels based on current and future land use, or EPA interim ecological risk screening values, or site-specific background levels (highest value and mean value), then an RI/FS may be recommended for the site. If the maximum concentrations measured at the site do not exceed EPA Regional Screening Levels or ecological risk screening values, then an NDAI designation may be recommended. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data, and comparison to regional background concentration ranges for metals (if available), will be used to make a final decision for an NDAI designation or RI/FS. Screening values selected for comparison at this site are specified in the chemical-specific measurement quality objective (MQO) tables.	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysics with a handheld analog magnetometer will be used to collect related data. The magnetometer is accurate to an approximate depth of 2 ft. Global Positioning System (GPS) equipment will be used to log locations of MEC items encountered by the magnetometer, subsurface anamolies, and the path of qualitative reconnissance. Visual observations will provide a continuous source of additional information which will be noted in the field log book with GPS coordinates of any munitions found. Photographs are used as an additional documentation method. Geophysical methods/procedures will be described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC are described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes ☑ No ☐	

Data Quality Objective Verification Worksheet			
Site: **Mitchel Field, New York**			
Project: FUDS MMRP SI Project Number **C02NY064503**			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Analytical Method	MEC: Analytical methods are not used with analog magnetometry. However, trained UXO professionals, engineers, and scientists will review all data to determine whether evidence gathered indicates the presence or absence of MEC. This analysis will be subject to an independent review within the Alion Team, by the USACE North Atlantic New York (CENAN), USACE Baltimore District Design Center (CENAB), and USACE Center of Expertise. MC: The methods that can be used for analysis include the following: Explosives Methods–8330A, 8330A (mod) for nitroglycerine; Metals Methods–6010B (reduced); Explosives Prep Methods - 8330A, 8330A (mod) for nitroglycerine; Metals Prep Method – 3050B, 3050 (mod).	Yes ☑ No ☐	

Data Quality Objective Verification Worksheet			
Site: **Mitchel Field, New York**			
Project: FUDS MMRP SI Project Number **C02NY064503**			
DQO Statement Number: **2 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine the potential need for a Time-Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk - MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	MEC and/or MC on the surface	Yes ☑ No ☐	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	Areas where military munitions-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes ☑ No ☐	
Number of Samples Required	Refer to DQO 1 for MC/MEC sampling parameters.	Yes ☑ No ☐	
Reference Concentration of Interest or Other Performance Criteria	If MC is reported in samples collected at the FUDS at concentrations exceeding screening criteria and those exceedances result in unacceptable risk and an imminent threat to receptors as identified through human health and ecological risk assessments or if one piece of confirmed MEC is found with the magnetometer or if physical evidence indicating the presence of MEC is found during the visual inspection, and if the item(s) is determined by a qualified UXO-Technician, explosive ordnance disposal (EOD) unit, and/or the USACE to be an immediate or imminent threat, then one of two actions may be initiated:		
	TCRA - If there is a complete pathway between source and receptor and the MEC and the situation is viewed as an "imminent danger threat posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment", the Alion Team will immediately notify the Military Munitions Design Center Project Manager at USACE and the property owner. USACE will determine, with input from the Alion Team and stakeholders, whether or not a TCRA will be implemented.	Yes ☑ No ☐	
	Non-TCRA - A non-TCRA (NTCRA) may be initiated in response to a release or threat of release that poses a risk where more than six months planning time is available.	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysical methods/procedures are described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC are described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes ☑ No ☐	
Analytical Method	Refer to DQO 1 for MEC and MC analytical methods to be incorporated.	Yes ☑ No ☐	

Data Quality Objective Verification Worksheet			
Site: **Mitchel Field, New York**			
Project: FUDS MMRP SI Project Number **C02NY064503**			
DQO Statement Number: **3 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect, or develop, additional data, as appropriate, in support of potential Hazard Ranking System (HRS) scoring by Environmental Protection Agency (EPA).	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk- MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	Data for HRS worksheet parameters will be compiled by gathering basic identifying information, general site description, site type, waste description, demographics, water use, sensitive environments, and response actions.	Yes ☑ No ☐	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	Areas where MEC has been historically found, used, or disposed as documented in interviews or existing documentation.	Yes ☑ No ☐	
Number of Samples Required	Refer to DQOs 1and 2.		
Reference Concentration of Interest or Other Performance Criteria	The HRS levels of contamination are Level I (concentrations that meet the criteria for actual contamination and are at or above media-specific benchmark levels), Level II (concentrations that either meet the criteria for actual contamination but are less than media-specific benchmarks, or meet the criteria for actual contamination based on direct observation), and Potential (no observed release is required but targets must be within the target distance limit). These levels are weighted for each target by EPA (Level I carries the greatest weight) and scores of 28.5 or above are then eligible for listing on the National Priorities List (NPL).	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Methods associated with historic data field reconnaissance and sampling (see DQOs 1 and 2). Refer to NPL Characteristics Data Collection Form, Version 3.0 (EPA 2001).	Yes ☑ No ☐	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

Data Quality Objective Verification Worksheet			
Site: **Mitchel Field, New York**			
Project: FUDS MMRP SI Project Number **C02NY064503**			
DQO Statement Number: **4 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect the additional data necessary to the complete the Munitions Response Site Prioritization Protocol (MRSPP).	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	Explosive Hazard Evaluation (EHE), Chemical Warfare Materiel Hazard Evaluation (CHE), and Health Hazard Evaluation (HHE). For the EHE and CHE modules, factors evaluated include the details of the hazard, accessibility to the Munitions Response Site (MRS), and receptor information. HHE factors include an evaluation of MC and any non-munitions-related incidental contaminants present, receptor information, and details pertaining to environmental migration pathways. Typical information compiled includes details pertaining to historical use, current/future use and ownership, cultural/ecological resources, and structures.	Yes ☑ No ☐	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	Areas where MEC has been identified historically and where sampling is recommended.	Yes ☑ No ☐	
Number of Samples Required	Refer to DQOs 1 and 2 for related sampling required.		
Reference Concentration of Interest or Other Performance Criteria	An MRS priority is determined by USACE based on integrating the ratings from the EHE, CHE, and HHE modules. Refer to Federal Register/Vol. 70, No. 192/Wednesday, October 5, 2005/Rules and Regulations.	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Data gathering prior to field activities as well as additional data gathered during field reconnaissance and sampling (DoD 2005).	Yes ☑ No ☐	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

APPENDIX C – INTERVIEW DOCUMENTATION

Appendix not used.

APPENDIX D – FIELD NOTES AND FIELD FORMS

- Daily Quality Control Reports
- Field Forms
- Logbook
- Chain of Custody

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	05-18-09-01	Date: May 18, 2009	
Project Name:	Mitchel Field (C02NY064503)	Contract Number:	W912DY-04-D-0017
Location of Work:	Garden City, Nassau County, NY		
Description of Work: Collection of background surface soil samples only.			
Weather: Clear	Rainfall: None	Temperature: Min. 60 f	Max. 65 f

1. Work performed today by Alion:

The Alion field team collected five background surface soil samples for metals analysis only. No qualitative reconnaissance was conducted on this day due to only background samples being collected. The field team also attempted to locate pre-existing groundwater wells installed by the U.S. Geological Survey. Two wells were located using GPS.

Samples Collected: Some sample locations may vary from SS-WP maps due to accessibility.

MF-BG-SS-01-01
MF-BG-SS-01-02
MF-BG-SS-01-03
MF-BG-SS-01-04
MF-BG-SS-01-05

Reconnaissance Acreage / Discussion:

No qualitative reconnaissance was conducted on this field day because only background samples were collected.

2. Work performed today by Subcontractors.

None

3. Type and results of Control Phases and Inspection. (Indicate whether Preparatory – P, Initial – I, or Follow-Up – F and include satisfactory work completed or deficiencies with actions to be taken)

Preparatory phase inspections for the field were completed prior to mobilization to the Mitchel Field FUDS. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

4. List type and location of tests performed and results of these tests.

GPS benchmark control point coordinates were collected prior to field work and then again after completion of the fieldwork (see below).

Benchmark coordinates: Northing 62524.711 m, Easting 334178.732 m (State Plan Long Island, Conus 1983)

Initial GPS reading: Northing 62524.789 m, Easting 334178.698 m (State Plan Long Island, Conus 1983)

Post event GPS reading: Northing 62524.814 m, Easting 334178.688 m (State Plan Long Island, Conus 1983)

5. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.

None

6. Off-site surveillance activities, including action taken.

None

7. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
8. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Five surface soil background samples were collected in a portion of the FUDS boundary not impacted by former military use of the property. No munitions presenting a potential explosive hazard (MPPEH) [inclusive of or munitions debris (MD), munitions, explosives of concern (MEC), range related debris] were identified at the FUDS.

Alion Science and Technology, Inc's Verification: On behalf of Alion, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

Curtis W Mitchell

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	05-19-09-01	Date: May 19, 2009	
Project Name:	Mitchel Field (C02NY064503)	Contract Number:	W912DY-04-D-0017
Location of Work:	Garden City, Nassau County, NY		
Description of Work: Conduct meandering path geophysics throughout the site with a focus around the former bombing, skeet, machine gun ranges. Collect surface and subsurface soil samples from target areas as well as groundwater samples from pre-existing wells.			
Weather: Clear	Rainfall: None	Temperature: Min. 60 f	Max. 65 f

1. Work performed today by Alion:

The Alion field team conducted qualitative reconnaissance on approximately 128,190 square feet (2.94 acres) within MRS-1, MRS-2, MRS-3, MRS-4, MRS-5 and MRS-6 at Mitchel Field. The Alion field team collected 16 surface soil samples and 16 subsurface soil samples for select explosives and metals analysis as well as three groundwater samples for select explosives analysis only.

Samples Collected: Some sample locations may vary from SS-WP maps due to accessibility.

MF-SR-SS-01-01	MF-MGR-SS-01-01
MF-SR-SB-02-01	MF-MGR-SB-02-01
MF-SR-SS-01-02	MF-MGR-SS-01-02
MF-SR-SB-02-02	MF-MGR-SB-02-02
MF-SR-SS-01-03	MF-MGR-SS-01-03
MF-SR-SB-02-03	MF-MGR-SB-02-03
MF-SR-SS-01-04	MF-DBR-SS-01-01
MF-SR-SB-02-04	MF-DBR-SB-02-01
MF-UKM-SS-01-01	MF-DBR-SS-01-02
MF-UKM-SB-02-01	MF-DBR-SB-02-02
MF-UKM-SS-01-02	MF-DBR-SS-01-03
MF-UKM-SB-02-02	MF-DBR-SB-02-03
MF-LDSP-SS-01-01	MF-UKM-SB-02-02P
MF- LDSP-SB-02-01	MF-DBR-SB-02-03P
MF-LDSP-SS-01-02	MF-MGR-SS-01-01P
MF- LDSP-SB-02-02	MF-UKM-SS-01-02P
MF-OS-GW-00-01	
MF-OS-GW-00-01P	
MF-OS-GW-00-02	

Reconnaissance Acreage / Discussion:

Reconnaissance was conducted in the meandering path fashion. Travel paths varied slightly from the geophysical site reconnaissance on figures in the SS-WP due to natural terrain and accessibility.

2. Work performed today by Subcontractors.

None

3. Type and results of Control Phases and Inspection. (Indicate whether Preparatory – P, Initial – I, or Follow-Up – F and include satisfactory work completed or deficiencies with actions to be taken)

Preparatory phase inspections for the field were completed prior to mobilization to the Mitchel Field FUDS. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

4. List type and location of tests performed and results of these tests.
GPS benchmark control point coordinates were collected prior to field work and then again after completion of the fieldwork (see below).
Benchmark coordinates: Northing 62524.711 m, Easting 334178.732 m (State Plan Long Island, Conus 1983)
Initial GPS reading: Northing 62524.654 m, Easting 334178.812 m (State Plan Long Island, Conus 1983)
Post event GPS reading: Northing 62524.682 m, Easting 334178.834 m (State Plan Long Island, Conus 1983)
Benchmark was located on Nassau Community College property.
5. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
None
6. Off-site surveillance activities, including action taken.
None
7. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
8. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Qualitative Reconnaissance (QR) was performed in various portions of each MRS (a total of 6 MRSs). All soil sample locations were clear of metallic debris as certified by the UXO technician. Cultural debris was observed in the woods in the central portion of MRS 3 and throughout MRS 2. The only former military structure identifiable at the Mitchel Field FUDS was an approximately 1,000-foot section of the former Mitchel Field aircraft runway in the northeast portion of the site. All environmental samples were collected successfully and according to the Final SS-WP. Two pre-existing (USGS) monitoring wells were located, deemed suitable and sampled in the vicinity of MRS 2 and within the FUDS boundary. No munitions presenting a potential explosive hazard (MPPEH) [inclusive of or munitions debris (MD), munitions, explosives of concern (MEC), range related debris] were identified at the FUDS.

Alion Science and Technology, Inc's Verification: On behalf of Alion, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.

Curtis W Mitchell

Daily Quality Control Journal

DATE: 19 MAY 09	PROJECT: Hitchel Field
SUXOS: Delon hee	PM: Brad Chinn
SSO:	QCO:
MAG TYPE USED: Schonstedt	MAG SETTING USED: 2-4

AREA / ITEMS QC'ed	TEAM	SAT	UNSAT
Proper work attire (PPE)		✓	
Morning Schonstedt check		✓	
Vehicle condition		✓	
Equipment condition		✓	
Emergency equipment, first aid kit, burn kit, fire ext.		✓	
Proper grid layout			
Proper search techniques			
Proper use of grubbing equipment			
Compliance with demolition procedures			
Proper tamping techniques, demo shot			
Team leaders daily paperwork		✓	
Office paperwork			
Mapping and UXO data			
Field office, inside			
Field office grounds			

QCO SIGNATURE: [signature]

HEALTH AND SAFETY ACTIVITY REPORT

Site: Mitchel Field Location: Garden City, Nassau County, New York

Weather Conditions: Clear Onsite Hours: From 0730 To 1630

Morning Briefing Topic:
UXO's, Hydration, Insects, wild life, Emergency, EVAC,

General Activities Complete:
Sample Collection

Morning Briefing Attendance: MARTA BOBEYSZA-Wyrucka BEN CLAUS

Changes in PPE Levels*	Work Operations	Reasons for Change

Site Safety and Health Plan Violations	Corrective Action Specified	Corrective Action Taken (yes/no)

Observations and Comments:

Completed by: DELON LEE DL Date: 19 MAY 09

Site Health and Safety Supervisor

*Only SSHO may change PPE levels, using only criteria specified in Programmatic APP.

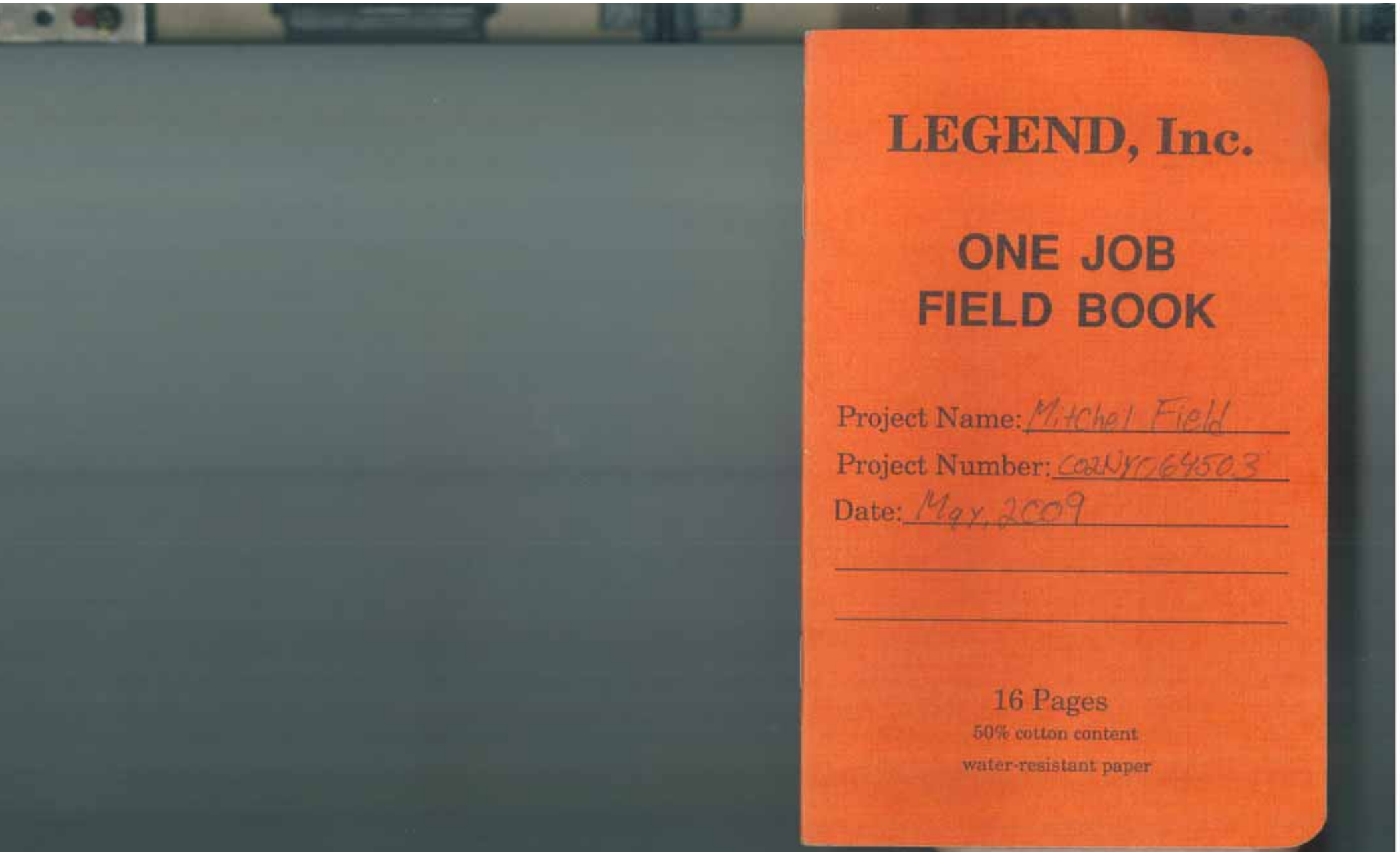
ACCIDENT PREVENTION PLAN REVIEW RECORD

SITE: Mitchel Field

Project No. C02NY064503

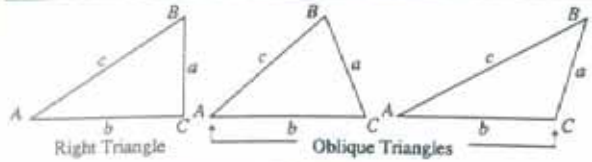
I have read the Accident Prevention Plan and have been briefed on the nature, level, and degree of exposure likely as a result of participation of field activities. I agree to conform to all the requirements of this Plan.

Name	Signature	Affiliation	Date
DEON LEE		HFA	18 may 09
Ben Clauss		Alion	18 May 09
Martha Borja-Lopeka		Alion	18 May 2009
DEON LEE		HFA	19 May 09
Ben Clauss		Alion	19 May 29
Martha Borja-Lopeka		Alion	19 May 2009


LEGEND, Inc.
ONE JOB
FIELD BOOK
Project Name: Mitchel Field
Project Number: C02NY0164503
Date: May, 2009
16 Pages
50% cotton content
water-resistant paper

Physical Plant Bldg
-NE corner of campus.

TRIGONOMETRIC FORMULÆ



Solution of Right Triangles

For Angle A. $\sin = \frac{a}{c}$, $\cos = \frac{b}{c}$, $\tan = \frac{a}{b}$, $\cot = \frac{b}{a}$, $\sec = \frac{c}{b}$, $\operatorname{cosec} = \frac{c}{a}$

Given	Required	
a, b	A, B, c	$\tan A = \frac{a}{b} = \cot B,\ c = \sqrt{a^2 + b^2} = a\sqrt{1 + \frac{b^2}{a^2}}$
a, c	A, B, b	$\sin A = \frac{a}{c} = \cos B,\ b = \sqrt{(c + a)(c - a)} = c\sqrt{1 - \frac{a^2}{c^2}}$
A, a	B, b, c	$B = 90° - A,\ b = a \cot A,\ c = \frac{a}{\sin A}$
A, b	B, a, c	$B = 90° - A,\ a = b \tan A,\ c = \frac{b}{\cos A}$
A, c	B, a, b	$B = 90° - A,\ a = c \sin A,\ b = c \cos A$

Solution of Oblique Triangles

Given	Required	
A, B, a	b, c, C	$b = \frac{a \sin B}{\sin A},\ C = 180° - (A + B),\ c = \frac{a \sin C}{\sin A}$
A, a, b	B, c, C	$\sin B = \frac{b \sin A}{a},\ C = 180° - (A + B),\ c = \frac{a \sin C}{\sin A}$
a, b, C	A, B, c	$A + B = 180° - C,\ \tan \frac{1}{2}(A - B) = \frac{(a-b)\tan \frac{1}{2}(A+B)}{a+b},$ $c = \frac{a \sin C}{\sin A}$
a, b, c	A, B, C	$s = \frac{a+b+c}{2},\ \sin \frac{1}{2}A = \sqrt{\frac{(s-b)(s-c)}{bc}},$ $\sin \frac{1}{2}B = \sqrt{\frac{(s-a)(s-c)}{ac}},\ C = 180° - (A + B)$
a, b, c	Area	$s = \frac{a+b+c}{2},\ \text{area} = \sqrt{s(s-a)(s-b)(s-c)}$
A, b, c	Area	$\text{area} = \frac{bc \sin A}{2}$
A, B, C, a	Area	$\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

Mitchel Field ①

Contacts:

Rich Gajdek/USACE = 917-790-8234
Julie Kaiser/USACE = 410-962-2227
Alan Wrainsk./USACE = 410-962-2179
Ben Claus/Hion = 202-309-6448
GPL labs = 301-694-5310
Corinne Shia = 703-259-5147
Hofstra University = 516-463-6623
Nassau college = 516-572-7113
Nassau Parks = 516-571-5993
Helen Edge/USACE = 917-790-8332
Larry Cain = 978-318-8236
Daniel Eaton/NYSDEC = 518-402-9620
Delon Lee/Yuko Tech. 706-577-9617

Site Location.

Garden city, NJ, within Hofstra university, Nassau Community college and N.Y. State Park property.

(2) 5/18/09

Mitchel Field

1600: Arrive at Mitchel field to look for pre-existing wells at site, and collect background samples.

1615: Arrive in Eastern portion of site near background surface soil samples.

Weather: 65°F, p-cloudy, 0-5 mph breeze.

1620: Arrive at back surface soil sample.

Sample ID: MF-BG-SS-01-01

T: 1620, Metals only.

1630: Arrive at background location area is open, undeveloped, slightly overgrown

Sample ID: MF-BG-SS-01-02

Time: 1630, Metals only.

1640: Arrive at soil background location

Sample ID: MF-BG-SS-01-03

Time: 1640, Metals only.

1650: Arrive at soil sam background sample

Sample ID: MF-BG-SS-01-04

Time: 1650, Metals only.

5/18/09

Mitchel Field

(3)

1700: Arrive at background surface soil sample.

Sample ID: MF-BG-SS-01-05

Time: 1700, Metals only

1715: demob from background sample locations and search for pre-existing wells, for GW samples on 5/19/09.

1720: Field team conducts a search using GPS and waypoints to try to locate pre-existing groundwater wells installed by USGS.

1800: Failed to locate two possible GW wells to east of steel range. No evidence of wells, even though there are several trails.

1810: Leave site and return to motel.

End of Day,

5/19/09

Mitchel Field

0730: Meet with field team B. Claus / Field team leader Alion Maria B.N Alion field tech Delon Lee / UXO Tech.

0745: Delon Lee gives a H&S meeting to team, topics include, slips/trips/falls, proper hydration, ticks and biological hazards and UXO threats.

0800: weather 60-70's, Clear, 5-10 mph breeze. Today's objectives, meet with property owners Hofstra university Nassau college and Parks service to discuss sampling, collect Sit Surface, Subsurface soil samples and groundwater samples.

0815: call various Stakeholders to alert them we are on-site, May meet w/ Masoom Ali of Nassau college.

0820: Arrive in area near skeet range and locate benchmark to check GPS device.

830: Arrive at former Skeet Range and prepare to collect surface / subsurface soil samples.

5/19/09 (5)

Mitchel Field

0840: Arrive at skeet range sample

Sample: MF-SR-SS-01-01 Time: 840

Metals and explosives.

845: Collect subsurface sample

Sample ID: MF-SR-SB-02-01

Time: 845, Metals / Explosives.

850: conduct QR and arrive at surface and subsurface location

Sample: MF-SR-SS-01-02

Time: 850

0900: collect subsurface (colocated)

MF-SR-SB-02-02

Time: 0900

0905: continue QR to surface / subsurface soil sample location.

0915: collect sample

ID: MF-SR-SS-01-03

T: 0915, Metals / explosives

0920: collect co-located subsurface sample

ID: MF-SR-SB-02-03

T: 920, Metals / explosives.

930: Arrive at last skeet Range location

SampleID: MF-SR-SS-01-04

Time: 930, Metals / explosives

5/19/09 ⑥

Mitchel Field

935: collect co-located subsurface
ID: MF-SR-SB-02-04
Time: 935, Metals/explosives.

950: Arrive at Precision Bombing range target area and prepare to do QR and sample collection.

1010: Arrive at ~~Surface/subsurface~~ soil
ID: ~~MF-DBR-SS-01-02~~
T: 1010, Metals/ explosives

1015: colocated ~~subsurface~~ soil
MF-DBR-SB-02-02
T: 1015 Metals/explosives

1030: Arrive at surface soil sample
ID: MF-DBR-SS-01-01
T: 1030, Metals/explosives.
Collect MS/MSD.

1040: collect subsurface sample
ID MF-DBR-SB-02-01
Time: 1040

100: Met with Haroom Ali of ~~the~~ Nassau College to discuss general sampling activities.

115: Mob back to Precision Bombing target area and to QR.

5/19/09 ⑦

Mitchel Field.

1120: arrive at sample location
ID: MF-DBR-SS-01-03
Time: 1120, Metals/explosives.

1130: subsurface sample
ID: MF-DBR-SB-02-03, Time: 1130
1135: Duplicate MF-DBR-SB-02-03P Time: 1135
1145 Contacted Hofstra University maintenance to machine gun range on Hofstra University property to collect samples. → Duplicate: MF-MGR-SS-01-DUP T: 1205
1200: arrive at sample collection
Sample ID: MF-MGR-SS-01-01
T: 1200, Metals/explosives
1210: collect subsurface sample
ID: MF-MGR-SB-02-01
T: 1210, Metals/explosives
12:20: Collect surface soil sample
ID: MF-MGR-SS-01-03
T: 12:20 Metals/explosives
12:30 collect subsurface sample
ID MF-MGR-SB-02-03
T: 12:30 Metals/explosives
12:35 arrive at sample location
Sample ID: MF-MGR-SS-01-02

⑧ 5/18/09

Mitchel Field.

T: 1235 metals/explosives

12:45 collect subsurface sample

ID [MF-MGR-SB-02-02]

T: 12:45 metals/explosives

1250: Mob to area where historically a Confederate mortar was found.

1300: Collect surface soil sample

ID: [MF-UKM-SS-01-01]

T: 1300, Metals/explosives

1310: Collect subsurface soil sample

[ID: MF-UKM-SB-02-01]

T: 1310, Metals/explosives.

1320: Mob back to hotel to get groundwater sampling supplies.

1330: Return to location of USGS well screened in glacial aquifer, well condition is good, 4-inch well, PVC, well cap intact. DTW ≈ 16 Ft

1330: Start to purge well to collect sample.

Sample ID [MF-OS-GW-00-02]

T: 1330

explosives only, MS/MSD collected.

5/18/09 ⑨

Mitchel Field.

1345: Mob to ~~sea~~ area near historic Mortar rounds.

1405: Collect surface soil sample

ID: [MF-UKM-SS-01-02]

Time: 1405, M&E,

~~60~~ 1410: Collect duplicate soil sample

[MF-UKM-SS-01-02P]

Time: 1410, M&E

1415: Collect subsurface soil sample.

ID: [MF-UKM-SB-02-02]

Time: 1415, MS/MSD collected

1420: Search for second pre-existing groundwater well.

1430: Decide to go collect soil samples near Landscape target. (LOSP).

1440: Arrive at soil sample location

Sample ID: [MF-LOSP-SS-01-02]

T: 1440, Metals (Explosives

1450: collect subsurface sample

ID: [MF-LOSP-SB-02-02]

T: 1450, Metals/explosive

~~1500: collect soil sa~~ SC.

1455: collect duplicate

[MF-LOSP-SB-02-02P]

Time: 14:55

(16) 5/19/09

Mitchel Field.

1500: Collected surface soil sample
ID: MF-LOSP-SS-01-01
T: 1500 Metals/Explosives

1510: Subsurface location
ID: MF-LOSP-SB-02-01
T: 1510. Metals/explosives

1580: MDs to go search for final GW well location.

1545: Find USGS well and collect groundwater sample.
SampleID: MF-OS-GW-00-01
T: 1600

1605: Collect duplicate sample
MF-OS-GW-00-01A
Time: 1605.

1640: Field team demobs from site, all field work complete.

1700: Note NO MD, MEC, or MPPEH observed during field a total of 12 subsurface anomalies were detected, as well as a great deal of cultural debris (garbage) throughout various MRSs.

End of Day.

(17) 5/19/09

Mitchel Field.

coordinates for anomalies and Sample locations.

Sample ID/Item	Northing	Easting	Notes
MF-LOSC-SS/SB-01-01	61448.62	335477.77	None
MF-LOSC-SS/SB-01-02	61364.42	335474.34	
MF-SR-SS/SB-01-01	62155.50	334949.82	
MF-SR-SS/SB-01-02	62098.15	335021.91	
MF-SR-SS/SB-01-03	61939.76	335009.08	
MF-SR-SS/SB-01-04	61967.06	335098.75	
MF-SR-SS/SB-01-05	62197.62		
MF-DBR-SS/SB-01-01	[illegible]	334515.60	
MF-DBR-SS/SB-01-02	62297.96	334[illegible]	
MF-DBR-SS/SB-01-03	62243.83	334381.07	
MF-MGR-SS/SB-01-01	61582.31	333745.62	
MF-MGR-SS/SB-01-02	61520.16	333717.16	
MF-MGR-SS/SB-01-03	61538.30	333774.46	
MF-UKM-SS/SB-01-01	61432.33	333654.94	
MF-UKM-SS/SB-01-02	61363.21	33486699	
MF-OS-GW-00-01	62039.02	335422.76	
MF-OS-GW-00-02	62107.09	3350729.0	
MF-BG-SS-01-01	62480.931	334906.59	
MF-BG-SS-01-02	62448.131	334951.022	
MF-BG-SS-01-03	62500.605	335002.188	
MF-BG-SS-01-04	62556.36	335079.81	
MF-BG-SS-01-05	62634.09	335093.61	

Cont. Pg #12

(12) 5/19/09

Mitchell Field.

Subsurface anomalies

Item	Northing	Easting	Notes
Sub-anom #1	61980.02	334999.5	Subsurface anom
" 2	61949.04	335002.8	
" 3	62291.70	334598.55	
" 4	62305.45	334608.66	
" 5	62197.57	334533.14	
" 6	62170.38	334558.71	
" 7	62251.38	834301.05	
" 8	61356.91	334655.08	
" 9	61980.02	334999.54	
" 10	61949.04	335002.08	
" 11	62291.70	334598.55	
" 12	62305.45	334608.64	

J. G

(13)

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GPL LABORATORIES, LLC

7210A Corporate Court
Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference

1 of 4 Pgs.

Project: Mitchel Field
Client: Arion
Send Results To: Corinne Shipp
Address: 3975 Fair Ridge Dr
Suite 125 South Fairfax VA 22033
Phone: 703-759-5147

Turnaround Time: Standard
# of Containers: 2
Container Type: 8-oz
Preservative Used: NA
Type of Analysis: VOC - 8260 Full List; Breakdown & Naphthalene; Arsenic, Lead & Antimony (6010) 2 Liter; Lab Cooler No.

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	CLIENT COMMENTS
MF-SB-S-01-01	5/19/09	8:40	SOIL	BC	
MF-SB-S-02-01	5/19/09	8:45			
MF-SB-S-01-02	5/19/09	8:50			
MF-SB-S-02-02	5/19/09	9:00			
MF-SB-S-01-03	5/19/09	9:15			
MF-SB-S-02-03	5/19/09	9:20			
MF-SB-S-01-04	5/19/09	9:30			
MF-SB-S-02-04	5/19/09	9:35			
MF-IDW-S-01	5/19/09	10:30			MS/MSD
MF-IDW-S-02	5/19/09	10:40			
MF-IDW-S-03	5/19/09	10:10			
MF-IDW-S-04	5/19/09	10:15			

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	5/20/09 1130				
Relinquished By:	Date/Time	Received By:	Date/Time / Shipper:	Airbill No.:	
Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:	

G.P. W.O. _____

GPL LABORATORIES, LLC

7210A Corporate Court
Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference

2 of 4 Pgs.

Project: Michel Field
Client: Alion
Send Results To: Corinne Shia
Address: 3975 Fair Ridge Dr. Suite 125 South
Fairfax VA 22033
Phone: 703-259-5147

Turnaround Time: Standard
# of Containers: 2
Container Type: 8-oz, 1-L Amber
Preservative Used: NA

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Nitroglycerine	CN, RDX	Breakdown Aluminum	Iron	Antimony, copper, iron, lead, Nickel					Lab Cooler No.	CLIENT COMMENTS
MF-05-GW-00-02	5/19/09	13:30	H_2O	BC	X	X									MS/MSD
MF-05-GW-00-01	5/19/09	16:00	H_2O		X	X									
MF-05-GW-00-01P	5/19/09	16:05	H_2O		X	X									
MF-WW-S-01-02	5/19/09	14:05	Soil		X	X	X								
MF-WW-SS-01-02P	5/19/09	14:10	Soil		X	X	X								
MF-WW-S-02-02	5/19/09	14:15	Soil		X	X	X								MS/MSD
MF-LDSP-SS-01-01	5/19/09	15:00	Soil		X	X		X							
MF-LDSP-SS-02-01	5/19/09	15:10	Soil		X	X		X							
MF-LDSP-SS-01-02	5/19/09	14:40	Soil		X	X		X							
~~MF-LDSP-SS-01-02P~~															
MF-LDSP-SS-02-02	5/19/09	14:50	Soil		X	X		X							
MF-LDSP-SS-02-02P	5/19/09	14:55	Soil		X	X		X							

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
[signature]	5/20/09 1130				

Relinquished By:	Date/Time	Received By:	Date/Time	Shipper:	Airbill No.:

Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:

G.P. W.O. ____________

GPL LABORATORIES, LLC

7210A Corporate Court
Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference

3 of 4 Pgs.

Project: Mitchell Field
Client: Hart
Send Results To: Corinne Shea
Address: 5975 Fair Lakes Ct #125
Fairfax VA 22033
Phone: 703-259-5147

Turnaround Time: Standard
# of Containers: 2
Container Type: 80z-02
Preservative Used: NA
Type of Analysis: Ultra Volume Cat-ONT; Arsenic, Iron, Lead, Zinc; Antimony, Copper, Lead, Nickel, Aluminum, Iron

Lab Cooler No.

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	CLIENT COMMENTS
MF-DMR-S-01	5/19/09	11:00	Soil	BC	
MF-DMR-S-02	5/19/09	11:30			
MF-DMR-S-03	5/19/09	11:35			
MF-MW2-S-01	5/19/09	12:00			
MF-MW3-S-01	5/19/09	12:05			
MF-MGP-S-01	5/19/09	12:10			
MF-MGP-S-02	5/19/09	12:20			
MF-MGP-S-03	5/19/09	12:30			
MF-MGP-S-04	5/19/09	12:35			
MF-MGP-S-05	5/19/09	12:45			
MF-MW4-S-01	5/19/09	13:00			
MF-MW4-S-02	5/19/09	13:10			

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	5/20/09 1130				

Relinquished By:	Date/Time	Received By:	Date/Time	Shipper:	Airbill No.:

Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:

G.P. W.O. _____

GPL LABORATORIES, LLC

7210A Corporate Court
Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference

4 of 4 Pgs.

Project: Mitchel Field
Client: Alion
Send Results To: Corinne Shia
Address: 3975 Fair Ridge Dr.
Fairfax, VA 22033
Phone: 703-259-5147

Turnaround Time: Standard
# of Containers: 1
Container Type: 8-oz
Preservative Used: NA
Type of Analysis: Aluminum, Antimony, Copper, Lead, Iron, Nickel, Zinc

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Lab Cooler No.	CLIENT COMMENTS
MF-B6-SS-01-01	5/18/09	1620	Soil	BC		
MF-B6-SS-01-02	"	1630	"	"		
MF-B6-SS-01-03	"	1640	"	"		
MF-B6-SS-01-04	"	1650	"	"		
MF-B6-SS-01-05	"	1700	"	"		

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
[signature]	5/20/09 1135				
Relinquished By:	Date/Time	Received By:	Date/Time / Shipper:	Airbill No.:	
Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:	

G.P. W.O. _____

APPENDIX E – PHOTO DOCUMENTATION LOG

APPENDIX E – PHOTOGRAPHIC LOG

Project/Site: Mitchel Field
Project No.: C01NY064503

Date	Photo ID	Description
05/18/2009	E.1	Location of background sample collection
05/18/2009	E.2	Background surface soil sample MF-BG-SS-01-01 location
05/19/2009	E.3	MRS 2 vegetation and ground cover
05/19/2009	E.4	Sample MF-SR-SS-01-04 location south of the firing point at MRS 2
05/19/2009	E.5	Sample MF-SR-SB-02-04 location south of the firing point at MRS 2
05/19/2009	E.6	Monitoring well location of samples MF-OS-GW-00-02
05/19/2009	E.7	Samples MF-DBR-SS-01-02 location at MRS 3 looking southwest
05/19/2009	E.8	Sample MF-DBR-SS-01-03 location at MRS 3
05/19/2009	E.9	View of the approximate location of the former firing point at MRS 5
05/19/2009	E.10	Sample MF-MGR-SS-01-01 approximate location of the former firing point at MRS 5
05/19/2009	E.11	Land cover at MRS 6
05/19/2009	E.12	Surface soil sample, MF-UKM-SS-01-02, at MRS 6
05/19/2009	E.13	Subsurface soil sample, MF-UKM-SB-02-02, at MRS 6
05/19/2009	E.14	Surface soil and subsurface soil samples, MF-LDSP-SS-01-01 and MF-LDSP-SB-02-01, locations at MRS 1

Mitchel Field – Field Photographs

Site:	Mitchel Field
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	Background Samples
GPS Coordinates: (UTM Zone 19N)	N 4523956.390 E 609846.156
Direction of Photo:	Southeast
Comments:	Location of background sample collection
Photograph No.:	E.1
Date:	05/18/09
Time:	16:10

Site:	Mitchel Field
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	Background Samples
GPS Coordinates: (UTM Zone 19N)	N 4523940.481 E 609868.764
Direction of Photo:	South
Comments:	Background surface soil sample MF-BG-SS-01-01 location
Photograph No.:	E.2
Date:	05/18/09
Time:	16:21

Site:	Mitchel Field
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	MRS 2- Skeet Range
GPS Coordinates: (UTM Zone 19N)	N 4523963.912 E 609866.670
Direction of Photo:	Southwest
Comments:	MRS 2 vegetation and ground cover
Photograph No.:	E.3
Date:	05/19/09
Time:	08:37

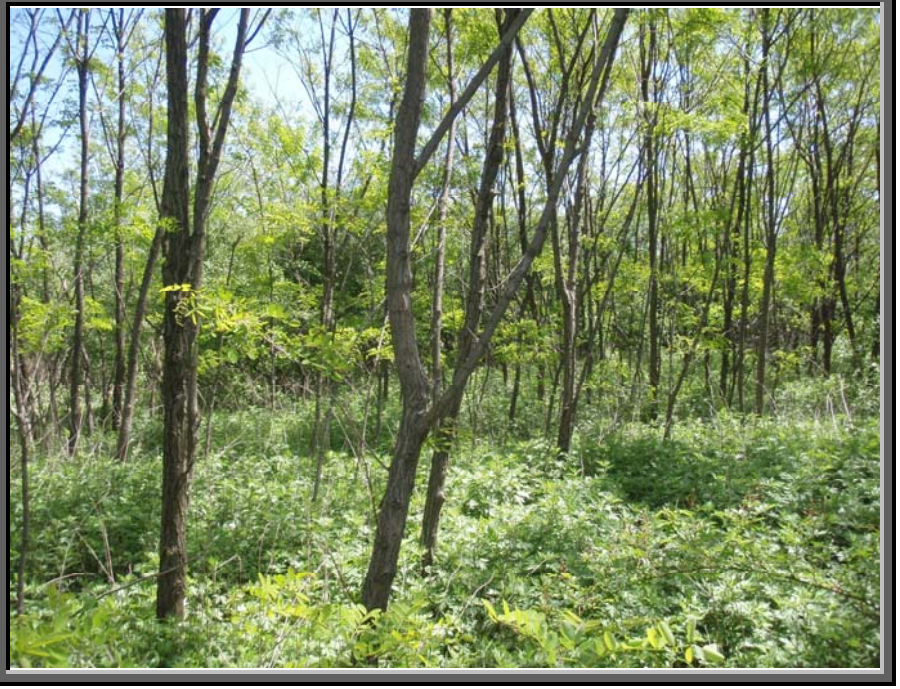
Site:	Mitchel Field
Photographer:	B. Claus
Location of Photograph:	MRS 2- Skeet Range
GPS Coordinates: (UTM Zone 19N)	N 4523975.697 E 609863.111
Direction of Photo:	N/A
Comments:	Sample MF-SR-SS-01-04 location south of the firing point at MRS 2
Photograph No.:	E.4
Date:	05/19/09
Time:	09:30

Site:	U.S. Naval Training Device Center
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	MRS 2- Skeet Range
GPS Coordinates: (UTM Zone 19N)	N 4523991.199 E 609864.407
Direction of Photo:	Northwest
Comments:	Sample MF-SR-SB-02-04 location south of the firing point at MRS 2
Photograph No.:	E.5 Date: 05/19/09 Time: 09:35

Site:	U.S. Naval Training Device Center
Photographer:	B. Claus
Location of Photograph:	Groundwater Well
GPS Coordinates: (UTM Zone 19N)	N 4523987.650 E 609844.482
Direction of Photo:	N/A
Comments:	Monitoring well location of samples MF-OS-GW-00-02
Photograph No.:	E.6 Date: 05/19/09 Time: 10:12

Site:	U.S. Naval Training Device Center
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	MRS 3- Demonstration Bombing Range
GPS Coordinates: (UTM Zone 19N)	N 4524236.543 E 609811.556
Direction of Photo:	Southwest
Comments:	Samples MF-DBR-SS-01-02 location at MRS 3 looking southwest
Photograph No.:	E.7 Date: 05/19/09 Time: 10:12

Site:	U.S. Naval Training Device Center
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	MRS 3- Demonstration Bombing Range
GPS Coordinates: (UTM Zone 19N)	N 4524309.645 E 610063.720
Direction of Photo:	Southwest
Comments:	Sample MF-DBR-SS-01-03 location at MRS 3
Photograph No.:	E.8 Date: 05/19/09 Time: 11:23



Site:	Mitchel Field
Photographer:	B. Claus
Location of Photograph:	MRS 5- Machine Gun Range
GPS Coordinates: (UTM Zone 19N)	N 4524319.798 E 610105.099
Direction of Photo:	West
Comments:	View of the approximate location of the former firing point at MRS 5

Photograph No.: E.9 Date: 05/19/09 Time: 12:01

Site:	Mitchel Field
Photographer:	B. Claus
Location of Photograph:	MRS 5- Machine Gun Range
GPS Coordinates: (UTM Zone 19N)	N 4524304.216 E 610082.775
Direction of Photo:	N/A
Comments:	Sample MF-MGR-SS-01-01 approximate location of the former firing point at MRS 5

Photograph No.: E.10 Date: 05/19/09 Time: 12:10

Site:	Mitchel Field
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	MRS 6- Unknown Mortar Range
GPS Coordinates: (UTM Zone 19N)	N 4524319.798 E 610105.099
Direction of Photo:	Northwest
Comments:	Land cover at MRS 6

Photograph No.: E.11 Date: 05/19/09 Time: 14:04

Site:	Mitchel Field
Photographer:	B. Claus
Location of Photograph:	MRS 6- Unknown Mortar Range
GPS Coordinates: (UTM Zone 19N)	N 4524304.216 E 610082.775
Direction of Photo:	N/A
Comments:	Surface soil sample, MF-UKM-SS-01-02, at MRS 6

Photograph No.: E.12 Date: 05/19/09 Time: 14:14

Site:	Mitchel Field
Photographer:	B. Claus
Location of Photograph:	MRS 6- Unknown Mortar Range
GPS Coordinates: (UTM Zone 19N)	N 4524319.798 E 610105.099
Direction of Photo:	N/A
Comments:	Subsurface soil sample, MF-UKM-SB-02-02, at MRS 6

Photograph No.: E.13 Date: 05/19/09 Time: 14:18

Site:	Mitchel Field
Photographer:	B. Claus
Location of Photograph:	MRS 1- Landscape 1000-inch Range
GPS Coordinates: (UTM Zone 19N)	N 4524304.216 E 610082.775
Direction of Photo:	South
Comments:	Surface soil and subsurface soil samples, MF-LDSP-SS-01-01 and MF-LDSP-SB-02-01, locations at MRS 1

Photograph No.: E.14 Date: 05/19/09 Time: 15:00

APPENDIX F – ANALYTICAL DATA

- Automated Data Review Library
- Automated Data Review EDDs
- EDMS
- Analytical Summary Reports
- Analytical Data Reports
- SEDD Deliverable

Located on CD.

APPENDIX G – ANALYTICAL DATA QUALITY ASSURANCE/ QUALITY CONTROL REPORT

- Validated Data from EDS
- USACE Memorandum for Record-CQAR of Quality Assurance Split Samples. (Split Samples not collected in accordance to NAB direction.)
- USACE-NAB will provide the Chemical Data Quality Assessment Report (CDQAR) prior to issuance of the Final SI Report

Located on CD.

APPENDIX H – GEOGRAPHIC INFORMATION SYSTEMS DATA

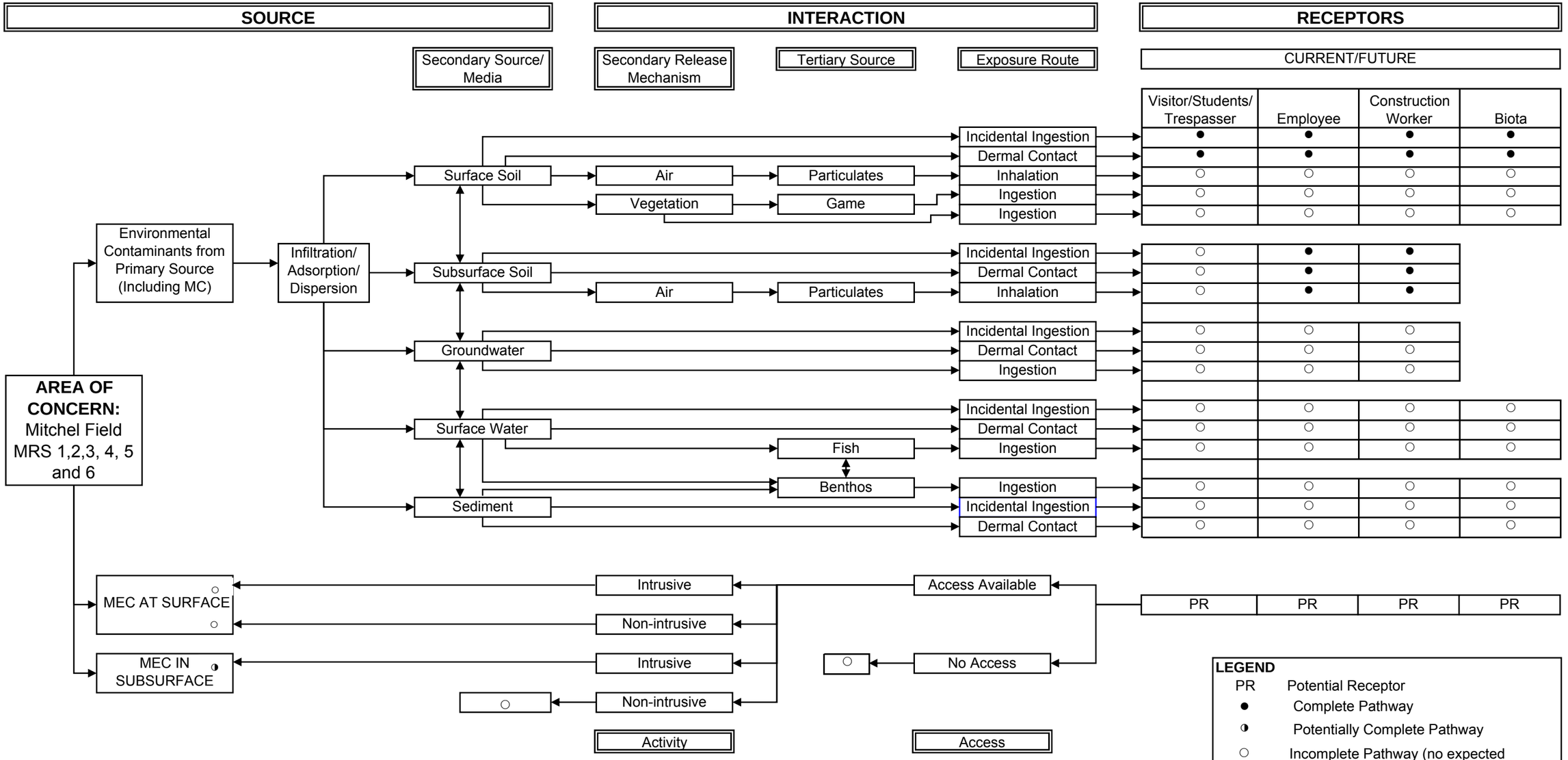
Located on CD

APPENDIX I – GEOPHYSICAL DATA

Appendix not used.

APPENDIX J – CONCEPTUAL SITE MODEL

- MRS 1 - 6



NOTES:

1. For the MMRP SI at Mitchel Field, this CSM summarizes the potential risk exposure scenarios for MRS 1,2,3, 4, 5 and 6. For a pathway to be complete, it must include a source, an exposure medium, an exposure route, and a receptor. A complete pathway may also include a release mechanism and a transport medium. Interaction between a potential receptor and MEC has two components: access and activity.
2. Primary sources will vary but will include the MRS 1 - 6 areas where hisotically MEC activities occured. Munitions items (MEC/MD) have been found at the FUDS ; therefore, the pathway for MEC at the surface and subsurface is potentially complete. During the 2009 Alion SI MEC/MD was not observed at MRSs 1-6. Permanent surface water bodies or wetlands are present in the vicinity of MRS 1 and 5 but due to their location and surface topography the potential impact in those areas are very limited. No explosive compounds were detected in the site groundwater samples therefore the groundwater pathway is incomplete. Additionally, potable water is provided by Suffolk County via deep wells drawing water from the Magothy Aquifer.
3. Explosives were not detected in any of the surface soil, subsurface soil or groundwater samples analyzed in this SI. Metals were detected above background in surface and subsurface soil; therefore, surface and subsurface soil are complete pathways.
4. Although no samples were collected at MRS 4 due to the extensive redevelopment of the area (buildings, parking lots) based on the sampling results at MRS 1, 2, 3, 5 and 6 surface and subsurface soil at MRS 4 are assumed to be above background and therefore complete pathways.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR

Mitchel Field[1. 2 and 3]

MRS 1 - 6

(WORKING DRAFT)

Revised October 2009 Figure J-1

Source: U.S. Army Corps of Engineers (USACE). 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM 1110-1-1200.

APPENDIX K – MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL RESULTS

- MRS 1
- MRS 2
- MRS 3
- MRS 4
- MRS 5
- MRS 6

MRS 1

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 1 - 1,000-inch Landscape Range

Component: U.S. Army

Installation/Property Name: Mitchel Field (FFID: NY29799F117800)

Location (City, County, State): Garden City, Nassau County, NY

Site Name (RMIS ID)/Project Name (Project No.): Mitchel Field (RMIS ID C02NY064503R01), Project # C02NY064503)

Date Information Entered/Updated: 10/16/2009 2:10:21 AM

Point of Contact (Name/Phone): Helen Edge/(917) 790-8332

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 Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used for various training purposes during each war the U.S. participated in through the Korean War. In the early 1930's and during World War II the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993 and USACE 2004a). Prior to 1957 MRS 1 was used for small bore shooting practice (.22 caliber rifle). Paper landscape targets, with features recognizable at a distance of 1,000-inches, were attached to vertical posts located on a range approximately 450 ft wide by 85 ft. long. Personnel fired .22 caliber rifles and occasionally .50 caliber guns from a single firing line that was the width of the range (USACE 1993). As of the 2009 SI field event no military structures remain at the FUDS.

Refer to Sections 2.1.1, 2.1.2, 2.1.3, 2.4.2.2, 2.5.1, 3.3.1.2 and Table ES-1 in the SI report for more information concerning the history of the FUDS.

Description of Pathways for Human and Ecological Receptors:

Surface soil, subsurface soil, and groundwater were identified as potentially complete pathways for human and ecological receptors. Refer to the CSM (Appendix J) and Sections 5.2.0.1, 5.2.0.2, 5.4.1.1 and 5.4.2.1.
Description of Receptors (Human and Ecological):
Visitor, Student,Trespasser, Employee, construction worker and biota.

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 hazardard.	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, pyrothechnics, 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.

No MEC or MD has been historically observed at MRS 1 (USACE 1993 and 2004a). The MRS was used as a 1000-inch landscape range where only small arms were used (.22 and .50 caliber). These items do not contain any explosive materials (solid lead bullet with copper jacket) and therefore do not pose an explosive hazard. No evidence of munitions were found during the 1993 USACE site visit or the 2009 Alion SI. Refer to Sections 2.4.2.1, 2.5.1, 4.2.1.1 and Tables 2-2 and 4-2 of this SI report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

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.

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Mitchel Field (USACE 1993, 2004a). Refer to Sections 2.4.0.1, 2.4.2.2 and 2.4.2.3 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: One groundwater sample was collected in MRS 1 from pre-existing monitoring well and was analzyed for NG and DNT and DNT breakdown products (Sample ID MF-OS-GW-00-01). Analytical results report non-detect for all explosive compounds. Reference CSM, Sections 5.1.3, 5.1.3.2, 5.1.4.3, 5.4.2.1, 5.4.2.2, 6.1.0.5 and Tables 5-2 and 5-4 in the SI Report.

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 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 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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint 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 for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ■

Table 23 Comments: Sediment is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ■

Table 25 Comments: Sediment is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 200). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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	Comparison Value	Unit	Ratios
Lead	204	400	mg/Kg	0.51
Copper	19.9	3100	mg/Kg	0.0064
Nickel	7.3	1600	mg/Kg	0.0046

CHF Scale	CHF Value	Sum The Ratios	0.52
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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).	*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).	*M*

No Known or Suspected Surface Soil MC Hazard ☐

Table 26 Comments: Analytes and the associated sample location that exceeded site maximum background concentrations include: Copper, Lead and Nickel all at location MF-LDSP-SS-01-01. No explosives were detected in surface or subsurface soil samples collected at MRS 1. Refer to Tables 5-1 and 5-5 in the SI Report.

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	M	MLL	F

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 data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	***F***

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				(7)	

MRS 2

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 2 - Skeet Range

Component: U.S. Army

Installation/Property Name: Mitchel Field (FFID: NY29799F117800)

Location (City, County, State): Garden City, Nassau County, NY

Site Name (RMIS ID)/Project Name (Project No.): Mitchel Field (RMIS ID C02NY064503R02), Project # C02NY64503

Date Information Entered/Updated: 10/21/2009 3:36:12 AM

Point of Contact (Name/Phone): Helen Edge/(917) 790-8332

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 Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used for various training purposes during each war the U.S. participated in through the Korean War. In the early 1930's and during World War II the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993 and USACE 2004a). Soldiers and airmen participated in small arms marksman training at a skeet range in the western portion of the FUDS. MRS 2 encompasses a total of 30 acres of predominantly flat, open terrain. A portion of the MRS has been redeveloped into a parking lot. Field activities were conducted throughout various portions of the former skeet range.

Refer to Sections 2.1.1, 2.1.3, 3.3.1.3, 4.2.2.1 and Tables 2-2 and 4-3 of the SI report for more information concerning the history of the FUDS and the types of munitions used at MRS 2.

Description of Pathways for Human and Ecological Receptors:

Surface soil, subsurface soil, and groundwater were identified as potentially complete pathways for human and ecological receptors. Refer to the CSM (Appendix J) and Sections 5.2.0.1, 5.2.0.2, 5.5.1.1 and 5.5.2.1.
Description of Receptors (Human and Ecological):
Visitor, Student,Trespasser, Employee, construction worker and biota.

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 hazardard.	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, pyrothechnics, 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.

Since military use of the FUDS ceased no evidence of intact munitions (MEC) or MD have been discovered at MRS 2 - Skeet Range, Mitchel Field FUDS. Only small arms (shotgun) were used at MRS 2. No evidence of munitions were found during the 2009 Alion SI. Refer to Sections 2.4.2.1, 2.5.1, 4.2.2.1 and Tables 2-2 and 4-3 of this SI report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

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.

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Mitchel Field. Although gas warfare training activities did occur at the FUDS CWM material was not used during this training (USACE 1993, 2004a). Refer to Sections 2.4.0.1, 2.4.2.2 and 2.4.2.3 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: One groundwater sample was collected at MRS 2 from pre-existing monitoring well and was analzyed for NG and DNT and DNT breakdown products (Sample ID MF-OS-GW-00-02). Analytical results report non-detect for all explosive compounds. Reference CSM, Sections 5.1.3.2, 5.1.4.3, 5.4.2.1, 5.4.2.2, 6.1.0.5 and Tables 5-2 and 5-4 in the SI Report.

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 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 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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint 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 for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ■

Table 23 Comments: Sediment is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ■

Table 25 Comments: Sediment is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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	Comparison Value	Unit	Ratios
Lead	155	400	mg/Kg	0.39

CHF Scale	CHF Value	Sum The Ratios	0.39
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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).	*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).	*M*
	No Known or Suspected Surface Soil MC Hazard	☐

Table 26 Comments: The analyte and the associated sample location that exceeded site maxiumum background concentrations include: Lead at location MF-SR-SS-01-01. No explosives were detected in surface or subsurface soil samples collected at MRS 1. Refer to Tables 5-1 and 5-6 in the SI Report.

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	M	MLL	F

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 data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	***F***

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				7	

MRS 3

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 3 - Demonstration Bombing Range

Component: U.S. Army

Installation/Property Name: Mitchel Field (FFID: NY29799F117800)

Location (City, County, State): Garden City, Nassau County, NY

Site Name (RMIS ID)/Project Name (Project No.): Mitchel Field (RMIS ID C02NY064503R03), Project # C02NY064503

Date Information Entered/Updated: 10/22/2009 11:57:48 AM

Point of Contact (Name/Phone): Helen Edge/(917) 790-8332

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 Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used for various training purposes during each war the U.S. participated in through the Korean War. In the early 1930's and during World War II the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993 and USACE 2004a). The Demonstration Bombing Range (MRS 3) was used as a circular bomb target and 3-pound miniature practice bombs were presumed to have been used (MK-5, MK-23, and MK-43). The targets were located next to the only runway that was present in 1938.

Refer to Sections 2.1.1, 2.1.3, 2.4.2.1, 2.4.2.4, 2.4.3.1, 2.5.1, 3.3.1.4, 4.2.3.1 and Tables 2-2 and 4-4 of the SI report for more information concerning the history of the FUDS and the types of munitions used at MRS 3.

Description of Pathways for Human and Ecological Receptors:

Surface soil, subsurface soil, and groundwater were identified as potentially complete pathways for human and ecological receptors. Refer to the CSM (Appendix J) and Sections 5.2.0.1, 5.2.0.2, 5.6.1.1 and 5.6.2.1.
Description of Receptors (Human and Ecological):
Visitor, Student,Trespasser, Employee, construction worker and biota.

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 hazardard.	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, pyrothechnics, 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.

Since military use of the FUDS ceased no evidence of intact munitions (MEC) or MD have been discovered at MRS 3 - Demonstration Bombing Range, Mitchel Field FUDS. Although there are unsubstatiated reports that practice bombs of unknown nomenclature were found during the 1960's no specific location was given and no legitimate report was made. Additionally, the area has been heavily redeveloped and no additonal munitions items were found. No evidence of munitions were found in MRS 3 during the 2009 Alion SI or the 1993 USACE site visit. Refer to Sections 2.4.2.1, 2.4.2.4, 2.5.1, 3.3.1.4, 4.2.3.1 and Tables 2-2 and 4-4 of this SI Report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

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.

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Mitchel Field (USACE 1993, 2004a). Refer to Sections 2.4.0.1, 2.4.2.2 and 2.4.2.3 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Per stakeholder agreement no groundwater samples were collected at MRS 3. The groundwater within the vicinity of MRS 3 is not used as a potable drinking water source (Alion 2008 and Alion 2009). However two groundwater samples were collected at MRS 1 and 2 (one each) and were analzyed for NG and DNT and DNT breakdown products (Sample IDs MF-OS-GW-00-01 and MF-OS-GW-00-02). Analytical results report non-detect for all explosive compounds.

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 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 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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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 geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint 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 for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ■

Table 23 Comments: Sediment is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 ■

Table 25 Comments: Sediment is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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	Comparison Value	Unit	Ratios
Iron	13200	23000	mg/Kg	0.57
Lead	83.6	400	mg/Kg	0.21
Zinc	46.4	23000	mg/Kg	0.002

CHF Scale	CHF Value	Sum The Ratios	0.78
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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).	*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).	*M*

No Known or Suspected Surface Soil MC Hazard ■

Table 26 Comments: Analytes and the associated sample location that exceeded site maxiumum background concentrations include: Iron at MF-DBR-SS-01-02, Lead at MF-DBR-SS-01-02 and Zinc at MF-DBR-SS-01-03. No explosives were detected in surface or subsurface soil samples collected at MRS 1. Refer to Tables 5-1 and 5-5 in the SI Report. Per USACE guidance since no munitions related material have been encountered at the MRS an alternative rating of "No Known or Suspected" will be entered in Table 28 and 29.

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	M	MLL	F

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 data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	***F***

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 CWM Hazard*	

MRS 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 4 - Firing-In Butt

Component: U.S. Army

Installation/Property Name: Mitchel Field (FFID: NY29799F117800)

Location (City, County, State): Garden City, Nassau County, NY

Site Name (RMIS ID)/Project Name (Project No.): Mitchel Field (RMIS ID C02NY064503R04), Project # C02NY064503

Date Information Entered/Updated: 10/22/2009 1:17:45 AM

Point of Contact (Name/Phone): Helen Edge/(917) 790-8332

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 Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used for various training purposes during each war the U.S. participated in through the Korean War. In the early 1930's and during World War II the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993 and USACE 2004a). At MRS 4, a target butt was constructed for test firing and sighting purposes on fixed-wing machine guns. Initially, the target butt was constructed of timber but was later rebuilt with concrete and earth. The MRS 4 range fan extends outside the FUDS boundary, but there is little chance that munitions would have extended beyond the impact berm. The site was also used as a rifle and carbine firing range. Currently no military made structures exist at the MRS 4 the area has been completely redeveloped into parking lots, warehouses, educational and office buildings.

Refer to Sections 2.1.1, 2.1.3, 2.4.3.1, 2.5.1, 3.3.1.5, 4.2.4.1 and Tables 2-2 and 4-5 of the SI report for more information concerning the history of the FUDS and the types of munitions used at MRS 4.

Description of Pathways for Human and Ecological Receptors:
Surface soil, subsurface soil, and groundwater were identified as potentially complete pathways for human and ecological receptors. However, based on current site conditions (pavement, building foundations etc.) sample media (soil) are not present at MRS 4 therefore these pathways are incomplete. Refer to the CSM (Appendix J) and Sections 5.2.0.1 and 5.2.0.2.
Description of Receptors (Human and Ecological):
Visitor, Student,Trespasser, Employee, construction worker and biota.

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 hazardard.	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, pyrothechnics, 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.

No MEC or MD has been historically observed at MRS 4 (USACE 1993 and 2004a). The MRS was used as a Firing-In Butt Range and small arms carbine and rifle range. There are unsubstantiated reports that Medium and Large caliber guns were used at the range, but from historical documents (ASR) the range did not appear to be suitable for firing of these weapons. The vast majority of MRS 4 has been redeveloped and currently parking lots, office buildings and warehouses are located at the MRS. No evidence of munitions were found during the 1993 USACE site visit or during the 2009 Alion SI. Refer to Sections 2.4.2.1, 2.5.1, 4.2.4.1 and Tables 2-2 and 4-5 of this SI report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

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.

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Mitchel Field (USACE 1993, 2004a). Refer to Sections 2.4.0.1, 2.4.2.2 and 2.4.2.3 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Per stakeholder agreement no groundwater samples were collected at MRS 4. The groundwater within the vicinity of MRS 4 is not used as a potable drinking water source (Alion 2008 and Alion 2009). However two groundwater samples were collected at MRS 1 and 2 (one each) and were analzyed for NG and DNT and DNT breakdown products (Sample IDs MF-OS-GW-00-01 and MF-OS-GW-00-02). Analytical results report non-detect for all explosive compounds.

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 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 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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 geological structures or physical controls).	L

MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L

RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not present at MRS 4 and is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint 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 for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 ■

Table 23 Comments: Sediment is not present at MRS 4 and is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 of the SI report for further information.

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.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Surface water is not present at MRS 4 and is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 ■

Table 25 Comments: Sediment is not present at MRS 4 and is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Soil MC Hazard ■

Table 26 Comments: The former firing point and suspected impact area at MRS 4 is completely developed. Soil that may be present at the site was brought in for landscaping or building purposes therefore it is not a medium of concern as agreed upon during the TPP meeting (Alion 2008 and 2009). Refer to Section 5.2.0.2 of the SI report for further information.

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 data elements, 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*	

MRS 5

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 - 5 Machine Gun Range

Component: U.S. Army

Installation/Property Name: Mitchel Field (FFID: NY29799F117800)

Location (City, County, State): Garden City, Nassau County, NY

Site Name (RMIS ID)/Project Name (Project No.): Mitchel Field (RMIS ID C02NY064503R05), Project # C0NY064503

Date Information Entered/Updated: 10/23/2009 8:59:42 AM

Point of Contact (Name/Phone): Helen Edge/(917) 790-8332

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 Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used for various training purposes during each war the U.S. participated in through the Korean War. In the early 1930's and during World War II the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993 and USACE 2004a). The Machine Gun Range (MRS 5) was built in 1922 and used by Reserve Officers' Training Corps cadets for small arms training. A wooden structure served as a firing point for machine gun (.50 cal) and pistols (.22 and .35 caiber). No military structures currently exist at the MRS and the MRS is now comprised of athletic fields and educational facilities.

Refer to Sections 2.1.1, 2.1.3, 2.4.3.1, 2.5.1, 3.3.1.6, 4.2.5.1 and Tables 2-2 and 4-6 of the SI report for more information concerning the history of the FUDS and the types of munitions used at MRS 5.

Description of Pathways for Human and Ecological Receptors:

Surface soil and subsurface soil were identified as potentially complete pathways for human and ecological receptors. Refer to the CSM (Appendix J) and Sections 5.2.0.1 and 5.2.0.2.
Description of Receptors (Human and Ecological):
Visitor, Student,Trespasser, Employee, construction worker and biota.

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 hazardard.	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, pyrothechnics, 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.

Since military use of the FUDS ceased no evidence of intact munitions MEC have been discovered at MRS 5 - Machine Gun Range, Mitchel Field FUDS. An unspecified number of shell casings (MD) were reportedly found near the historic firing point by Nassau County Parks Department employees in the 1990's during the construction of athletic fields. Expended shell casings do not pose an explosive hazrd. Only small arms (.22, .35 and .50 cal) were used at MRS 5. No evidence of munitions were found during the 1993 USACE site visit or the 2009 Alion SI. Refer to Sections 2.4.1.1, 2.4.2.1, 2.5.1, 4.2.2.1, 4.3.5.1 and Tables 2-2 and 4-6 of this SI report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

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.

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Mitchel Field (USACE 1993, 2004a). Refer to Sections 2.4.0.1, 2.4.2.2 and 2.4.2.3 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Per stakeholder agreement no groundwater samples were collected at MRS 5. The groundwater within the vicinity of MRS 5 is not used as a potable drinking water source. Additionally, groundwater is unlikely to be adversely effected by past military use at MRS 5 (Alion 2008 and Alion 2009). However two groundwater samples were collected at MRS 1 and 2 (one each) and were analzyed for NG and DNT and DNT breakdown products (Sample IDs MF -OS-GW-00-01 and MF-OS-GW-00-02). Analytical results report non-detect for all explosive compounds.

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 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 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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not present at MRS 5 and is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint 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 for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ☐

Table 23 Comments: Sediment is not present at MRS 5 and is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 of the SI report for further information.

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.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☐

Table 24 Comments: Surface water is not present at MRS 5 and is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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 ☐

Table 25 Comments: Sediment is not present at MRS 5 and is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to Section 5.2.0.2 of the SI report for further information.

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	Comparison Value	Unit	Ratios
Iron	11400	23000	mg/Kg	0.5
Lead	60.3	400	mg/Kg	0.15
Copper	14.4	3100	mg/Kg	0.0046
Nickel	7.6	1600	mg/Kg	0.0048

CHF Scale	CHF Value	Sum The Ratios	0.66
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [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).	(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).	(M)
	No Known or Suspected Surface Soil MC Hazard	☐

Table 26 Comments: Analytes and the associated sample location that exceeded site maxiumum background concentrations include: Copper and Nickel at MF-MGR-SS-FD1 (duplicate of MF-MGR-SS-01-01), Iron at MF-MGR-SB-02-02 and Lead at MF-MGR-SS-01-03. No explosives were detected in surface or subsurface soil samples collected at MRS 5. Refer to Tables 5-1 and 5-8 in the SI Report.

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	M	MLL	F

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 data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	(F)

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				(7)	

MRS 6

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 6 - Unknown Mortar Range

Component: U.S. Army

Installation/Property Name: Mitchel Field (FFID: NY29799F117800)

Location (City, County, State): Garden City, Nassau County, NY

Site Name (RMIS ID)/Project Name (Project No.): Mitchel Field (RMIS ID C02NY064503R05), Project # C02NY064503

Date Information Entered/Updated: 10/23/2009 11:19:12 AM

Point of Contact (Name/Phone): Helen Edge/(917) 790-8332

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 Mitchel Field FUDS was comprised of approximately 1,436 acres and was used as a training base. The FUDS was used as a troop encampment during the Revolutionary War and continued to be used for various training purposes during each war the U.S. participated in through the Korean War. In the early 1930's and during World War II the FUDS was a training base including; small arms firing ranges, aircraft firing-in butt, skeet range, gas chamber, and practice demonstration bombing target. In April 1961, Mitchel Field was officially deactivated and released to private and public entities (USACE 1993 and USACE 2004a). MRS 6 is comprised of four separate areas where during construction activities in the early 1980's at the FUDS suspected mortars were discovered. There is no historical information indicating that a mortar range was located at Mitchel Field. Three of the four areas have been redeveloped (buildings, roads, parking lots) and one area is still partially underveloped. As previously menitoned MRS 6 is comprised of four separate, approximately 0.75 acre circular areas.

Refer to Sections 2.1.1, 2.1.3, 2.4.3.1, 3.3.1.7, 4.2.6.1 and Tables 2-2 and 4-7 of the SI report for more information concerning the history of the FUDS and the types of munitions used at MRS 6.

Description of Pathways for Human and Ecological Receptors:

Surface soil and subsurface soil were identified as potentially complete pathways for human and ecological receptors. Refer to the CSM (Appendix J) and Sections 5.2.0.1 and 5.2.0.2.
Description of Receptors (Human and Ecological):
Visitor, Student,Trespasser, Employee, construction worker and biota.

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 hazardard.	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, pyrothechnics, 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.

MD and suspected MEC have been found at MRS 6. Suspected 60mm and 81mm mortars were found at the MRS during the road construction activities in 1980 and 1982. However based on the following significant circumstances the MRS 6 received a rating of "Evidence of No Munitions":
- It was noted in the ASR and ASR Supplemental that the suspected 60mm and 81mm mortars were misidentified and actually may have been practice bombs (MK-23 or MK-43) which were known to have been used at Mitchel Field. Physical similarities exist between the 60mm and 81mm mortars and the MK 23 or MK-43 practice bombs this may have been contributed to the possbile misidentification items.
-The items, when found, were not examined by an EOD Technician and no written report was made of the incidient.
-The items were removed and no further evidence of munitions was found in these areas over the past 27 years.
- Approximately 90% of MRS 6 has been redeveloped and is currently either under asphalt parking lots, building footprints or other impervious surfaces.
- No MEC or MD was observed at the MRS during the 1993 USACE site visit or during 2009 SI field event (USACE 1993 and 2004a).

Refer to Sections 2.4.1.1, 2.4.2.1, 2.4.2.4, 2.5.1, 3.3.1.7, 4.2.6.1, and Tables 2-2 and 4-7 of this SI report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

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.

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Mitchel Field (USACE 1993, 2004a). Refer to Sections 2.4.0.1, 2.4.2.2 and 2.4.2.3 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Per stakeholder agreement no groundwater samples were collected at MRS 6. The groundwater within the vicinity of MRS 6 is not used as a potable drinking water source (Alion 2008 and Alion 2009). However two groundwater samples were collected at MRS 1 and 2 (one each) and were analzyed for NG and DNT and DNT breakdown products (Sample IDs MF-OS-GW-00-01 and MF-OS-GW-00-02). Analytical results report non-detect for all explosive compounds.

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 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 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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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 geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not present at MRS 6 and is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint 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 for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ■

Table 23 Comments: Sediment is not present at MRS 6 and is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☐

Table 24 Comments: Surface water is not present at MRS 6 and is not a medium of concern; therefore surface water was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 and Figure 2-4 of the SI report for further information.

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	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [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 ☐

Table 25 Comments: Sediment is not present at MRS 6 and is not a medium of concern as agreed upon during the TPP meeting; therefore sediment was not sampled (Alion 2008 and 2009). Refer to CSM, Section 5.2.0.2 of the SI report for further information.

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	Comparison Value	Unit	Ratios
Iron	12200	23000	mg/Kg	0.53
Aluminum	11600	76000	mg/Kg	0.15

CHF Scale	CHF Value	Sum The Ratios	0.68
CHF > 100	H (High)		
100 > CHF > 2	M (Medium)	*CHF =* [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
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).	*M*

No Known or Suspected Surface Soil MC Hazard ■

Table 26 Comments: Analytes and the associated sample location that exceeded site maxiumum background concentrations include: Aluminum and Iron at MF-UKM-SS-01-01) No explosives were detected in surface or subsurface soil samples collected at MRS 6. Refer to CSM, Sections 5.8.1.1, 6.5.0.3, Tables 5-1 and 5-9 in the SI Report. Per USACE guidance since no munitions related material have been encountered at the MRS an alternative rating of "No Known or Suspected" will be entered in Table 28 and 29.

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	M	MLL	F

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 data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	***F***

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 MC Hazard*	

APPENDIX L – REFERENCE COPIES

Located on CD.

FINAL

Response To Comments - Site Inspection Report for Mitchel Field, Garden City, NY

DERP FUDS Project No. **C02NY064503**

Prepared Under: **Contract No. W912DY-04-D-0017**
Task Order # 00170001

Prepared for:
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Prepared by:
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Durham, North Carolina 27713

December 2009

PROJECT: Draft Final Site Inspection Report for Mitchel Field (C02NY064503)			
DESIGN REVIEW COMENTS			
		REVIEW: Draft Final Site Inspection Report for Mitchel Field (December 2009) DATE: 11 December 2009 NAME: Daniel Eaton (NYSDEC)	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	No Comments.	A-ACCEPT/CONCUR: No action required.

PROJECT: Draft Final Site Inspection Report for Mitchel Field (C02NY064503)			
DESIGN REVIEW COMENTS			
		REVIEW: Draft Final Site Inspection Report for Mitchel Field (December 2009) DATE: 16 December 2009 NAME: Kevin O'Brien/Masoom Ali (Nassau Community College)	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	No Comments.	A-ACCEPT/CONCUR: No action required.

PROJECT: Draft Final Site Inspection Report for Mitchel Field (C02NY064503)			
DESIGN REVIEW COMENTS			
		REVIEW: Draft Final Site Inspection Report for Mitchel Field (December 2009) DATE: 16 December 2009 NAME: Joseph DeFranco (Nassau County)	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	No Comments.	A-ACCEPT/CONCUR: No action required.

PROJECT: Draft Final Site Inspection Report for Mitchel Field (C02NY064503)			
DESIGN REVIEW COMENTS			
		REVIEW: Draft Final Site Inspection Report for Mitchel Field (December 2009) DATE: 15 December 2009 NAME: Terry Gries (Hofstra University)	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	Section 5 General	It would be helpful to include additional narrative that explains the three different screening levels (human residential, industrial/trespasser/visitor and ecological).	A-ACCEPT/CONCUR: Text was added to Section 5.1.3 (Screening Values) describing the three screening evaluations as well as what receptors fall into each category.
2	Section 5 soil screening	It would also be helpful to more clearly separate the human and ecological screening discussion into two categories, one for health risks and one for ecological risks.	A-ACCEPT/CONCUR: A separate header (in bold) was added for the Human Health Screening and Ecological Screening discussion for each MRS in the Final SI Report. This action makes the distinction between the two processes more clear.
3	Section 5 detection limitations for NG	The explanation of the detection limits for nitroglycerin could be expand so it is clearer.	A-ACCEPT/CONCUR: Additional text was added to Section 5 when discussing the fact that the laboratory reporting limits are higher than the residential screening criteria for NG (reporting limit 4.0 mg/kg, residential screening criteria 0.61 mg/kg). Text was also included in this discussion which states that the industrial/trespasser/visitor screening criteria for NG (6.2 mg/kg) is above the reporting limit.
4	Section 5	Lastly I would like to see more detail included on the process of reviewing the data. You explained that there are many criteria used, including risk management decisions, to decide if the levels found require further action.	A-ACCEPT/CONCUR: Text was added to the bulleted lines in the “weight-of-evidence” evaluation discussing what factors contribute to risk management decisions (i.e. physical condition at the site [paved, inaccessible], conservative nature of screening values and clarification of what receptors may be present at the site and the level of expected exposure).