FINAL

Site Specific Work Plan Addendum to the FUDS MMRP Programmatic Work Plan for the Site Inspection of Fort Niagara

FUDS Project # **C02NY061303**

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

Prepared for:

U.S. Army Engineering and Support Center, Huntsville
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September 2008

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September 18, 2008
Roger Azar — Date
Alion Program Manager

September 18, 2008
Curtis Mitchell — Date
Alion Corporate Quality Management Reviewer

September 2008

LIST OF TABLES

LIST OF FIGURES (See Appendix A)

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

Alion	Alion Science and Technology Corporation
ADR	Automated Data Review
AOC	Area of Concern
APP	Accident Prevention Plan
ASR	Archive Search Report
bgs	Below Ground Surface
BHG	Bore Hole Gradiometer
C	Degrees Celsius
CELRB	Corps of Engineers Great Lakes Ohio River Buffalo District
CENAB	Corps of Engineers North Atlantic Baltimore
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CO2	Carbon Dioxide
CONUS	Continental United States
CSM	Conceptual Site Model
CX	Center of Expertise
DC	Design Center
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoA	Department of the Army
DoD	Department of Defense

DQO	Data Quality Objective
EDD	Electronic Data Deliverable
EDS	Environmental Data Services, Inc.
EM	Engineering Manual
EM-CX	Environmental & Munitions Center of Expertise (EM-CX)
EOD	Explosive Ordnance Disposal
ER	Engineering Regulation
FD	Field Duplicate
FDE	Findings and Determination of Eligibility
ft	Feet
FTL	Field Team Leader
FUDS	Formerly Used Defense Site(s)
GIS	Geographic Information Systems
GPL	GPL Laboratories, LLLP
GPS	Global Positioning System
HFA	Human Factors Applications, Inc.
HHE	Health Hazard Evaluation
HHRA	Human Health Risk Assessment
HRS	Hazard Ranking System
HTRW	Hazardous Toxic and Radiological Waste
ID	Identification
IDW	Investigative-Derived Waste
IGD	Interim Guidance Document

INPR	Inventory Project Report
LLLP	Limited Liability Limited Partnership
m	meter
MC	Munitions Constituents
MCL	Maximum Contaminant Levels
MD	Munitions Debris
MDL	Method Detection Limits
MEC	Munitions and Explosives of Concern
MFR	Memorandum for Record
mg/kg	milligram per kilogram
MHT	Mean High Tide
MPPEH	Material Potentially Presenting an Explosive Hazard
MMRP	Military Munitions Response Program
MQO	Measurement Quality Objective
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	Mean Sea Level
MSSL	Medium Specific Screening Levels
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAI	No Department of Defense Action Indicated
NG	Nitroglycerine
NTCRA	Non-Time Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation

NYSOPRHP	New York State Office of Parks. Recreation and Historic Preservation
oz	ounce
OEW	Ordnance and Explosive Waste
PAOI	Potential Area (s) of Interest
PCB	Polychlorinated Biphenyls
PFSP	Programmatic Field Sampling Plan
PGM	Program Manager
PM	Project Manager
PMMQL	Preferred Maximum Method Quantitation Limits
PPE	Personal Protective Equipment
PQAPP	Programmatic Quality Assurance Project Plan
PSAP	Programmatic Sampling and Analysis Plan
PWP	Programmatic Work Plan
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QSM	Quality Systems Manual
RAC	Risk Assessment Code
RBC	Risk Based Concentration
RCWM	Recovered Chemical Warfare Materiel
RI/FS	Remedial Investigation and Feasibility Study
RMIS	Restoration Management Information System
ROE	Right of Entry

SI	Site Inspection
SSHASP	Site-Specific Health and Safety Plan
SSHO	Site Safety and Health Officer
SSL	Soil Screening Level
SS-SAP	Site-Specific Sampling and Analysis Plan
SS-WP	Site-Specific Work Plan Addendum
SVOC	Semi-Volatile Organic Compound
SW	Surface Water
T&E	Threatened and Endangered
TAL	Target Analyte List
TCRA	Time Critical Removal Action
TNT	Trinitrotoluene
TPP	Technical Project Planning
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
USGS	U. S. Geological Survey
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VOC	Volatile Organic Compounds
WWII	World War II

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 U.S.C.2710(e)(2))

Explosive Ordnance Disposal (EOD)—The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration (USACE 2000).

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 (DoA 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 (USACE 2004b).

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 (DoA 2005).

Military Munitions—All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants;

explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges; and devices and components thereof. The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other then non-nuclear 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 U.S.C. 2011 et seq.) have been completed. (10 U.S.C 101(e)(4)(A) through (C)).

Munitions Response Site Prioritization Protocol (MRSPP) — The MRSPP was published as a rule on October 5, 2005. This rule implements the requirement established in section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the Department to assign a relative priority for munitions responses to each location (hereinafter MRS) in the Department's inventory of defense sites known or suspected of containing unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (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 taking into consideration various factors related to safety and environmental hazards.

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 U.S.C. 101(e)(5); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard (10 USC 2710(e)(2)).

Munitions Constituents (MC)—Materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 U.S.C. 2710(e)(3)).

Munitions Debris (MD)—Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal (10 USC 2710(e)(2)).

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

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

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 Department of Defense. 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 U.S.C. 101(e)(1)(A) and (B)).

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 U.S.C. 101(e)(2)(A) and (B)).

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).

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 six months to reduce risk to public health or the environment (USACE 2000).

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 U.S.C 101(e)(5)(A) through (C)).

1.0 INTRODUCTION

This Site-Specific Work Plan (SS-WP) Addendum has been prepared to document the Site Inspection (SI) activities to be conducted at the site known as Fort Niagara in accordance with the Military Munitions Response Program (MMRP). The SI at Fort Niagara falls under the purview of the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). The specific FUDS project number for Fort Niagara is C02NY061303. This SS-WP is an addendum to the Programmatic Work Plan (PWP) for the DERP FUDS MMRP SIs (entitled *Programmatic Work Plan for Formerly Used Defense Sites Military Munitions Response Program Site Inspections at Multiple Sites in the Northeast Region*, referred to throughout this document as the PWP) (Alion 2005). The U.S. Army Corps of Engineers (USACE) approved the final PWP, dated October 2005, for use in conducting SIs at multiple sites located throughout the Northeastern United States. The reader is directed to the PWP (Alion 2005) for additional programmatic details regarding general SI plans and procedures. This addendum provides site-specific plans, objectives, and procedures for conducting the SI at the FUDS known as Fort Niagara.

1.1 Project Authorization

The U. S. Army Engineering and Support Center Huntsville (USAESCH) contracted with Alion Science and Technology Corporation (Alion) to perform an SI at Fort Niagara, Niagara County, New York. This work, which is being performed in the Northeast Region of the Continental United States (CONUS) under contract W912DY-04-D-0017, Task Order 00170001, falls under the purview of DERP FUDS. USAESCH transferred management of the contract to the U.S. Army Corps of Engineers North Atlantic Division Baltimore (CENAB). CENAB works with USAESCH on this project. As the local USACE Geographic District, the USACE Great Lakes Ohio River Buffalo District (CELRB) completes the USACE Project Team by providing project management and technical support to work with the regulators and all stakeholders in execution of the SI.

The work under this task order is being completed by Alion, along with Alion's subcontractors: GPL Laboratories LLLP, Integral Consulting, Inc. and Environmental Data Services (EDS) Data Validation Services, Inc.

1.2 Project Scope and Objectives

The goal of this SI is to determine whether the site warrants a further response action or No Department of Defense Action Indicated (NDAI) designation with respect to MMRP (Alion 2005). To make this determination, investigations for Munitions and Explosives of Concern

(MEC) and Munitions Constituents (MC) will be performed in accordance with Engineering Regulation (ER) 200-3-1 (USACE 2004b), the Department of Defense (DoD) Management Guidance for DERP (DoD 2001), the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). In accordance with ER 200-3-1 (USACE 2004b), this SI is a screening level assessment to determine presence/absence of MEC and MC, and is not intended as a full-scale study of the nature and extent of MEC or MC hazards. Further project response actions, if required, will be conducted under the CERCLA process (to include RI/FS, TCRA, NTCRA, or other investigations/actions).

The project objectives of this SI are as follows:

- Determine if the site requires additional investigation through a Remedial Investigation/Feasibility Study (RI/FS) or if the site may be recommended for NDAI designation based on the presence or absence of MEC and MC.

- Determine the potential need for a Time-Critical Removal Action (TCRA) for MEC and MC by compiling data from previous investigations/reports, conducting site visits, performing qualitative reconnaissance (using visual observations and analog geophysics), and collecting MC samples.

- Collect or develop additional data, as appropriate, in support of potential Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA).

- Collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

The following describes the site-specific process used to complete the project objectives:

- Conduct a site visit and contact facility personnel at Fort Niagara, as necessary, to obtain additional site-specific data (associated reports and documents).

- Review available reports/data for Fort Niagara to identify potential MEC/MC sources, pathways, receptors, and associated data gaps.

- Prepare a read-ahead package for stakeholder review to clarify the MMRP process, discuss historical site operations, and present potential MEC/MC hazards.

- Initiate the Technical Project Planning (TPP) process to involve site owners and regulators (stakeholders) in a meeting to establish/confirm project objectives and data

needs required to: (1) screen the property for releases that, if present, would trigger the RI/FS phase of the CERCLA process, or if releases are not found to be present, determine the data required to reach project closeout; (2) define Data Quality Objective (DQO) worksheets; (3) prepare a conceptual site model (CSM); and; (4) obtain stakeholder consensus on the SI approach and planned field activities. The results of the TPP meeting are documented in a TPP Memorandum.

- Prepare a SS-WP (this document) to document site history and field investigation and analysis plans.

- Conduct field work activities to include qualitative reconnaissance for MEC and sampling for MC.

- Complete a comprehensive SI Report to document findings, conclusions, and recommendations.

This MMRP SI does not require MEC intrusive/clearing activities (Alion 2005). Furthermore, initiation or completion of a TCRA/NTCRA or emergency response action is not within the SI scope. Refer to Section 2.6.1 for additional detail on the munitions response approach.

A determination of NDAI designation or RI/FS for an MMRP project will only address MEC/MC issues at a site; *i.e.* this determination does not address potential Hazardous, Toxic, and Radioactive Waste (HTRW) issues at the property. Potential HTRW concerns identified during SI activities will be documented and this information will be provided to USACE for determination of future action under the HTRW program. In addition, if an NDAI designation is given, and MEC/MC contamination is discovered at a later date, USACE may reopen the MMRP project.

1.3 Technical Project Planning Summary

The TPP Meeting for Fort Niagara was conducted on 26 February 2008 at the Fort Niagara State Park, Youngstown, New York. The Old Fort Niagara Association, New York State Department of Environmental Conservation (NYSDEC), New York State Office of Parks (NYSOP), USACE Baltimore District, USACE Buffalo District, and Alion representatives participated in this meeting. The TPP participants concurred with the technical approach for the planned SI activities discussed as documented in the TPP Memorandum (Alion 2008) and summarized below:

- **SI Objectives and Approach**. Stakeholders understood limited scope study and supported the general approach presented.

- **Munitions Response Sites / Potential Areas Of Interest (MRS/PAOI).** Identified Stakeholders agreed to Munitions Response Site (MRS) 1 (Offshore Dump Site), MRS 2 (Rifle/1000' Machine Gun Range), MRS 3 (Pistol/Anti-aircraft Range), MRS 4 (Skeet Range), and MRS 5 (90-mm Firing fan) as being the focus of the SI. However, it was agreed by attendees that the pistol/anti-aircraft range (MRS 3) would not be investigated as the impact area was over water and the firing point had eroded into Lake Ontario. Also, at the Rifle/1000' Machine Gun Range (MRS 2) the berm (impact area) was moved and used for fill in another area. Therefore, geophysical reconnaissance will be conducted at the former MRS 2 location and the samples will be collected where the soil was relocated (PAOI 1). Since the meeting, *The Subsurface Investigation Report, Fort Niagara State Park, Youngstown, New York, Niagara County, NYSDEC Spill #98-6022* (The IT Group 1999) was provided to Alion for review. The report focused on underground storage tanks (USTs) and it concluded that in addition to elevated levels of Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compounds (SVOCs), and Polychlorinated Biphenyls (PCBs), there were elevated levels of metals (arsenic, barium, cadmium, chromium, lead, mercury, and selenium) in sludge mud collected between buildings 41 and 102 off of Quarter Master Court. These compounds are not MC of the munitions used historically at Fort Niagara and were not within areas identified as having historical military munitions use. Therefore this information is not applicable to this SI.

- **CSMs (MEC and MC).** Stakeholders agreed to the CSMs presented for MEC and CSMs for MC, as modified during the TPP:
    - MRS 1 CSM: No Changes
    - MRS 2 CSM: Proposed samples will be relocated to PAOI 1.
    - MRS 3 CSM: No Changes
    - MRS 4 CSM: No Changes
    - MRS 5 CSM: No Changes
    - PAOI 1 CSM: Newly added to SI as a result of TPP Meeting

- **DQOs.** Stakeholders agreed to the DQOs, with the following revisions only for DQO 1. Addition of subsurface soil as a sampling media for PAOI - 1 (relocated soil from MRS 2 backstop and target butt).

TPP actions items (Alion 2007) and their respective status are noted below:

- Alion will scan in the attendee list and email to Mr. Ng, Ms. Finley, and Mr. MacPherson. ***[****Follow Up: Alion scanned and e-mailed the sign-in sheet to Mr. Ng, Ms. Finley, and Mr. MacPherson on March 3, 2008.****]***

- Alion will verify the locations of the former navy barracks, the commandants house, and the former post theater and that these locations are not within any of the MRS/PAOI areas. ***[****Follow Up: Alion reviewed historical maps of Fort Niagara and talked to Mr. Clarke to verify that the former navy barracks, commandants house, and post theater are not within any of the MRS/PAOI areas. Therefore the potential future use/construction will not change the designation to residential.****]***

- Alion will research the use of the trenches for training and determine if this area should be a Potential Area of Interest (PAOI). If evidence shows that munitions were used, this area will be labeled PAOI 2 and one sample will be collected for specific metals and/or explosives associated with the types of munitions used in this area. ***[****Follow Up: Alion reviewed the ASR documents and concluded that live munitions were not used in these trenches. The trenches were used to simulate war scenarios. No PAOI designation is required at this location.****]***

- Alion will revise the sample map in the site specific work plan (SS-WP) to reflect the updated sample locations from the Rifle/Machine Gun Range impact berm to the area, identified as PAOI 1, where the former impact berm soils were transferred to use as fill dirt. ***[****Follow Up: Updated sample maps will be included in the Draft SS-WP.****]***

- Alion will show the background sample locations in the site specific work plan (SS-WP) to reflect the locations that were agreed on at the TPP meeting. ***[****Follow Up: Maps updated with background sample locations will be included in the Draft SS-WP.****]***

- Alion will revise the MQOs to include the more stringent Nitroglycerin value from Region 6 screening values. ***[****Follow Up: Updated MQO tables will be included in the Draft SS-WP.****]***

Postscript*: After completion of the TPP meeting, a new draft directive for the MMRP Program was issued. As part of this directive, an update in terminology for "Area of Concern (AOC)"was issued. What was previously called "AOC" will hereon out be referred to as "Potential Area of Interest (PAOI)"; therefore AOC has been replaced with PAOI throughout this document.*

1.4 Decision Rules

Site-specific DQOs have been developed for Fort Niagara and are presented in Worksheets 1-4 (Appendix C). These DQOs and the decision rules to support decision-making for this SI are presented below:

- DQO 1 - Determine if the site requires additional investigation through an RI/FS or if the site may be recommended for NDAI designation based on the presence or absence of MEC and MC.

  The basis of recommendation for RI/FS related to the presence/absence of MEC includes:

  - Historic data that indicates the presence of MEC or Munitions Debris (MD)
  - Visual evidence or anomalies classified as MEC, MD or Material Potentially Presenting an Explosives Hazard (MPPEH)
  - 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. ground scarring, bomb craters, burial pits, MD, etc.)

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

  - Maximum concentrations at the site exceed USEPA Regional Screening Levels based on current and future land use
  - Maximum concentrations at the site exceed USEPA interim ecological risk screening values
  - Maximum concentrations at the site exceed site-specific background levels

If none of these aforementioned scenarios occur, then the recommendation for NDAI designation is a possible option.

- DQO 2 - Determine the potential need for a TCRA for MEC and MC by compiling data from previous investigations/reports, conducting site visits, performing qualitative reconnaissance, and by collecting MC samples. The basis for recommendations are specified below:

- A TCRA or an emergency response - If there is a complete pathway between source and receptor and if the MEC presence is 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.

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

- DQO 3 – Collect or develop additional data, as appropriate, in support of a potential HRS scoring by the USEPA.

- DQO 4 - Collect the additional data necessary to complete the MRSPP.

1.5 Work Plan Organization

This SS-WP covers the inspection and all associated preparations necessary for SI activities at Fort Niagara. Refer to the PWP (Alion 2005) for additional detail regarding general SI plans and procedures. This SS-WP is organized as follows:

Section 1 Introduction

Section 2 Project Description

Section 3 Field Investigation Plan

Section 4 Site Specific Quality Assurance Project Plan

Section 5 References

Appendix A Figures

Appendix B Draft Phase I MFR Work Sheet

Appendix C DQO Worksheets and MQO Tables

Appendix D Interim Guidance Document for UXO and Munitions Data Sheets

Appendix E Site-Specific Accident Prevention Plan

Appendix F Logs and Forms Used During the Site Inspection

Appendix G State Preservation and Historic Office (SHPO) and Threatened and Endangered Species Consultation Response Letters for the State of New York

Appendix H Rights of Entry (ROE) and Additional Stakeholder Correspondence

Appendix I Response to Stakeholder Comments

1.6 Project Organization

Technical, ordnance, and managerial personnel required to support the SI activities are provided from a pool of Alion professionals. Key positions include the Program Manager (PGM), Site-Specific Project Manager (PM), Task Managers, Field Team Leaders (FTLs), Chemical Quality Control (QC) Officer, Certified Industrial Hygienist (CIH), Unexploded Ordnance (UXO) Technician II/III, and Geographic Information Systems (GIS) Manager. The key positions, qualification requirements, and assigned personnel are identified in the PWP (Alion 2005).

Project points of contact for Fort Niagara SI are identified in Table 1-1. Project communication and reporting is conducted in accordance with the procedures outlined in the PWP (Alion 2005).

The Alion SI Field Team for Fort Niagara will include a three-person team, with each person qualified in his/her area of expertise. The FTL leads the field sampling activities. For this site, the FTL is the Task Manager; they are knowledgeable of the historical and logistical details regarding Fort Niagara. The FTL will manage the field team and make decisions in coordination with the Alion PM. A Sampling Technician assigned to perform the MC sampling will support the FTL. The Field Team will also include a UXO Technician (II or III) tasked with ensuring all aspects of field safety as well as identification of MEC, Discarded Military Munitions (DMM), or any MD encountered. The UXO Technician also will conduct the geophysical reconnaissance and ensure safe pathways to allocated sampling locations. The use of one UXO Technician is a deviation from the PWP (Alion 2005), which states that two UXO Technicians will be used during these field activities. The reason for the deviation from the PWP is related directly to experience on many of the SI sites performed to date that indicate that the use of two UXO Technicians is not required to perform the field activities. One UXO Tech per environmental sampling team is sufficient to conduct field activities in a safe manner.

The Fort Niagara SI field team will be comprised of the following individuals:

- FTL, Sarah Moore
- UXO Technician, Rusty Mitchell
- Sampling Technician, Benjamin Claus

Table 1-1. Project Points of Contact

NAME	ORGANIZATION	PHONE	ADDRESS	E-MAIL	PROJECT ROLE
Bradford McCowan	U.S. Army Corps of Engineers (USACE), Environmental & Munitions Center of Expertise (EM-CX)	256-426-4214	P. O. Box 1600 4820 University Square Huntsville, AL 35816	Brad.McCowan@hnd01.usace.army.mil	MMRP SI Program Manager
Julie Kaiser	U.S Army Corps of Engineers North Atlantic Baltimore (CENAB) MM Design Center (DC)	410-962-4006	City Crescent Building 10 S. Howard St. Baltimore, MD 21201	Julie.E.Kaiser@nab02.usace.army.mil	MMRP SI Regional Program Manager
David MacPherson	U.S Army Corps of Engineers-Buffalo District (CELRB) Geographic District	716-879-4294	1776 Niagara Street Buffalo, NY 14207	david.r.macpherson@usace.army.mil	MMRP SI Geographic District Project Manager
William Butler	U.S Army Corps of Engineers-Buffalo District (CELRB) Geographic District	716-879-4268	1776 Niagara Street Buffalo, NY 14207	william.e.butler@usace.army.mil	Geographic District Archeologist
Jennifer Janik	U.S Army Corps of Engineers-Detroit District (CELRB) Geographic District	716-879-4113	1776 Niagara Street Buffalo, NY 14207	jennifer.r.janik@usace.army.mil	Geographic District Real Estate
Liza Finley	CENAB Hazardous Toxic and Radiological Waste (HTRW) Branch, RID Section	410-962- 2683	City Crescent Building 10 S. Howard St. Baltimore, MD 21201	liza.finley@usace.army.mil	DC Design Team Leader
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Chek Ng	NYSDEC	518-402-9620	625 Broadway Albany, NY 12233-7015	cbng@gw.dec.state.ny.us	State Regulator
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Table 1-1. Project Points of Contact

NAME	ORGANIZATION	PHONE	ADDRESS	E-MAIL	PROJECT ROLE
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Nancy Herter	NYSOPRHP	716-745-7273	New York State Historic Preservation Office Peebles Island Resource Center P.O. Box 189 Waterford, NY 12188-0189	david.clarke@oprhp.state.ny.us	Fort Niagara State Park Manager
Jere Brubaker	OPRHP- Old Fort Niagara	716-745-7611	P.O. Box 169, Youngstown, NY 14174	jbrubaker@oldfortniagara.org	Old Fort Niagara Curator
Robert Emerson	OPRHP- Old Fort Niagara	716-745-7611	P.O. Box 169, Youngstown, NY 14174	remerson@oldfortniagara.org	Old Fort Niagara Executive Director
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Table 1-1. Project Points of Contact

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1.7 Project Schedule

The Fort Niagara SI project schedule presented in Figure 1 (Appendix A), includes proposed submittal dates, review times for stakeholders, expected fieldwork dates, and reporting dates. This revised project schedule supersedes the project schedule originally presented in the Final TPP Memorandum (Alion 2008). The current SI schedule, planned for completion in April 2009, will be updated as necessary to reflect current progress and anticipated activities.

- Summarized Schedule of Document completion (see Appendix A, Figure 1)
  - TPP Memorandum - March 7, 2008
  - Draft Site-Specific Work Plan - July 16, 2008
  - Review comments on Draft SSWP due – *August 18, 2008
  - Final SSWP - September 12, 2008
  - Field Work- *October 20, 2008
  - Draft Final SI Report- *February 2009
  - Draft SI Report- *March 2009
  - TPP #2 - *April 2009
  - Final SI Report - *April 2009

* Dates are approximate

2.0 PROJECT DESCRIPTION

2.1 Project Location

The site known as Fort Niagara is located in Niagara County, New York (Figure 2, Appendix A). The North American Datum (NAD) 1983 Universal Transverse Mercator (UTM) easting (X) and northing (Y) coordinates for the area are 657216 meters (m) and 4792146 m, respectively (USACE 2004a). This site falls under the geographical jurisdiction of the USACE, New York Buffalo (CELRB).

2.2 Site Description

Fort Niagara has been used for military purposes for over 300 years due to its strategic location on both Lake Ontario and the Niagara River (Figure 3, Appendix A). The earliest know military uses were by the French and British as a colonial military outpost. Fort Niagara is comprised of approximately 288 acres, with approximately 4 acres that is currently known as the Coast Guard Station and building number 88; this area was investigated under the INPR site number C02NY1006. The Fort Niagara proper is owned by the State of New York and operated by the Niagara Frontier Park Commission as Fort Niagara State Park. The New York State Office of Parks and Recreation owns the property (USACE 1999).

2.2.1 Topography

The Fort Niagara site has elevations that range from approximately 250 to 300 feet (ft) above mean sea level (msl). The surface topography is mostly flat with woods on the eastern portion (Figure 4, Appendix A). Lake Ontario is situated to the north and the Niagara River bounds Fort Niagara to the west. The elevation gradually increases to the east and to the south at the Fort Niagara site (USACE 1999).

2.2.2 Vegetation

The land at Fort Niagara has both open and heavily vegetated portions. The eastern portion of the FUDS has the densest vegetation, comprised predominantly of trees, shrubs, and bushes (USACE 1999).

2.2.3 Geology and Soils

There are two primary soil types underlying Fort Niagara, the Rhinebeck and the Hudson soils series. The Rhinebeck soils are generally located in the central and eastern portion of the site (Figure 5, Appendix A). The Rhinebeck soils are typically poorly drained, moderately fine to

medium textured, and derived in calcarerous lacustrine deposits of silt and clay. Surface soil is typically composed of a dark grayish brown, silty loam present from approximately 0 - 8 inches below ground surface (bgs). The underlying subsurface soil profile consists of grayish brown, friable silty-loam from 8 - 10 inches bgs. Below this is dark grayish brown firm, plastic, heavy silty-clay loam extending from 10 inches to a depth of approximately 23 inches. Beyond 23 inches in depth, a very firm, calcareous substratum that contains brown silty-clay loam, thin lenses of silt with mottling and some thin pinkish white streaks of lime. The water table rises to a seasonal high within approximately one foot of the surface early in the spring and in excessively wet periods (USACE 1999).

Soils on the western, and a small area of the eastern, portion of the FUDS, are Hudson soils which are deep, moderately well drained soils that have medium to moderately fine textured surface layer that were derived from glacial lake sediments. The sediments are primarily high lime silt and clay. The typical profile of this type of soil is a surface soil layer of dark grayish-brown silty loam that extends from approximately 0 – 8 inches bgs. The subsurface soil profile consists of friable, brown silt-loam from 9 – 12 inches bgs underlain by firm, brown to dark-brown, silty-clay loam which extends from 12 – 30 inches bgs. The upper portion of which is slightly acidic to neutral, becoming more alkaline at greater depths. The water table rises to a seasonal high of approximately 18 inches bgs during the early spring when the area experiences excessively wet periods (USACE 1999).

2.2.4 Hydrology and Hydrogeology

The former Fort Niagara borders Lake Ontario, and the Niagara River. The water table can be found within one foot of the surface in the Rhinebeck series or within 18 inches in the Hudson series during the wet season in early spring. The area has at least three distinct groundwater flow regimes in the bedrock. In the uppermost regime, analysis indicated active groundwater circulation primarily towards the Niagara Gorge. Analysis indicated that in the remaining two regimes, very old and saline groundwater from pre-Pleistocene time is present due to the lack of permeability (USACE 1999). The Fort Niagara State park personnel and the surrounding population are supplied by public water supply (Alion 2008).

2.2.5 Threatened and Endangered (T&E) Species

No threatened or endangered (T&E) species have been documented at Fort Niagara (USACE 1999). NYSDEC lists multiple animal species for the state of New York that are on the federal endangered, threatened, recovered, or species of concern list. Therefore the New York State Department of Environmental Conservation (NYSDEC) was contacted and provided a description of the proposed sampling activities to determine if T&E species were present at the

FUDS and the possibility of having an adverse effect on these species during the sampling activities. The response letter from NYSDEC was included in Appendix G and identifies the area along the Niagara River as being a waterfowl winter concentration area. However, the limited sampling activities will not affect the species or their habitats. USACE also contacted the New York State Historic Preservation Office; the response letter is also included in Appendix G and reflects concurrence that the limited work proposed will have no adverse affects on cultural resources.

2.2.6 Wetlands

Marine regularly flooded and irregularly flooded wetlands are not known to be present at Fort Niagara, as shown in Figure 6, Appendix A. However, if wetlands are encountered during the field sampling activities, every effort will be made to avoid impact to these areas during the SI field activities at the Fort Niagara (USACE 1999).

2.2.7 Cultural, Archaeological, and Water Resources

The ASR Findings indicate that the entire Fort Niagara FUDS is eligible for listing in the National Register of Historic places (USACE 1999). USACE/Alion are currently consulting with the New York State Office of Parks, Recreation, and Historic Preservation and New York Landmarks Commission to ensure cultural, archaeological and water resources are not present in the MRS/PAOIs being inspected at Fort Niagara and/or will not be disturbed during field activities. In the event that cultural, archeological, and/or water resources are identified in these areas, any disturbances will be avoided or mitigated in accordance with State requirements. Any adjustments required to the sampling design, to avoid impacts on cultural resources, will be documented in the Final SS-WP, prior to commencement of field activities.

2.2.8 Coastal Zone

A portion of the former Fort Niagara is situated within the New York State Inland Coastal Zone of the Western Great Lakes Region. The New York State Coastal Management Zone is managed by the New York State (NYS), Department of State (DOS), Division of Coastal Resources (NYS DOS 2004). However, the limited SI sampling activities will not have a significant impact on the New York Coastal Zone

2.3 Site History

The earliest known military use of Fort Niagara was by the French as early as 1687. As discussed in section 2.2, the location of Fort Niagara made it an extremely coveted military post due to its position on Lake Ontario and the Niagara River. The United States took the fort from

the British in 1796 in the Jay Treaty of 1794. In June 1812 the U.S. declares war on Britain which started the battles between Fort Niagara and Fort George across the river in Canada. Fort Niagara eventually prevailed and reduced Fort George to rubble in May 1813. In December 1813, the British captured Fort Niagara and held it until the end of the war. The U.S. reoccupied the fort in 1815 and plans for re-construction were discussed but never completed. Fort Niagara was abandoned with the exception of a caretaker from 1826 to 1828 when the fort was reoccupied. In 1840, the NY state legislature conveyed 288.41 acres to the War Department. The U.S. Army Corps of Engineers completed upgrades to Fort Niagara from 1841 to 1848, including the installation of emplacements for heavy guns and a shot furnace. Construction continued from 1865 to 1870, followed by major expansions in 1882, 1885, 1908, and 1912. Between the early 1900's and 1946 the fort served as an officer training camp, reception center for draftees, and prisoner of war camp. In early 1946, the Department of Army declared Fort Niagara excess and the "new" portion of Fort Niagara became veteran housing. In 1949, 288.49 acres were returned to New York State and then the state conveyed the acres to the Niagara Frontier State Park Commission. The veteran housing project was not disturbed and later that year the government leased building 13 and the surround 3.12 acres. The lease end date was 30 June 1951, however the lease was extended until 1953 when the Department of the Army entered a new leasehold to use and occupy 275 acres of Fort Niagara. This lease was for three years and did not include the area known as "old fort Niagara", the 1812 cemetery, or the property that houses the U.S Coast guard (USACE 1999).

A single battery of sixteen 90mm guns were stationed at Fort Niagara and test fired in January 1954. These guns became obsolete in 1955 and most 90mm were replaced with Nike missiles. The impact area for the 90mm guns was completely over Lake Ontario (USACE 1999).

The Department of Army terminated its lease in August 1964 and the property reverted back to the State of New York. Between 1965 and 1966 the Niagara Frontier Park Commission cleared the "new" Fort Niagara by removing most of the twentieth century buildings. This area today is Fort Niagara State Park (USACE 1999).

2.4 Current Use and Projected Land Use

The State of New York is the owner of the former Fort Niagara FUDS which is operated by the Niagara District as Fort Niagara State Park. Fort Niagara State Park, which is adjacent to Old Fort Niagara, is used for recreational purposes such as boating, picnicking, hiking, fishing, biking and playing sports (tennis courts, pool, soccer fields).

2.5 Previous Investigations of the Site

2.5.1 Inventory Project Report

USACE issued the Inventory Project Report (INPR) for the Fort Niagara in September 1996. The 1996 INPR determined that the present condition of the project site has been determined to be the result of a prior DOD ownership, utilization, or activity. Moreover, it is determined that an environmental restoration project is an appropriate undertaking within the purview of the DERP. There is the possibility that ordnance may still be present; therefore the property was determined to be eligible for cleanup under the FUDS program. The Risk Assessment Code (RAC) score of 3 was given to the Fort Niagara ranges. RAC score indicates the level of MEC risk associated with the area; ranging from 1 being the highest category of risk, to 5, being the lowest. A site survey and a Findings and Determination of Eligibility (FDE) were created in 1996 and included in the INPR (USACE 1996).

2.5.2 Archives Search Report (ASR)

The USACE Rock Island District prepared the Archives Search Report (ASR) Findings Fort Niagara in February 1999. The ASR Findings contains previous investigations at the site, property description, physical characteristics of the site, the historical property ownership summary, site eligibility as a FUDS, a visual site inspection, an evaluation of ordnance presence at the site, property MEC/Recovered Chemical Warfare Materiel (RCWM) technical data, and recommendations. The ASR also included ordnance technical data sheets, physical and chemical characteristics data sheets, maps, interviews, visual inspection property report and photographs, and a preliminary assessment form. The ASR concluded that the Fort Niagara FUDS be carried forward to the SI stage (USACE 1999).

2.5.3 ASR Supplement

The ASR Supplement was prepared for the site in 2004. The areas identified in the ASR Supplement as potential areas of concern were the Offshore Dump Site, Rifle Range/1000‘ Machine Gun Range, Pistol Range/Anti-aircraft Range, Skeet Range, and 90-mm firing fan. The INPR and ASR indicated the RAC score of 3 for the entire Fort Niagara site. However, the ASR Supplement assigned a RAC score to each individual MRS, as follows: MRS 1 - the Offshore Dump Site has a RAC score of 2; MRS 2 – Rifle Range/1000’ Machine Gun Range, MRS 3 - Pistol Range/Anti-aircraft Range, MRS 4- Skeet Range and MRS 5 – 90-mm firing fan have a RAC score of 5 (Figure 8, Appendix A). No historic munitions discoveries have been reported at any of the MRS areas since site closure (USACE 2004).

Table 2-1. Potential Risk from Munitions and Explosives of Concern (USACE 2004)

Site Name	Range Name	Sub-range Name	RMIS ID	Acreage	RAC Score	Type Of Munitions	Munitions ID
Fort Niagara	MRS 1 – Offshore Dump Site	NA	C02NY061303M01	2	2	3-inch, Mortar, HE, MK 1	Mortars, HE (CTT22)
	MRS 2 – Rifle Range/ 1000" Machine Gun Range	NA	C02NY061303R01	89[1]	5	Small Arms, General	Small Arms (CTT01)
	MRS 3 – Pistol Range/ Anti-aircraft Range	NA	C02NY061303R02	72[1]	5	Small Arms, General	Small Arms (CTT01)
	MRS 4- Skeet Range	NA	C02NY061303R03	1[1]	5	Small Arms, General	Small Arms (CTT01)
	MRS 5- 90-mm Firing Fan	NA	C02NY061303R04	41106[1]	5	90mm, HE. M71 and HE-T, M71A1	Large Caliber (37mm and Larger), HE (CTT18)
	*PAOI 1- relocated soils from MRS 2	NA	NA	NA	NA	NA	NA

[1] Includes acreage over water due to range fans.
*PAOI identified at TPP meeting.

2.6 Site Inspection Approach and Rationale

Small arms, mortars, and larger caliber munitions were used on Fort Niagara. Table 2-1 lists the areas of evaluation, the acreage associated with each area, the RAC score given to each area and munitions type.

2.6.1 Approach to Munitions Response Activities

The overall approach to munitions response activities is presented in the PWP (Alion 2005). As discussed in Section 2.5.3 of this SS-WP, no evidence of historical munitions has been found at the site since property transfer. Therefore, the technical approach, as defined during the TPP Meeting (Alion 2007), will focus on biased screening for the presence of MEC/MC in ranges or sub-ranges (referred to as MRSs) most likely to be impacted from former munitions-related activities.

The Fort Niagara SI, as defined in the ASR Supplement, includes five MRSs and one PAOI potentially impacted by MEC and/or MC based on the site use and history. The five MRSs and one PAOI are the focus of this SI as identified below:

- **MRS 1 (Offshore Dump Site).** This range is identified as Restoration Management Information System (RMIS) C02NY061303M01 and includes approximately two acres of water only.

- **MRS 2 (Rifle Range/ 1000' Machine Gun range).** This range is identified as RMIS C02NY061303R01 and includes approximately 83 acres of land and six acres of water.

- **MRS 3 (Pistol Range).** This range is identified as RMIS C02NY061303R02 and includes approximately 66 acres of land and six acres of water.

- **MRS 4 (Skeet Range).** This range is identified as RMIS C02NY061303R03 and includes approximately one acre of land only.

- **MRS 5 (90-mm Firing Fan).** This range is identified as RMIS C02NY061303R04 and includes approximately two acres of land and 41,104 acres of water.

- **PAOI 1 (Relocated berm soils from the Rifle Range/ 1000' Machine Gun range).** This PAOI is the current location of the previous shooting butt impact soils that was moved from MRS 2 and used as fill material. The acreage associated with this PAOI is not known.

Consistent with USACE guidance, the SI will address land areas within the FUDS boundary, and water up to 100 yards from the Mean High Tide (MHT) mark. MRS 2, MRS 3, MRS 4, and MRS 5 all include water range areas. Only the land area of the aforementioned MRSs will be assessed during this SI given that the impact area location is in the deep water of Lake Ontario. The offshore dump (MRS 1) is completely under water and will be investigated within the 100 yard MHT demarcation. The SI will assess and provide recommendations for areas identified in the ASR Supplement. MRSPPs are completed only for MRSs in accordance with USACE guidance. The MRS boundaries are shown in Figure 3 (Appendix A).

2.6.2 Munitions and Explosives of Concern Exposure Analysis

2.6.2.1 Munitions Type and Composition

The types of MEC historically used at the site are presented in Table 2-2. The associated MC analysis (also listed in Table 2-2) was developed based on the munitions used at each MRS and/or PAOI for Fort Niagara. This data was gathered from munitions data sheets, historical documents, and other munitions reference documents. The Appendix D (Munitions Data Sheet) was prepared and included in this SS-WP to serve as a visual guide for the SI field team to ensure accurate identification should suspect MEC be located on site. Also of note are the MC

documented to be associated with the specific munitions used at the site or with similar munitions (USACE 2004).

Table 2-2. Military Munitions Type and Composition (USACE 2004a and other sources)

Range ID (MRS)/ Subrange	Munitions ID	Munitions Type	Composition (explosives and metallic components)	Associated MC Analysis[1, 2]
MRS 1- Offshore Dump Site	MORTARS, HE (CTT 22)	3-inch mortar, HE, MK1	***Body*:** Forged steel or cast-iron[2] ***Filler*:** Trinitrotoluene (TNT) ***Propellant*:** Ballistite (Nitroglycerin (NG) and Nitrocellulose[3]) ***Booster*:** Tetryl, TNT ***Shrapnel powder*:** Black powder (sodium nitrate or potassium nitrate, charcoal, and sulfur) ***Fuze*:** Black powder, antimony sulphide, Mercury Fulminate, potassium chlorate	*The Offshore Dump Site will be sampled for the following:* Explosives • NG • TNT[4] • Tetryl *The Offshore Dump Site will not be sampled for metals analysis since the only metal potentially of concern in this area is iron.*[2] Metals • None
MRS 2- Rifle Range/Machine Gun Range	Small Arms (CTT01)	Small Arms, General	***Projectile:*** .50 caliber and .30 caliber (ball): Lead, antimony, cupro-nickel, and soft steel. ***Propellant:*** Single or Double-base smokeless powder (nitrocellulose, NG dinitrotoluene (DNT), potassium sulfate, graphite) ***Primer:*** Lead Styphnate, Barium Nitrate, Antimony Sulfide, Aluminum Powder, PETN, tetracene	*The shoot-in-butt impact soils from this MRS have been excavated and moved to Potential Area of Interest (PAOI) no. 1; discussed below in this table. Consequently, per agreement with TPP attendees ,no MC samples will be collected at this MRS. Alternatively, all MC samples that were slated to be collected at this MRS will be moved to PAOI 1 and will be collected there as sub-surface samples.*
MRS 3- Pistol Range/Anti Aircraft Range	Small Arms (CTT01)	Small Arms, General	***Projectile:*** .30 caliber (ball): Lead, antimony, cupro-nickel, and soft steel. ***Propellant:*** Single- or Double-base smokeless powder (nitrocellulose, NG, DNT, potassium sulfate, graphite) ***Primer:*** Lead Styphnate, Barium Nitrate, Antimony Sulfide, Aluminum Powder, PETN, tetracene	*This MRS has an impact area over deep water and the firing point has been eroded into Lake Ontario over the years. Consequently, per agreement with TPP attendees, no MC samples will be collected at this MRS.*

MRS 4-Skeet Range	Small Arms (CTT01)	Small Arms, General	***Projectile:*** No. 00 Lead Antimony-Arsenic shot or Lead shot ***Propellant:*** Single- or Double-base smokeless powder (nitrocellulose, NG, DNT, potassium sulfate, graphite) ***Primer:*** Lead Styphnate, Barium Nitrate, Antimony Sulfide, Aluminum Powder, PETN, tetracene	*Explosives MC from small arms ranges are associated with the firing point; therefore, the propellant constituents will be analyzed at the firing point and the projectile constituents at both the firing point and the impact area are carried forward for analysis in this SI. See Note #1.* Explosives (at firing point): • NG • DNT[5] *Metals are associated with the projectile and are usually only sampled for at the impact area. The impact area for MRS 4 is under deep water. Due to agreements made with the stakeholders at the TPP, the firing point will be sampled for the following:* Metals (at firing point area): • Antimony • Arsenic • Lead

MRS 5-90mm Firing Fan	Large Caliber (37mm and larger), HE (CTT18)	90mm, HE. M71 and HE-T, M71A1	***Projectile:*** Steel filled with TNT or Ammonal (TNT, aluminum, ammonium nitrate) or Composition B (RDX, TNT, polyisoluctylene, wax) or Amatol 50-50 (ammonium nitrate, TNT, cyclonite) ***Propellant:*** M1 (Nitrocellulose, DNT, dibutylphthalate, diphenylamine, lead, carbonate, potassium sulfate) or M6 (nitrocellulose, DNT, dibutylphthalate, potassium sulfate, diphenylamine) or M15 (nitrocellulose, NG, nitroguanidine, cryolite, ethyl centralite) or M16 (ethyl, centralite, carbon, remove diphenylamine) ***Primer:*** Potassium Chlorate, Lead Thiocyanate, Antimony Sulfide, TNT ***Fuze:*** Potassium Chlorate, Lead Azide, Antimony Sulfide, Carborundum, Mercury Fulminate, Tetryl, Lead Thiocyanate, TNT, Glass, Barium Nitrate, Lead styphanate, tetracene, Black Powder, RDX, stearic acid	*Explosives MC from small arms ranges are associated with the firing point; therefore, the propellant constituents will be analyzed at the firing point and the projectile constituents at both the firing point and the impact area are carried forward for analysis in this SI. See Note #1.* Explosives (at firing point): • NG • DNT[5] *Metals associated with the projectile would be sampled for at the impact area; however the 90mm impact area is completely under Lake Ontario.* Metals (at impact area): • None
PAOI 1,-Rifle Range/ 1000" Submachine Gun Range soils (MRS 2)	Small Arms (CTT01)	Small Arms, General	***Projectile:*** .50 caliber and .30 caliber (ball): Lead, antimony, cupro-nickel, and soft steel. ***Propellant:*** Single or Double-base smokeless powder (nitrocellulose, NG dinitrotoluene (DNT), potassium sulfate, graphite) ***Primer:*** Lead Styphnate, Barium Nitrate, Antimony Sulfide, Aluminum Powder, PETN, tetracene	*The shoot-in-butt impact soils from MRS 2 have been excavated and moved to Potential Area of Interest (PAOI) no. 1; all MC samples at PAOI 1 will be collected as sub-surface samples for metals only.* Explosives (firing point): • None Metals (impact area): • Antimony • Copper • Iron • Lead • Nickel

AP=Armor Piercing BD=Base Detonating CTT=Closed Transferring and Transferred DNT=dinitrotoluene HE=High Explosive Mk=Mark M=Model MRS=Munitions Response Site N/A=Not Applicable NG = nitroglycerine PETN=Pentaerythrite Tetranitrate Tetryl=Methyl-2,4,6-trinitrophenylnitramine TNT=trinitrotoluene	[1] Based on available technical manuals, MCs identified for Fort Niagara site munitions include the following: **Fuze and Primer** (black powder, barium nitrate, lead styphnate, lead thiocyanate, antimony sulfide, aluminum powder, PETN, TNT, tetracene). Fuze and Primer materials typically represent a very small percentage of the total small arms munition weight. This material along with the propellant typically burn as the projectile is fired. Therefore, the MC sampling/analysis typically focuses on primary constituents present in propellants at the firing point and the projectile in impact areas. Based on this rationale, primer constituents in small arms are not included in the list of Associated MC Analysis. [2] Iron is present in small arms projectiles, grenades, and bombs. During the TPP meeting, it was agreed that iron would not be analyzed for because it is not a CERCLA hazardous substance. [3] Refer to the discussion in Section 5.1.1.2 on black powder and nitrocellulose. [4] TNT and break down products currently on the approved PWP explosives analysis using method 8330A list (1,3-Dinitrobenzene; 1,3,5-Trinitrobenzene; 2-Amino-4,6-dinitrotoluene; 4-Amino-2,6-dinitrotoluene, 2,4,6- Trinitrotoluene) will be analyzed. [5] DNT and break down products currently on the approved PWP explosives analysis using method 8330A list (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene, 4- Nitrotoluene) will be analyzed.

Available historical information indicates that munitions were used/fired at the Fort Niagara. Explosives may be present in detectable quantities at firing points and metals may be present at impact areas. Some of the munitions associated with Fort Niagara contained black powder, the major component of the munitions primer. Black powder will not be sampled within the FUDS because (a) black powder is a rapidly burning material that, when fired, leaves little residue as either decomposition products or un-combusted compounds (ITRC, 2003) and (b) typically any residual amounts are insignificant in volume to present a MC hazard. Additionally, the original chemical constituents and the decomposition products are, in general, common soil compounds (organic carbon, carbon dioxide (CO2), nitrates, etc.), which would be difficult to specifically identify as originating from within the FUDS boundary.

Nitrocellulose was in the propellant of the munitions used at Fort Niagara. However, 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 proposed. Below is a brief description of each MRS or PAOI and the MC sample analysis scheme for each site or area.

MRS 1 (Offshore Dump Site). The military use of MRS 1 included a dump site. Based on what has been previously found in that area, including numerous expended or inert ordnance items, and unfired 3" practice mortar rounds (without spotting charges) (USACE 2004), three sediment samples were proposed during the TPP meeting to be collected for analysis of TNT breakdown products (1,3-Dinitrobenzene, 2,4,6-Trinitrotoluene, 1,3,5-Trinitrobezne, 2-Amino-4,6-dinitrotoluene, 4-Amino-2,6-dinitrotoluene), Nitroglycerine, and Tetryl. In order to collect a sediment sample from the depth of MRS 1, a ponar dredge or dip spoon will have to be lowered to the bottom of the MRS to grab a sediment sample. The area where sediment samples are proposed to be collected will have to be cleared using geophysical equipment prior to lowering the ponar dredge or dip spoon, in order to ensure that the area is clear of MEC items. In the event that the areas cannot be cleared from MEC due to depth or excessive anomaly presence, the three sediment samples will not be collected at MRS 1. The inspection of MRS 1 will be conducted using a locally chartered boat (approximately 20 ft.) which holds up to four occupants, and will be launched at one of the two Fort Niagara State Park launches.

MRS 2 (Rifle Range/ 1000' Submachine Gun Range). As noted in Table 2-2 and documented in the TPP, no samples will be collected within this MRS due to the soil berm impact targets being relocated (see below PAOI 1).

MRS 3 (Pistol Range/ Anti-Aircraft Range). As noted in Table 2-2 and documented in the TPP, no samples will be collected within this MRS due to the erosion of the firing points into Lake Ontario. Samples are not proposed at the impact area or in the range fan of MRS 4 as these areas are under the waters of Lake Ontario.

MRS 4 (Skeet Range). As per Table 2-2, the most likely MC to be found at MRS 2 (Skeet Range) include constituents of the projectile propellant generated during the firing of shot guns. Therefore, explosives constituents from the projectile propellant will be analyzed for in the surface soil samples at the firing point. The propellant used with the 12 gauge shotgun contained a smokeless powder mixture. Since the exact type of smokeless powder used (single or double base) is unknown, both varieties of powder potentially associated with MC will be analyzed in order to be conservative. Two surface soil samples will be collected at the firing point and will be analyzed for explosive compounds: nitroglycerin (NG), and DNT break down products (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene, and 4-Nitrotoluene). Although metals are typically associated with the projectile and therefore sampled for at the impact area (over water), an exception to this rule was made by consensus of the attendees of the TPP meeting, therefore, antimony, arsenic, and lead were added to the analysis suite of the two soil samples being collected. No samples will be

collected at the impact area or in the range fan of MRS 4 as these areas are under the waters of Lake Ontario.

MRS 5 (90mm Firing Fan). The impact area for MRS 5 is under the waters of Lake Ontario, therefore no samples will be collected in the 90mm Firing fan impact area. One surface soil sample will be collected at the firing point and will be analyzed for nitroglycerin (NG), and DNT break down products (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene, and 4-Nitrotoluene).

PAOI 1 (Relocated berm soils from MRS 2). The MRS 2 rifle and submachine gun range impact area was a soil berm used as a target butt. In 1965-66, this soil berm was moved and used as fill dirt during the demolition of buildings 10, 11, 12, 50, 51, and 52 (Appendix A, Figure 3). Therefore two subsurface samples (2-18 inches) will be collected for analysis of antimony, copper, iron, lead, and nickel in the area of the relocated soils from the berm impact area of MRS 2.

2.6.2.2 Munitions and Explosives of Concern and Munitions Constituents Exposure Routes

As shown in the CSMs (Figures 7a, 7b, 7c, and 7d, Appendix A) for each MRS, except for MRS 2 and MRS 3, there are potentially complete exposure pathways for receptors including visitors/trespassers, construction workers, employees (park personnel) and biota in surface soil.

Surface water is not considered a medium of concern at this site for any of the MRSs or the PAOI given there is no permanent surface water body within any of the MRSs and because of the great depth and location of Lake Ontario (MRS 2, MRS 3, MRS 4, and MRS 5), any MC potentially deposited within the lake would have either been extensively diluted or would have settled to the bottom of the lake and been effectively covered by sediment deposition. Therefore, surface water samples will not be collected during the SI.

A potentially complete exposure pathway is present visitors/trespassers, construction workers, employees (park personnel), and for biota within the sediment of Lake Ontario located adjacent to MRS 1. Therefore, sediment samples will be collected at MRS 1 during this SI if clearance can be obtained for sampling. For MRS 2, MRS 3, MRS 4, or MRS 5 the impact areas are outside of the 100 yards buffer and therefore only the land portions will be investigated in accordance with the scope of this SI.

Although currently no residents located near Fort Niagara utilize groundwater for domestic use, a potentially complete exposure pathway may be present in the future due to construction.

Currently groundwater is not a medium of concern at MRS 1, MRS 2, MRS 3, MRS 4, MRS 5 or PAOI 1.

The proposed MEC reconnaissance and MC sampling areas at Fort Niagara were selected by assessing the potential pathways and receptors and then choosing biased sample locations based on historical and other site-specific information. Biasing MEC screening/sampling to these areas will achieve the MEC DQOs and permit completion of the MRSPP. MC sampling is further discussed in Section 3.

Site-specific DQOs have been defined to complete a MEC/MC exposure analysis. The programmatic DQOs outlined in Section 3.1.2 of the PWP (Alion 2005) were reviewed and modified to address the site-specific needs of the SI at Fort Niagara. These DQOs were discussed and agreed to during the TPP meeting, and included in the Final TPP Memorandum. The DQO worksheets are provided in Appendix C.

USACE and Alion obtained agreement during the TPP to collect surface soils samples to assess the potential presence of MC, associated with the munitions used/fired at the site. The MC associated with known munitions used at Fort Niagara and the MC analysis list was further refined and reduced using the MC screening process shown in Table 2-2.

The sampling approach presented below is based on the MRS specific CSM and current understanding of the sources and pathways for MEC/MC through the environment to the potential receptors (see Section 2.6.3). See Figure 8 in Appendix A for the proposed sampling locations discussed below.

MRS 1 (Offshore Dump Site). The location of the offshore dump was identified in the ASR and ASR Supplement. The approximately two acre area is just off of the historic sea wall. A brief site visit was coordinated concurrent with the TPP meeting to assess the location. Three sediment samples (NG, TNT and TNT breakdown products, and Tetryl) were proposed at the offshore dump. Qualitative reconnaissance (analog geophysics) will be conducted in this area using a magnetometer at depths not greater than approximately 25 ft; however anomalies will only be recorded and not identified.

MRS 2 (Rifle Range/1000' Submachine gun range). The soils from the berm impact area at MRS 2 were removed and relocated to the PAOI 1 (see below). Therefore only geophysical reconnaissance will be completed in and around the former berm location at this MRS.

MRS 3 (Pistol Range/Anti Aircraft range). As discussed in section 2.6.2.1, and documented in the TPP, no samples will be collected within this MRS due to the erosion of the firing points

into Lake Ontario. Samples are not proposed at the impact area or in the range fan of MRS 4 as these areas are under the waters of Lake Ontario.

MRS 4 (Skeet Range). Two surface soil samples will be collected at the firing point of this range for a reduced list of explosives and metals (NG, DNT, Antimony, Arsenic, and Lead).

MRS 5 (90mm Firing Fan). One surface soil sample will be collected at the firing point of this range for a reduced list of explosives (NG and DNT).

PAOI 1 (Relocated berm soils from MRS 2). PAOI 1 is the location of the relocated berm impact area soils from MRS 2- Rifle Range/1000" Submachine gun range. The former berm soils were used as fill dirt, therefore three sub surface soil samples will be collected for analysis of antimony, copper, iron, lead, and nickel. Geophysical reconnaissance (using a Whites All-metals detector; refer to Section 3.3.2 for a description) will be completed for sample clearance only in this area due to being the location of former buildings. The possibility of piping and/or other metal objects being present when fill was brought in during construction makes geophysical reconnaissance in this area unproductive; however visual reconnaissance will be conducted in this area.

Background Samples. Explosive compounds are not naturally occurring and are not expected to be present in detectable background media therefore no background samples will be collected for explosives. Six[1] background soil samples will be collected within the Fort Niagara FUDS boundary for metals only. Three of the background samples will be surface soil collected for antimony, arsenic and lead and three will be subsurface collected and analyzed for antimony, copper, iron, lead, and nickel.

In addition to the MC sampling activities described above, a qualitative reconnaissance will be performed at various locations within MRS 1 (Offshore Dump Site), MRS 2 (Rifle Range/1000' Submachine gun range), MRS 4 (Skeet Range), MRS 5 (90mm Firing Fan) and PAOI 1 (Relocated berm soils from MRS 2). This qualitative reconnaissance will include visual observations and use of hand-held analog all-metals geophysics equipment for identifying potential surface presence of MEC/MD and supporting anomaly avoidance. The DQO for the determination of MEC risk will be achieved by completing the reconnaissance within and around

[1] An additional background sample was added (total six samples) and the depths of half the background samples were adjusted from surface to subsurface for comparability purposes at this FUDS. A phone call to Mr. Ng verified that NYSDEC agrees to this background sampling approach.

the MRS areas, which is considered to be the most likely accessible area to verify the presence of MEC, MC, or MD.

2.6.3 Conceptual Site Model

Based on the discussion in 2.6.2.2, the current versions of the CSMs are provided in Appendix A of this SS-WP (Figure 7a-d). Figure 7a CSM represents MRS 1 (Offshore dump site), Figure 7b CSM represents MRS 2 (Rifle Range/1000" Machine gun ranges), MRS 4 (Skeet Range), MRS 5 (90mm Firing Fan), Figure 7c represents MRS 3 (Pistol Range/Anti-aircraft Range), and Figure 7d represents PAOI 1 (relocated soils from MRS 2 berm targets). The CSM is limited to those areas potentially impacted by MEC and/or MC based on the site use and history. The CSM does not include acreage beyond 100 yard from shore, consistent with the scope of the SI program. The CSM is a dynamic model that will be updated throughout the SI process as additional site information is collected.

3.0 FIELD INVESTIGATION PLAN

3.1 Pre-Field Activities

USACE North Atlantic Division Buffalo (CELRB) will complete the Right-Of-Entry (ROE) prior to conducting the field sampling activities at Fort Niagara. Alion will coordinate utility clearance, if appropriate, with Dig-safe. USACE will notify site owners of actual fieldwork dates in advance of site entry to ensure no access problems are encountered.

3.2 Environmental Protection Program

Potential environmental resources associated with the site (including T&E species, wetlands, Cultural, Archaeological, and Water Resources) are presented in Section 2 along with avoidance procedures for minimizing potential adverse effects to the environment occurring as result of the planned SI activities at Fort Niagara. Furthermore, in accordance with the PWP, each sampling location will be evaluated individually to avoid tree and shrub removal during SI activities. As a result of these procedures, tree and shrub removals are not anticipated during the field sampling activities.

3.3 Munitions and Explosives of Concern Avoidance Design and Rationale

A UXO Technician II/III will be present to perform MEC avoidance during all SI on-site activities. Prior to conducting site reconnaissance or field sampling operations, the field personnel will have reviewed applicable health and safety documents and become familiar with the types of military munitions used at the site. The field personnel also will receive a daily safety briefing from the site UXO Technician to highlight the munitions and the potential hazards associated with MEC at the site.

3.3.1 Site Reconnaissance Field Procedures

Field procedures are described below for both land and water areas where the field team will be conducting SI related activities.

3.3.1.1 Land Areas

The qualitative site reconnaissance[2] and field sampling activities require the use of analog geophysical equipment to identify access routes to environmental sampling locations that are free of anomalies. Figure 8, Appendix A includes representative qualitative reconnaissance paths planned for the site. The UXO Technician II/III will ensure an anomaly-free location at or in the vicinity of sample locations. The UXO Technician II/III will document surface or subsurface anomalies at or in the vicinity of the sample collection location, if encountered. Surface and subsurface anomaly locations will be surveyed using a Global Positioning System (GPS) unit, and a description of the surface anomalies (to include type, details, etc.) will be documented in the daily field notes for later inclusion into the SI Report.

In the event that MPPEH is observed and Alion is unable to identify and certify that the MPPEH is (1) Munitions Debris (MD) remaining after munitions use, demilitarization, or disposal; (2) range-related debris, or (3) cultural debris, then Alion shall consult with USACE, for guidance on whether the site or area where the item was found should be considered for a potential emergency response. An emergency response action may be initiated if there is a complete pathway between receptor and the source and the situation is viewed as an "immediate and unacceptable hazard" to the local populace or site personnel. Alion will adhere to the requirements of Engineer Pamphlet 1110-1-18 (USACE 2000) and the USACE Interim Guidance Document (IGD), *Procedure for Preliminary Assessment and Site Inspection Teams That Encounter UXO While Gathering Non-UXO Field Data* (USACE 2006a) for initiating an emergency response (Appendix D).

[2] Meandering path refers to the route the field team will follow to navigate through, in, or around a range or Potential Area of Interest. It is not a pre-designed transect at a preset interval, but rather refers to wandering in a zig-zag fashion through an area to identify additional locations of interest, observe site conditions, and present visual observations related to MEC in potentially impacted areas. Qualitative reconnaissance describes the process whereby the field team completes a reconnaissance of certain areas around the site using analog geophysics and visual surveys in a meandering path to avoid MEC, evaluate/confirm proposed sampling locations and collect additional data on anomalies and site conditions to be used in completion of the data quality objectives. The results of the qualitative reconnaissance including surface observations and surface/subsurface anomaly counts related to past DoD operations involving military munitions will be documented in the field books and the SI Report.

If the UXO Technician determines that an item may present an explosives hazard that poses an imminent threat to human health, the following steps of the USACE IGD will be implemented:

- The area will be flagged and GPS coordinates will be obtained.
- The property owner will be notified of the hazard and advised to call the local emergency response authority. The USACE Geographic District PM and CENAB will be notified.
- The property owner will be informed that if they do not call the local response authority within 1 hour, the UXO Technician will notify the local emergency response authority.
- The local response authority will decide on how to respond to the reported incident, including a decision not to respond. Neither USACE personnel nor Alion personnel have the authority to call Explosive Ordnance Disposal (EOD) to respond to an explosives hazard.
- If local response authority decides to respond, the UXO Technician or his designee will mark the location of the item, wait for the arrival of local response personnel, and provide accurate location information to the emergency response authority.

Once the UXO Technician II/III identifies an area as anomaly-free, the MC sampling team will collect the samples for analysis. Samples will be collected from areas identified by the CSM or the MEC survey to be suspected of containing high concentrations of MEC and/or MC.

If suspected MPPEH subsequently is confirmed to be MEC, and there is a complete pathway between receptor and the source (confirmed MEC), but the situation is not viewed as immediate but rather an "imminent danger posed by the release or threat of a release", USACE, in consultation with Alion, may consider implementing a TCRA. A TCRA is implemented where cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment. Alternatively, a non-TCRA (NTCRA) may be initiated by USACE if more than six months is available for planning. Alion will immediately notify the Geographic District PM at CELRB and the Military Munitions Design Center (DC) Technical Manager at CENAB and provide the necessary detail for USACE to discuss and plan any future actions (TCRA, NTCRA, or other). Alion will follow similar procedures of using a GPS unit to document the location for USACE and providing documentation (including photographs of the scene) as part of the field records.

3.3.1.2 Aquatic Areas

Qualitative reconnaissance will be conducted while collecting three sediment samples (MRS 1) from a boat on the Lake Ontario during field activities, if possible. The offshore dump may have areas where the depth of the waters will limit the Bore Hole Gradiometer (BHG)-1 magnetometer from being able to accurately detect the presence/absence of metals, due to cable length limitations. Additionally once metals are detected, Alion will not be able to differentiate between non DoD related debris and potential MEC. Therefore, anomalies detected will only be recorded and not identified. Other than at MRS 1, aquatic geophysical reconnaissance is not proposed in Lake Ontario for this field event. During the TPP Meeting (Alion 2008), stakeholders agreed that due to both the depths of the lake and the inability to identify anomalies, aquatic reconnaissance would not yield useful data.

3.3.2 Equipment Calibration and Method Testing

The UXO Technician will utilize hand-held analog metal detection instruments to aid in the identification of potential surface and subsurface MEC locations. In addition to the Schoenstedt, the BHG-1 magnetometer (MRS 1 only), and the Whites XT All-Metals detector (PAOI 1 only) will be used for the purpose of anomaly avoidance during sampling activities at the Fort Niagara. Both the Schoenstedt and the Whites XLT all-metals detector are hand-held analog geophysical equipment. The Whites XLT all-metals detector has been included to ensure that non-ferrous items do not go undetected, thereby risking a failure in meeting the QC/QA standards set for this project. These instruments provide ample detection considering the munitions, geology, and potential interferences expected at the site.

The UXO Technician II/III is trained in the use of the analog instruments and will check these instruments daily, prior to the start of field work. Schonstedt metal detectors and the Whites XLT all-metals detector do not require calibration; they have a simple "Go/No Go" field operational check. The XLT weighs in at a counter-balanced four pounds, has on-the-box instructions, five ready-to-go factory programs, four custom programs, on-screen instructions, and a simple menu system. The XLT is light and balanced and runs on a 12-volt battery system. It exhibits a Target I.D. System which allows the operator to electronically examine every target. The XLT software is the link between the push-pads and the circuit board. Through the push-pads, adjustments to the circuit board can be loaded or individually change the performance characteristics of one or more of the functions of the XLT circuits. This function test requires the instruments be used on objects that are representative of the smallest munitions item known or suspected on the site. The UXO Technician II/III will determine the depth of detection for the test items and test the instrument (and spare) close to that limit for everyday testing. If the depth

of a soil sample to be taken is deeper than the determined detection depth of the equipment being used (*e.g.*, subsurface samples), then the sample depth screening for UXO will be achieved in steps so that any anomalies deeper than the established detection depth can be detected. If the instrument does not detect the test object, being used to ensure the equipment is in proper functioning condition, the UXO Technician II/III will replace the batteries and retest the instrument. If the instrument fails twice, the instrument will be replaced with a spare that has undergone the daily testing described above. The UXO Technician II/III will check his instruments periodically throughout the day on objects known to contain ferrous metals such as boot eyelets, belt buckles, or other readily available items.

A BHG-1 magnetometer will also be utilized for underwater analog geophysics and is a Go/No Go instrument that does not require any calibration. There is a Battery Check button on the keypad that when depressed will display the battery voltage. The BHG-1 has an internal 12 volt battery that can not be changed at the field level and should be charged prior to being used. A full charge will last thru an entire days work. Should the instrument not power up, an attempt should be made to recharge the battery. If the BHG-1 continues to not power up or functions erratically, it must be sent out for repair and a replacement obtained to continue work. The BHG-1 can identify ferrous metals in water; therefore, this instrument will be used for anomaly avoidance in aquatic areas.

Handheld GPS equipment will be used to log the locations of MPPEH items encountered, adjusted sampling locations, and other items of interest. A Trimble ProXRS, which is specified in the PWP (Alion 2005), will be used as a primary GPS unit. A handheld GPS unit will be used as a secondary GPS unit and, if used, will be documented in the SI report as a variance to the PWP. Operator(s) will receive appropriate training on use of the GPS prior to their arrival at the site. GPS locations will be transferred from the data logger at the end of each field day for inclusion in the FUDS GIS. GPS waypoints will be logged and the Alion member will take measurements at known locations. In the event the GPS does not function because of interference, the field team will use both the data provided in Table 3-1 (coordinates and site descriptions) and sampling maps to visually identify sample locations. The sample locations will be marked and Alion will measure off from available known locations to obtain coordinates. If MPPEH is encountered, the field team will photograph (digital) the item and mark its location using GPS.

Continued acceptable GPS performance will be documented through the use of a control point. During the mobilization of the field sampling efforts, a surveyed point with a known location (third order or better) will be identified. This point will be occupied by the GPS unit each field day. The GPS location will be recorded and compared to the known value, validating the unit's

accuracy. The surveyed test point will be in similar vegetation (if possible) to most of the area where the GPS will be used (if wooded, test point should be in woods). The pass/fail GPS performance test will require that the GPS unit to register within 3 meters (m) of the established surveyed/control point.

3.4 Munitions Constituents Field Sampling Activities

Field activities will follow the procedures outlined in the PWP (Alion 2005), Programmatic Sampling and Analysis Plan (PSAP) and Addendum (Appendix E.1 and E.2 of the PWP [Alion 2005]) except that the soil samples will be homogenized in a one-gallon plastic bag rather then in a stainless steel mixing bowls. Information pertaining to the specific samples that will be collected at Fort Niagara is detailed below.

Field sampling identification designations, GPS location coordinates, and the sampling rationale for each sample location are presented in Table 3-1. The actual coordinates (listed below) established for the sample locations were taken from a review of aerial photographs and historical information. These sample locations may require adjustments in the field due to site-specific conditions (i.e. access issues, MEC avoidance, etc.). During the SI, three surface soil samples, three subsurface soils samples, and three potential sediment samples (in addition to the six background samples) will be collected. The proposed sampling locations, shown in Figure 8, Appendix A, are areas where MEC/MC were historically used/fired and, if present, are most likely to be detected. Sampling methods for each media are described in Table 3-3.

Table 3-1. Fort Niagara Sample Location Descriptions

Location	Sampling ID	Coordinate System: NAD 1983 UTM Zone 17N		Area of Interest / Rationale of Sampling Locations
		Easting(ft)	Northing(ft)	
Offshore Dump Site (MRS 1)	FTNI-OSD-SD-02-01	657136.9691	4791895.5276	Offshore dump area where munitions finds have occurred
	FTNI-OSD-SD-02-02	657196.0133	4791927.5694	Offshore dump area where munitions finds have occurred
	FTNI-OSD-SD-02-03	657276.1876	4791952.6223	Offshore dump area where munitions finds have occurred
Skeet Range (MRS 4)	FTNI -SR-FP-SS-01-01	657867.0252	4792161.1581	Skeet Range firing point, impact area under water
	FTNI -SR-FP-SS-01-02	657886.2959	4792186.2876	Skeet Range firing point, impact area under water
90mm Firing Fan (MRS 5)	FTNI -90MM-FP-SS-01-02	657828.8606	4792157.6029	90mm firing point
PAOI 1-Rifle Range/ 1000" Submachine gun Range soils (MRS 2)	FTNI-PAOI1-SB-02-01	657804.2496	4791676.2847	Soils from berm impact area, at MRS 2, that were moved and used for fill
	FTNI-PAOI1-SB-02-02	657875.6677	4791618.4222	Soils from berm impact area, at MRS 2, that were moved and used for fill
	FTNI-PAOI1-SB-02-03	657921.0837	4791578.6241	Soils from berm impact area, at MRS 2, that were moved and used for fill
Background samples	FTNI-BG-SS-01-01	657353.0195	4791712.6546	Background sample for metals
	FTNI-BG-SS-01-02	657407.4542	4791700.7922	Background sample for metals
	FTNI-BG-SS-01-03	657454.8114	4791692.2947	Background sample for metals
	FTNI-BG-SB-02-04	658393.3603	4791521.0897	Background sample for metals
	FTNI-BG-SB-02-05	658437.7364	4791472.6236	Background sample for metals
	FTNI-BG-SB-02-06	658469.5978	4791422.9805	Background sample for metals

FN= Fort Niagara
OSDS= Off Shore Dump Site
SR= Skeet Range
FP= Firing Point
90MM= 90mm Firing Fan
PAOI 1= Potential Area of Interest 1 (soils from MRS 2)

IA= Impact Area
SS= Surface Soil Sample
SB= Sub surface Soil Sample
SD= Sediment Sample

3.4.1 Background Samples

As stated in section 2.6.2.2 six background samples, three subsurface soil and two sediment samples will be analyzed for antimony, arsenic, copper, iron, lead, and nickel at Fort Niagara. Sediment samples collected at MRS 1 will not be analyzed for metals, therefore background sediment samples will not be collected.

3.4.2 Surface/Subsurface Soil

All the soil samples proposed for collection at Fort Niagara are surface soil samples except for the three samples at PAOI 1. Surface samples will be collected from 0 – 2 inches below ground

surface and the subsurface samples will be collected from 2 – 18 inches. Soil samples will be collected utilizing dedicated, disposable plastic trowels. The sample will be analyzed, per details in Table 3-2 below, at each of these surface soil sampling locations. The field team plans to achieve the planned 0 – 2 inches sample depth; however, actual total sample depth may be limited based on conditions at each site. Below are the proposed analyses to be performed at each MRS or PAOI.

MRS 1 (Offshore Dump Site). No surface or subsurface samples will be collected from this MRS since it is under water. The samples proposed for collection in this area are sediment .

MRS 2 (Rifle Range/1000" Submachine gun Range). No surface soil or subsurface samples will be collected from this area since the berm/impact area soils were moved and used for fill. The new location of the berm soils is designated as PAOI 1. Only Qualitative Reconnaissance will be conducted at MRS 2.

MRS 3 (Pistol Range/Anti-aircraft Range). The original firing point has eroded into Lake Ontario and the impact area is under the waters of Lake Ontario. Therefore TPP attendees agreed that no samples will be collected from MRS 3.

MRS 4 (Skeet Range). Two surface soil samples will be collected from the firing point and analyzed for antimony, arsenic, and lead using method 6010B, Nitroglycerin using method 8330A (mod) and DNT breakdown products (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene; 4-Nitrotoluene) using method 8330A.

MRS 5 (90mm firing fan). One surface soil sample will be collected and analyzed for Nitroglycerin using method 8330A (mod) and DNT breakdown products (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene; 4-Nitrotoluene) using method 8330A.

PAOI 1 (Rifle Range/1000" Submachine gun Range moved soils). Three subsurface soil samples will be collected from PAOI 1. This area was identified as the location of the former MRS 2 rifle and submachine gun range berm/impact area soils that were used as fill dirt during the demolition of buildings 10, 11, 12, 52, 52, and 54. Samples will be collected for analysis of antimony, copper, iron, lead, and nickel using method 6010B.

3.4.3 Sediment

Three sediment samples will be collected at MRS 1 (Offshore Dump Site) for analysis of TNT breakdown products (1,3-dinitrobenzene, 1,3,5-trinitrobenzene, 2,4,6-trinitrobenzene, 2- Amino-

4,6-dinitrotoluene, 4-Amino-2,6-dinitrotoluene) using method 8330A, Nitroglycerin using method 8330A (mod), and Tetryl using method 8330A. There is a possibility that an area will not be able to be cleared for sampling. If this occurs, then no sediment samples will be collected at MRS 1.

3.4.4 Surface Water

Lake Ontario is the Fort Niagara property border on the North and the Niagara River is the property border on the west. Both the lake and river are permanent, non-tidal, freshwater features at Fort Niagara. However, due to the depth, mobility of the lake/river waters, the length of time since munitions were used and the types of munitions used, surface water samples will not be collected during the SI.

3.4.5 Groundwater

Currently groundwater is an incomplete exposure pathway based on that there are no wells on the property and city water is used for drinking water on the property. Therefore groundwater samples will not be collected at Fort Niagara.

3.4.6 Quality Control/Quality Assurance Samples

Quality control (QC)/quality assurance (QA) samples will be collected as specified and described in the PWP and as indicated on Table 3-2 and Table 3-3. QC samples will include field duplicates, matrix spike and matrix spike duplicates. Note: no equipment (rinsate) blanks are anticipated since only dedicated disposable equipment will be used during sample collection. Per direction from the USACE CENAB chemist, no QA samples will be collected at Fort Niagara.

Table 3-2. Sample Identification Table

Location	Sampling ID	Media		MC Sampled				Quality Control Samples[1]	
		Soil	Sediment	Explosives (reduced 8330A list of TNT breakdown products) and Tetryl	Explosives (reduced 8330A list of DNT breakdown products)	Metals (reduced 6010B list)	Nitroglycerin (8330A mod)	Field Duplicate[2]	MS/MSD[3]
Offshore Dump Site (MRS 1)	FTNI-OSD-SD-01-01		X	X			X		
	FTNI-OSD-SD-01-02		X	X			X		X
	FTNI-OSD-SD-01-03		X	X			X	X	
Skeet Range (MRS 4)	FTNI-SR-FP-SS-01-01	X			X	X	X		
	FTNI-SR-FP-SS-01-02	X			X	X	X	X	
90mm Firing Fan (MRS 5)	FTNI-90MM-FP-SS-01-01	X			X		X		
PAOI 1- Rifle Range/ 1000" Machine Gun Range soils (MRS 2)	FTNI-PAOI1-SS-02-01	X				X			
	FTNI-PAOI1-SS-02-02	X				X			
	FTNI-PAOI1-SS-02-03	X				X			
Background	FTNI-BG-SS-01-01	X				X			
	FTNI-BG-SS-01-02	X				X			
	FTNI-BG-SS-01-03	X				X			
	FTNI-BG-SB-02-04	X				X			
	FTNI-BG-SB-02-05	X				X			
	FTNI-BG-SB-02-06	X				X			
Totals		12	3	3	3	11	6	2	1

1. For each QC sample, the marked sample type will be gathered for every MC category that is being sampled. Use of dedicated equipment is anticipated. Proposed QA sample locations may change depending on sampling conditions and sampling media available (i.e. may change if adequate media is not available to collect additional volume).
2. FD# will replace sample ID (the sample ID and its corresponding FD# will be indicated in the field notebook); 10%
3. MS/MSD samples will be analyzed at a frequency of 5%. The Field Team will add the following note on the field Chain of Custody: Additional volume collected for MS/MSD analysis.

FD#: Field Duplicate Number
ID: Identification
MS/MSD Matrix Spike/Matrix Spike Duplicate
MC : Munition Constituent
PWP: Programmatic Work Plan for Formerly Used Defense Sites Military Munitions Response Program Site Inspections in the Northeast Region
QA: Quality Assurance
QC: Quality Control

Table 3-3. Analytical Parameters, Methods, Standards, and Total Number of Soil/Sediment Analyses

Compound	Analytical/ Preparation Method	Preservative	Sample Container Type[1]	Holding Times[2]	Number of Soil/ Sediment Samples	Field Duplicates[3]	QA Splits[4]	MS[5]	MSD[5]	Equipment Blanks[6]	Total Analyses
Explosives[7]											
2,4- Dinitrotoluene; 2,6- Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3- Nitrotoluene, 4-Amino-2,6-dinitrotoluene; 4- Nitrotoluene;	SW8330A	Cool to 4°C	1- 8 oz wide-mouth glass jar w/ Teflon-lined cap (250 grams)	14/40 days	3	1	0	1	1	N/A	6
Nitroglycerin	SW8330A (mod)	Cool to 4°C	1- 8 oz wide-mouth glass jar w/ Teflon-lined cap (250 grams)	14/40 days	6	1	0	1	1	N/A	9
1,3- Dinitrobenzene; 1,3,5- Trintrobenzene; 2,4,6- Trinitrotoluene; 2-Amino-4,6-dinitrotoluene; 4-Amino-2,6-dinitrotoluene; Tetryl	SW8330A	Cool to 4°C	1- 8 oz wide-mouth glass jar w/ Teflon-lined cap (250 grams)	14/40 days	3	1	0	1	1	N/A	6
Metals[7]											
Antimony; Arsenic; Copper; Iron; Lead; Nickel	6010B	Cool to 4°C	1- 8 oz wide-mouth glass jar w/ Teflon-lined cap (250 grams)	14/40 days	5	1	0	1	1	N/A	8

[1]Indicates number of bottles
[2]Number of days between sample collection and extraction/number of days between extraction and analysis
[3]Field Duplicates, 1 per 10 (10%)
[4]QA Splits, none per CENAB direction
[5]MS/MSD, 1:20 (5%) – To be selected at the laboratory by GPL Laboratories LLLP
[6]Temperature Blank, 1/cooler; Equipment Blank, 1/ FUDS (if necessary); No reusable equipment anticipated

[7] The list provided in this table includes all analytes for Fort Niagara. However, for each MRS and the PAOI 1, samples will be collected for a reduced list of explosives and metals analysis based on the munitions used at each location as agreed at the TPP meeting. Also, totals do not include background samples for metals analysis.	
N/A	Not Applicable
QA	Quality Assurance
MS/MSD	Matrix Spike/Matrix Spike Duplicate

3.5 Sample Handling

Samples collected during the SI activities at Fort Niagara will be handled as outlined in the Programmatic Field Sampling Plan (PFSP) located in Appendix E of the PWP, with the exception that soil samples will be homogenized in one-gallon plastic bag rather than in stainless steel mixing bowls. Disposable scoops will be used to collect the surface soil and sediment samples. A decontaminated hand auger will be used to collect the subsurface soil sample. Table 3-3 provides additional information regarding preservatives, sample container types, and allowable sample holding times. Table 3-2 details the location, matrix sampled, sampling ID, types of analyses, and number of samples to be collected, including those for QC purposes. Adjustments to these plans may be necessary in the field due to unforeseen site conditions. Deviations from the PFSP during field work will be documented in the field notebook along with an explanation for each modification. Examples of the logs and forms used to document field activities are provided in Appendix F.

3.6 Analytical Procedures

Both field and non-measurement data will be used to support this SI. Non-direct measurement refers to data and other information that have been previously collected or generated under some effort outside the specific project being addressed by the QA Project Plan. Potential non-direct measurement sources to be used during the SIs include, but are not limited to:

- Site-specific USACE information (i.e., ASR, INPR, ASR Supplement, etc.)
- Site-specific information from stakeholders or knowledgeable individuals associated with the FUDS collected during the TPP or SS-WP development process
- Site-specific demographic and climatic data from the U.S. Census Bureau
- Site-specific geology, hydrology, and soil information from the U.S. Geological Survey (USGS)
- Site-specific aerial maps, topography, and land use from the U.S. Department of Agriculture (USDA)
- Site-specific information on T&E Species from the NYSDEC and the U.S. Fish & Wildlife Service (USFW)

- Site-specific information pertaining to cultural and archeological resources associated with the site collected from the New York Office of Parks, Recreation and Historic Preservation

Field data collected will be analyzed in accordance with the procedures and protocol defined in the PWP and this SS-WP. In particular, the following organizations have responsibilities for sample analysis, data validation, and QA Requirements:

- Sample Analysis – GPL Laboratories, LLLP is responsible for the data analysis and for following applicable protocols for pertaining to analytical methods (outlined in the Programmatic Quality Assurance Project Plan [PQAPP] located in Appendix E of the PWP). Analytical results will be used by all stakeholders during the SI process.

- Review/validation of SI Analytical Results – EDS Inc. is responsible for reviewing and validating the data acquired during the SI.

- QA Requirements - QA split samples will not be collected per CENAB direction since laboratory QA samples have been tested for two years and the results have verified that the laboratory quality assurance is satisfactory.

Table 3-3 identifies the analytical methods for each media for which samples are planned. The tables also provide details on preserving samples, sample containers, hold times, and numbers of quality control samples that will be collected.

The DQO worksheets were developed using the TPP process (USACE 1998) and the Guidance on Systematic Planning using the Data Quality Objectives Process (USEPA 2006). The DQO worksheets define the performance criteria that limit the probabilities of making decision errors by considering the intended data uses, defining the appropriate type of data needed, and specifying the appropriate sampling and analysis methods. The site-specific DQOs will be evaluated throughout the SI Process to determine if the DQOs are achieved during the SI. A DQO attainment verification worksheet will be included in the SI Report.

3.7 Investigative Derived Waste

The only Investigative Derived Waste (IDW) anticipated will be from dedicated sampling equipment and sampling materials (gloves, disposable trowels, paper towels etc.). This material will be disposed of as general refuse off-site. Excess soil will be placed back in the sampling locations in accordance with the approved PWP.

4.0 QUALITY ASSURANCE

The PQAPP, prepared by USACE and included in Appendix E.1 of the PWP along with the programmatic addendum to the PQAPP (Appendix E.2 to the PWP), provides guidance for QA procedures (Alion 2005). The PQAPP addresses the following topics:

- Project organization and responsibilities (related to project QA and QC)
- Data assessment organization and responsibilities
- DQOs
- Sample receipt, handling, custody, and holding time requirements
- Analytical procedures (related to operations of laboratory and field equipment)
- Data reduction/calculation of data quality indicators. Alion reviews and confirms the final data qualifiers of chemical data validated by Alion's third party team member, EDS, are in compliance with the DoD Quality Systems Manual (QSM) (DoD 2006) and the USEPA Region Criteria and Standards[3].
- Laboratory operations documentation
- Data assessment procedures

Based on the history of munitions used at Fort Niagara (Table 2-2) and the sampling rationale, the chemical-specific MQOs include selected metals and selected explosives (Appendix C). These analytes are presented in Table 3-3. Federal and state human health and ecological screening values will be used for comparison of sampling results in the human health and ecological risk screening. In addition, the Preferred Maximum Method Quantitation Limits (PMMQL) (half of the most stringent criteria) was identified to verify laboratory detection levels will achieve the project goals. Since the metal analytes are naturally occurring in soil, site metals data will be compared with background sample data. The range of metal concentrations found in site samples will be compared qualitatively to site-specific background levels (highest value and

[3] The most recent USEPA Regional Screening Values will be used in the human health screening for this SI, in lieu of USEPA Region IX Preliminary Remediation Goals (PRGs) or Region VI Medium Specific Screening Levels (MSSLs).

mean value) found in the site background samples. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data, comparison to regional background concentration ranges for metals, and comparison to state screening/cleanup criteria, will be used to make a final decision for an NDAI designation or RI/FS.

This site-specific Quality Assurance Project Plan (QAPP) (Alion 2005) (e.g., see Sections 1 and 3) provides project specific information and operating procedures applicable to sampling and analytical activities to be performed as part of the SI at Fort Niagara. Specifically this QAPP provides site-specific DQOs developed for Fort Niagara and provides insight into the DQO process. The reader is referred to the PWP (Alion 2005) for discussions relating to the other PQAPP topics.

5.0 REFERENCES

Alion. 2005. *Programmatic Work Plan for Formerly Used Defense Sites (FUDS) Military Munitions Response Program (MMRP) Site Inspections at Multiple Sites in the Northeast Region.*

Alion. 2008. *Draft Technical Project Planning Memorandum for the Formerly Used Defense Site (FUDS) Fort Niagara, February 2008 Meeting. Final April 2008.*

Department of the Army (DoA). 1984. *Military Explosives.* Department of the Army Technical Manual. September.

DoA. 2005. *Office of the Assistant Secretary, Installations and Environment, Memorandum for the Assistant Chief of Staff for Installation Management, Munitions Response Terminology.*

Department of Defense (DoD). 2001. *Management Guidance for the Defense Environmental Restoration Program.*

DoD. 2005. *32 Code of Federal Regulations (CFR) Part 179.*

Journal of Waste Management. 1994. Anaerobic Biotransformation of Nitrocellulose. Volume 14, No 6, pp 481-487.

Interstate Technology and Regulatory Council (IRTC). 2003. Characterization and Remediation of Soils at Closed Small Arms Firing Ranges

New York State (NYS) Department of State (DOS). 2004. *New York State Coastal Atlas, Western Great Lakes Region, GL106: Fort Niagara.* Available from http://www.nyswaterfronts.com/maps_lakes_western1.asp. Accessed 28 August 2008.

Talmage, S.S., D.M Opresco, C.J. Maxwell, C.J.E. Welsh, F.M Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic munition compounds: Environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161:1-156.

USACE. 1996. DERP-FUDS INPR for C02NY0613, Fort Niagara Site, Youngstown, New York.

USACE. 1998. *Technical Project Planning (TPP) Process, Engineering Manual (EM) 200-1-2.*

USACE. 1999. *Archives Search Report (ASR) for the former Fort Niagara, Youngstown, New York, Project No. C02NY061303 February 1999.*

USACE. 2000. *Ordnance and Explosives Response. EP 1110-1-18. 24 April.*

USACE. 2003. *Explosives Safety Submission, EP 385-1-95b.*

USACE. 2004a. *Archives Search Report (ASR) Supplement, Fort Niagara, 2004.*

USACE. 2004b. Defense Environmental Restoration Program (DERP) Formerly Used Defense Sites (FUDS) Program Policy, ER 200-3-1.

USACE. 2006 *Procedure for Preliminary Assessment and Site Inspection Teams That Encounter UXO While Gathering Non-UXO Field Data, Military Munitions Center of Expertise, Interim Guidance Document 0605. March 16.*

USACE, 2007. Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations, ER 385-1-95.

USDA/USGS 2001. U.S. Department of Agriculture and US Geological Survey. 2001. *Topographic map*.

USDA 2006. U.S. Department of Agriculture Natural Resources Conservation Services. 2006. *Soils map.*

USEPA. 2001. *National Priorities List Characteristics Data Collection Form, Version 3.0.*

USEPA. 2002. *Guidance for Quality Assurance Project Plans for Modeling, QA/G-5M.*

USEPA. 2001. *National Priorities List Characteristics Data Collection Form, Version 3.0.*

USEPA. 2004. *Region VI Human Health Medium Specific Screening Levels (MSSLs).*

USEPA. 2005a. *Ecological Soil Screening Level (SSL) for Antimony.* Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 1 March 2008.

USEPA. 2005b. *Ecological Soil Screening Level (SSL) for Arsenic.* Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 1 March 2008.

USEPA. 2005c. Ecological Soil Screening Level for Copper. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed March 2008.

USEPA. 2005e. *Ecological Soil Screening Level for Iron.* Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_iron.pdf. Accessed 1 March 2008.

USEPA. 2005e. *Ecological Soil Screening Level for Lead.* Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 1 March 2008.

USEPA. 2005f. *Ecological Soil Screening Level for Nickel*. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf . Accessed March 2008.

USEPA 2006. Guidance on systematic Planning using the DQO process.

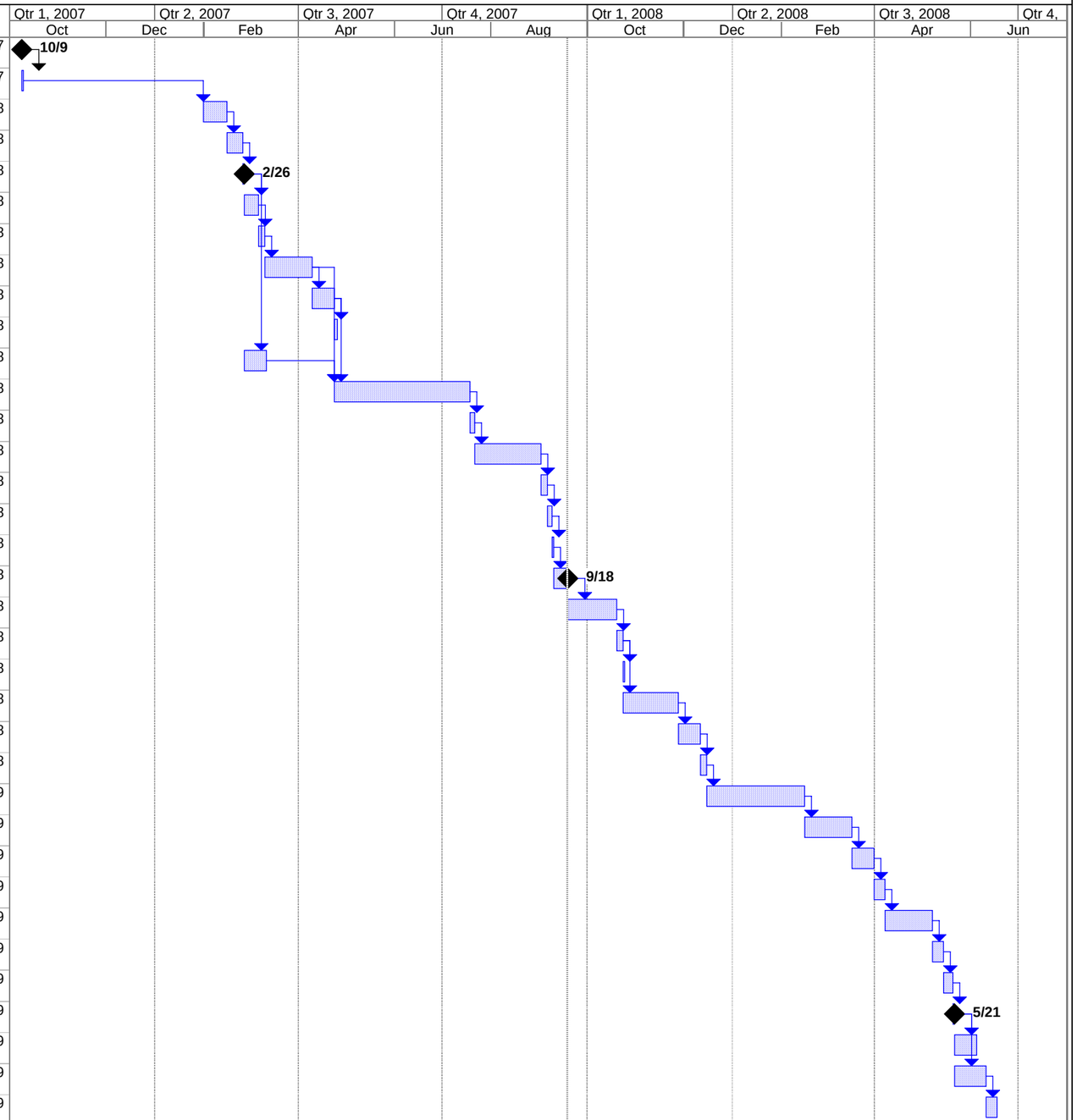
USEPA. 2008. *Regional Screening Levels.* Available from http://epa-prgs.ornl.gov/chemicals/index.shtml

USFWS 1991 & 1992. US Department of Interior – Fish and Wildlife Services, 1991 & 1992. *Water bodies and wetland.*

APPENDIX A—FIGURES

Fort Niagara

ID	Task Name	Duration	Start	Finish
1	SITE AWARD	0 days	Tue 10/9/07	Tue 10/9/07
2	ADDITIONAL HISTORICAL DATA RESEARCH	1 day	Tue 10/9/07	Tue 10/9/07
3	PREPARE 'READ AHEAD' PACKAGE, DRAFT CSM, & DRAFT TPP SLIDES	15 days	Fri 2/1/08	Fri 2/15/08
4	USACE SUBMITS READ AHEAD FOR STAKEHOLDERS REVIEW	10 days	Sat 2/16/08	Mon 2/25/08
5	TPP # 1	1 day	Tue 2/26/08	Tue 2/26/08
6	TPP # 1 MEMORANDUM (DRAFT) PREPARATION	9 days	Wed 2/27/08	Thu 3/6/08
7	TPP # 1 MEMO SUBMITTED TO USACE FOR DISTRIBUTION TO STAKEHOLDERS	4 days	Fri 3/7/08	Mon 3/10/08
8	TPP # 1 MEMO STAKEHOLDER & USACE REVIEW & COMMENT PERIOD	30 days	Tue 3/11/08	Wed 4/9/08
9	TPP # 1 MEMO ALION RESPOND TO COMMENTS & PREPARATION OF FINAL TPP	14 days	Thu 4/10/08	Wed 4/23/08
10	TPP # 1 RESPONSE TO COMMENTS REVIEW / MEMORANDUM CONCURRENCE	2 days	Thu 4/24/08	Fri 4/25/08
11	COLLECTION OF ADDITIONAL DATA FROM SITE OWNERS FOLLOWING TPP #1	14 days	Wed 2/27/08	Tue 3/11/08
12	PREPARE DRAFT SS-WP w/ADDITIONAL SITE OWNER DATA	86 days	Thu 4/24/08	Fri 7/18/08
13	DRAFT SS-WP SUBMITTED TO USACE FOR DISTRIBUTION TO STAKEHOLDERS	3 days	Sat 7/19/08	Mon 7/21/08
14	REVIEW & COMMENT PERIOD FOR DRAFT SS-WP BY USACE & STAKEHOLDERS	42 days	Tue 7/22/08	Mon 9/1/08
15	RESPOND TO COMMENTS ON SS-WP	4 days	Tue 9/2/08	Fri 9/5/08
16	USACE & STAKEHOLDERS REVIEW RESPONSES	3 days	Sat 9/6/08	Mon 9/8/08
17	CONFERENCE CALL (IF NEEDED) WITH COMMENTERS TO FINALIZE SS-WP	1 day	Tue 9/9/08	Tue 9/9/08
18	PRODUCE FINAL SS-WP	9 days	Wed 9/10/08	Thu 9/18/08
19	FIELDWORK PREPERATION AND MOBILIZATION TO SITE	31 days	Fri 9/19/08	Sun 10/19/08
20	FIELD WORK - MEC SURVEY, GEOPHYSICS, AND MC SAMPLING	4 days	Mon 10/20/08	Thu 10/23/08
21	DEMOBILIZATION FROM SITE	1 day	Fri 10/24/08	Fri 10/24/08
22	DATA TO LABORATORY	35 days	Fri 10/24/08	Thu 11/27/08
23	DATA TO VALIDATOR	14 days	Fri 11/28/08	Thu 12/11/08
24	DATA TO ALION TEAM	4 days	Fri 12/12/08	Mon 12/15/08
25	DRAFT SI REPORT	62 days	Tue 12/16/08	Sun 2/15/09
26	REVIEW PERIOD OF DRAFT SI REPORT BY USACE	30 days	Mon 2/16/09	Tue 3/17/09
27	RESPOND TO USACE COMMENT & PRODUCE DRAFT FINAL SI REPORT	14 days	Wed 3/18/09	Tue 3/31/09
28	DRAFT FINAL REPORT SUBMITTED TO USACE FOR DISTRIBUTION TO STAKEHOLDERS	7 days	Wed 4/1/09	Tue 4/7/09
29	REVIEW & COMMENT PERIOD FOR DRAFT FINAL REPORT BY USACE & STAKEHOLDERS	30 days	Wed 4/8/09	Thu 5/7/09
30	RESPOND TO COMMENTS ON DRAFT FINAL REPORT	7 days	Fri 5/8/09	Thu 5/14/09
31	USACE & STAKEHOLDER REVIEW RESPONSES	6 days	Fri 5/15/09	Wed 5/20/09
32	TPP #2 (IF NEEDED) WITH STAEHOLDERS/COMMENTERS TO FINALIZE SI REPORT	1 day	Thu 5/21/09	Thu 5/21/09
33	TPP #2 MEMORANDUM PREPARATION	14 days	Fri 5/22/09	Thu 6/4/09
34	PRODUCE FINAL SI REPORT	20 days	Fri 5/22/09	Wed 6/10/09
35	USACE ACCEPTANCE OF FINAL SI REPORT	7 days	Thu 6/11/09	Wed 6/17/09



Project: 11_Fort_Niagara_ Schedule_091808
Date: Thu 9/18/08

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

SCHEDULE FOR SITE INSPECTION OF FORT NIAGARA PROJECT NO. C02NY061303

Fort Niagara

Niagara Falls, New York
Niagara County

Legend

FUDS Boundary

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

N
W E
S

Feet
0 400 800 1,600

Figure 2: Aerial Map

Fort Niagara

Niagara Falls, New York
Niagara County

Legend

- Approximate Back Stop Area
- FUDS Boundary
- MRS - 1 Offshore Dump Site
- MRS - 2 Rifle Range / 1000" Machine Gun Range
- MRS - 3 Pistol Range / Anti-aircraft Range
- MRS - 4 Skeet Range
- MRS - 5 90-mm Firing Range
- PAOI -1 Relocated soils from MRS 2 backstop and target butts

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

N
W E
S

Feet
0 400 800 1,600

Figure 3. Site Layout

Fort Niagara

Niagara Falls, New York
Niagara County

Legend

- Approximate Back Stop Area
- FUDS Boundary
- MRS - 1 Offshore Dump Site
- MRS - 2 Rifle Range / 1000" Machine Gun Range
- MRS - 3 Pistol Range / Anti-aircraft Range
- MRS - 4 Skeet Range
- MRS - 5 90-mm Firing Range
- PAOI -1 Relocated soils from MRS 2 backstop and target butts

Imagery Source: New York Geographic Information Systems Clearinghouse (1980)

N
W E
S

0 400 800 1,600 Feet

Figure 4. Topographic Map

Fort Niagara

Niagara Falls, New York
Niagara County

Legend

- Approximate Back Stop Area
- FUDS Boundary
- MRS - 1 Offshore Dump Site
- MRS - 2 Rifle Range / 1000" Machine Gun Range
- MRS - 3 Pistol Range / Anti-aircraft Range
- MRS - 4 Skeet Range
- MRS - 5 90-mm Firing Range
- PAOI -1 Relocated soils from MRS 2 backstop and target butts
- Appleton silt loam, 0 to 3 percent slopes
- Hudson silt loam, 2 to 6 percent slopes
- Madalin silt loam, loamy subsoil variant
- Niagara silt loam, 0 to 2 percent slopes
- Ovid silt loam, 0 to 2 percent slopes
- Rhinebeck silt loam, 0 to 2 percent slopes
- Rhinebeck silt loam, 2 to 6 percent slopes
- Water

Soils Information: United States Department of Agriculture Natural Resources Conservation Service (2008)

N
W E
S

0 405 810 1,620 Feet

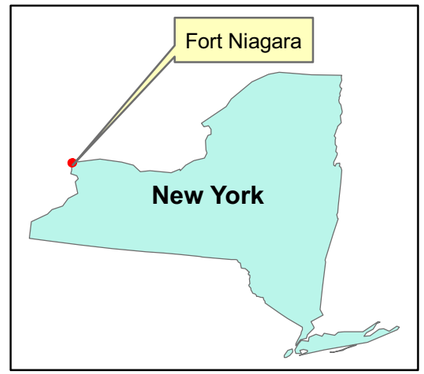


Figure 5. Soils

Fort Niagara

Niagara Falls, New York
Niagara County

Legend

- Approximate Back Stop Area
- FUDS Boundary
- MRS - 1 Offshore Dump Site
- MRS - 2 Rifle Range / 1000" Machine Gun Range
- MRS - 3 Pistol Range / Anti-aircraft Range
- MRS - 4 Skeet Range
- MRS - 5 90-mm Firing Range
- PAOI -1 Relocated soils from MRS 2 backstop and target butts
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Other

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

N
W E
S

0 405 810 1,620 Feet

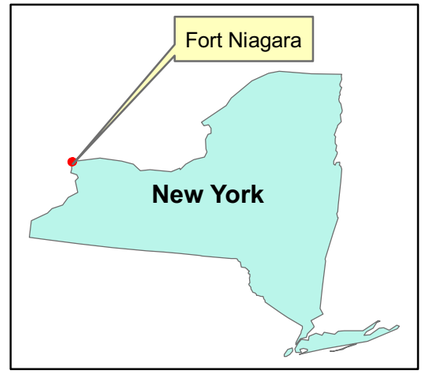
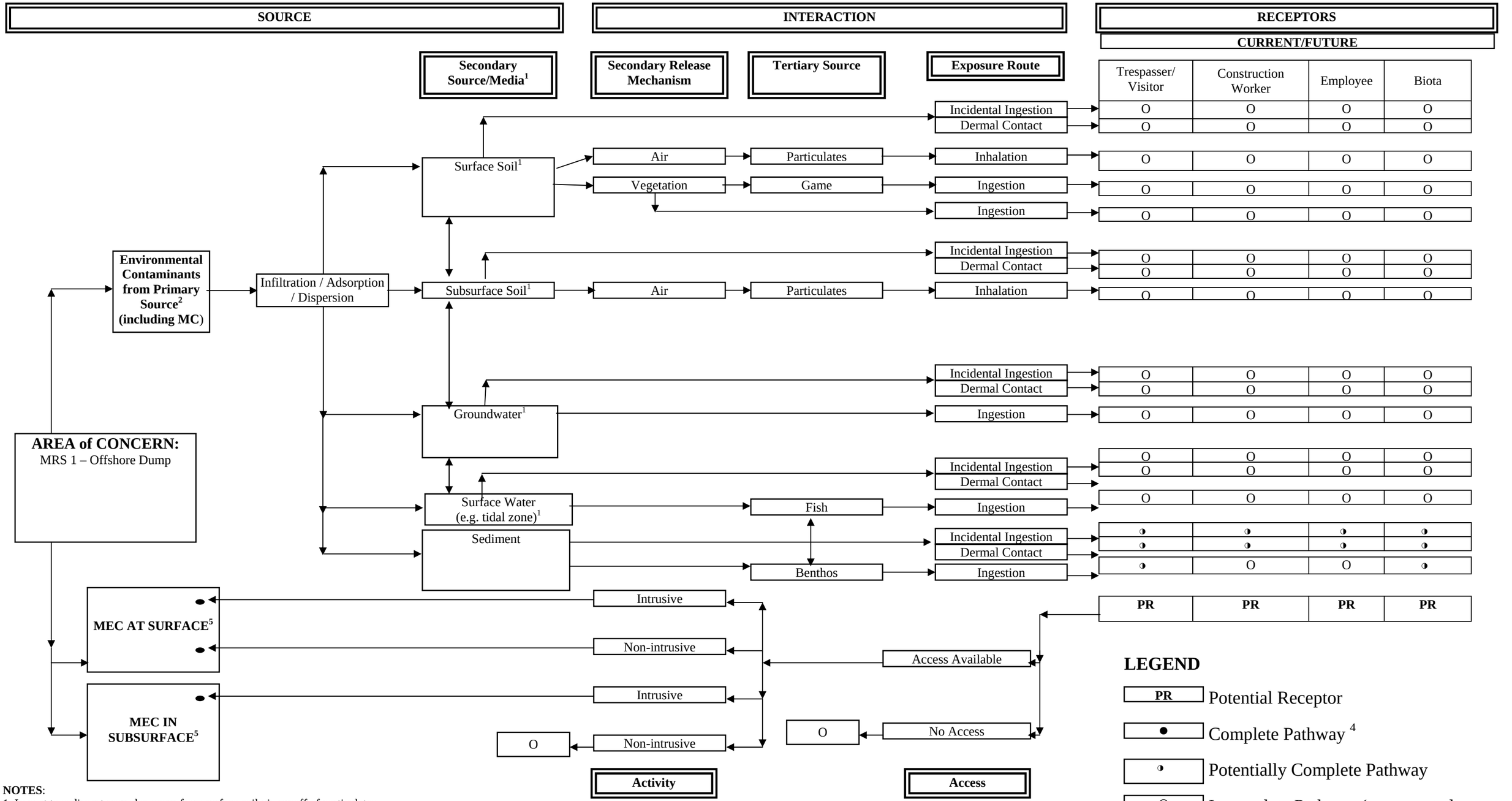


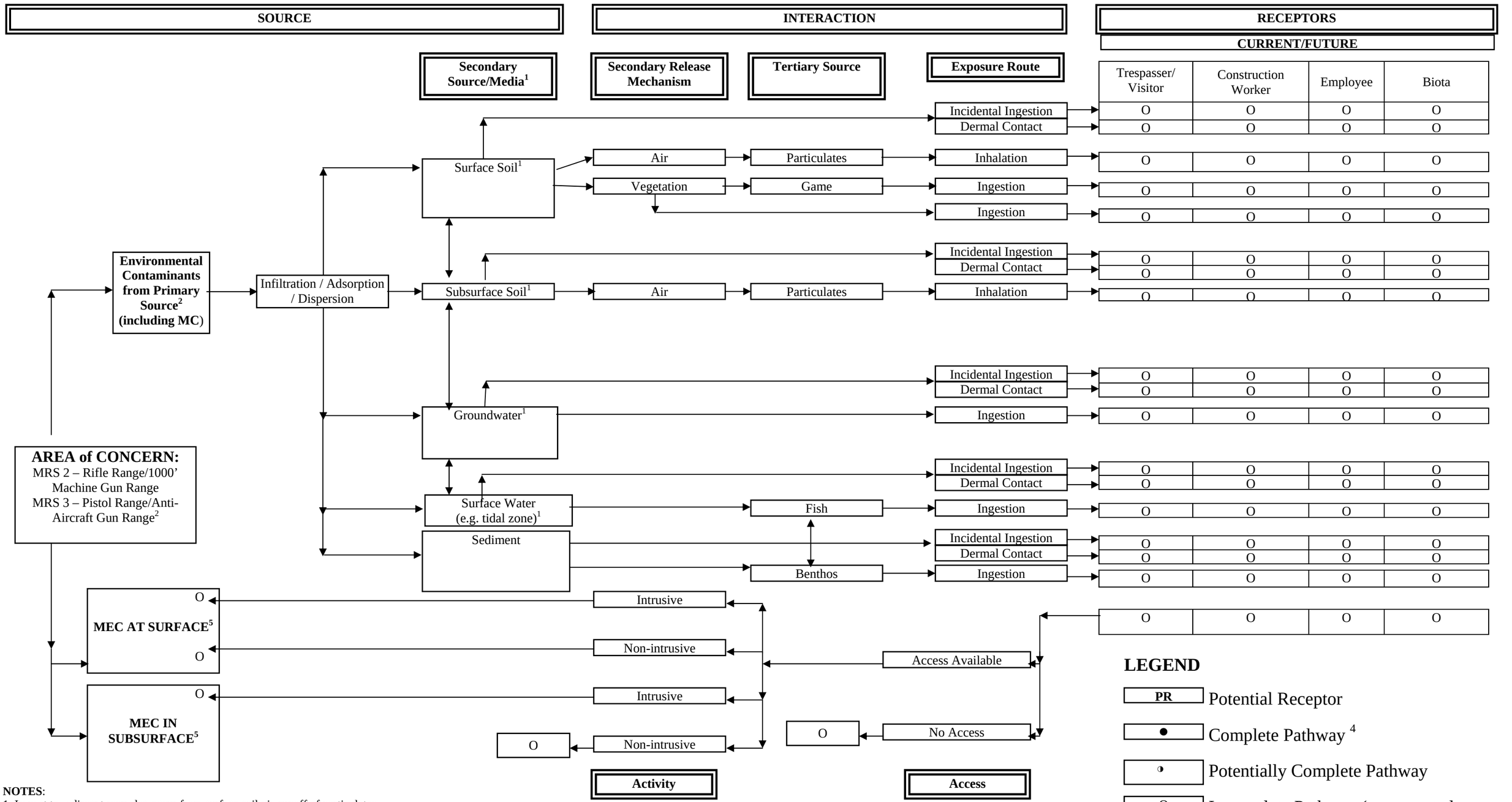
Figure 6. Wetlands



NOTES:
1. Impact to sediment may also occur from surface soil via runoff of particulates.
A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water or sediment may also occur from discharge of groundwater.
2. Primary sources will vary but are expected to include surface and subsurface soil.
3. CSM will be refined as more data is obtained and finalized in the Site Inspection Report.
4. 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.
5. Interaction between a potential receptor and MEC has two components: access and activity

Figure 7a-DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT NIAGARA MMRP FUDS SITE MRS 1-Offshore Dump[3] (**WORKING DRAFT)**

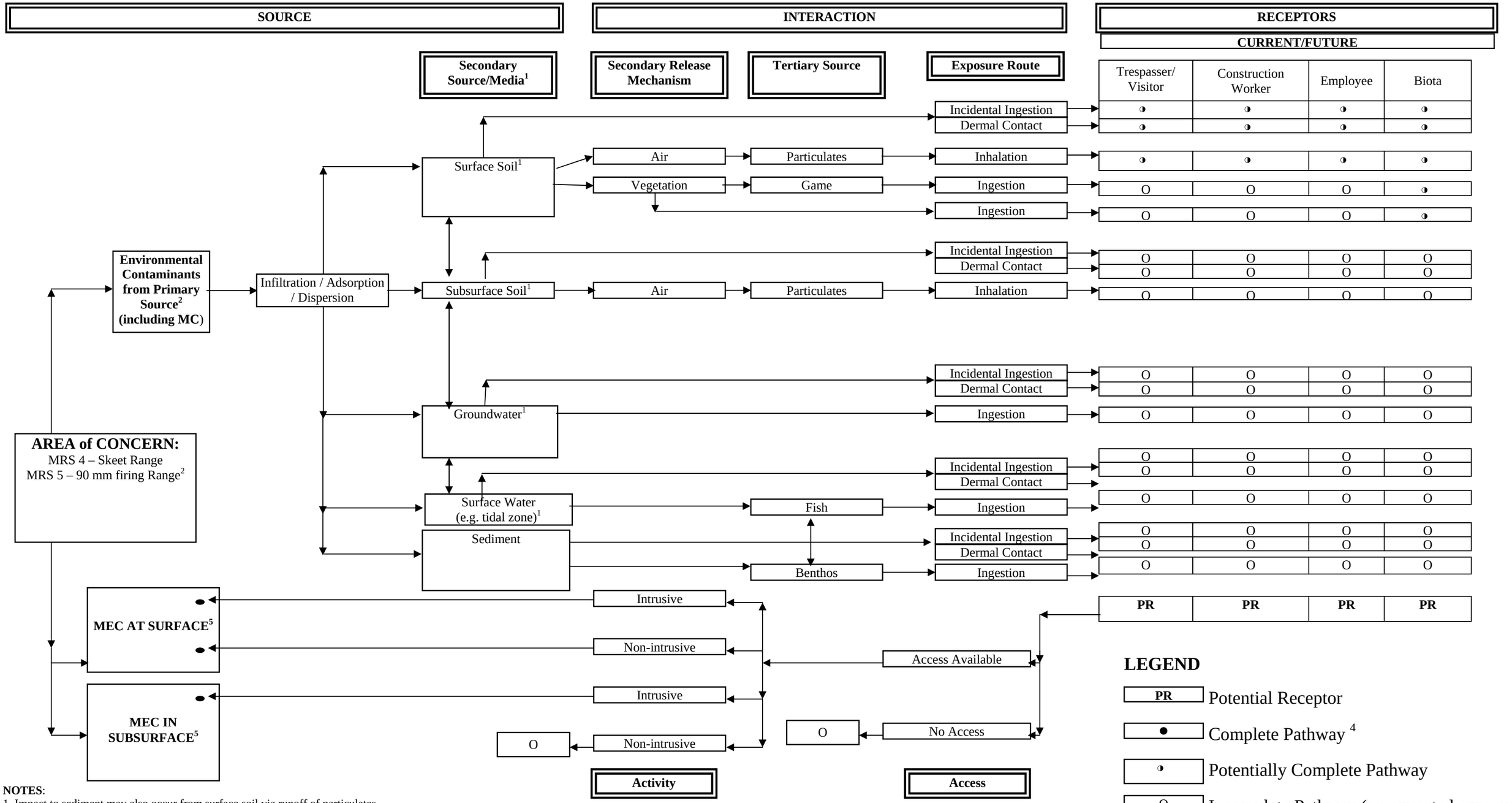
Source: U.S. Army Corps of Engineers (USACE). 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM1110-1-1200.



NOTES:
1. Impact to sediment may also occur from surface soil via runoff of particulates.
A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water or sediment may also occur from discharge of groundwater.
2. Primary sources will vary but are expected to include surface and subsurface soil.
3. CSM will be refined as more data is obtained and finalized in the Site Inspection Report.
4. 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.
5. Interaction between a potential receptor and MEC has two components: access and activity

Figure 7b- DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT NIAGARA MMRP FUDS SITE MRS 2- Rifle Range/1000' Machine Gun Range and MRS 3- Pistol Range/Anti-aircraft Range[3] (**WORKING DRAFT)**

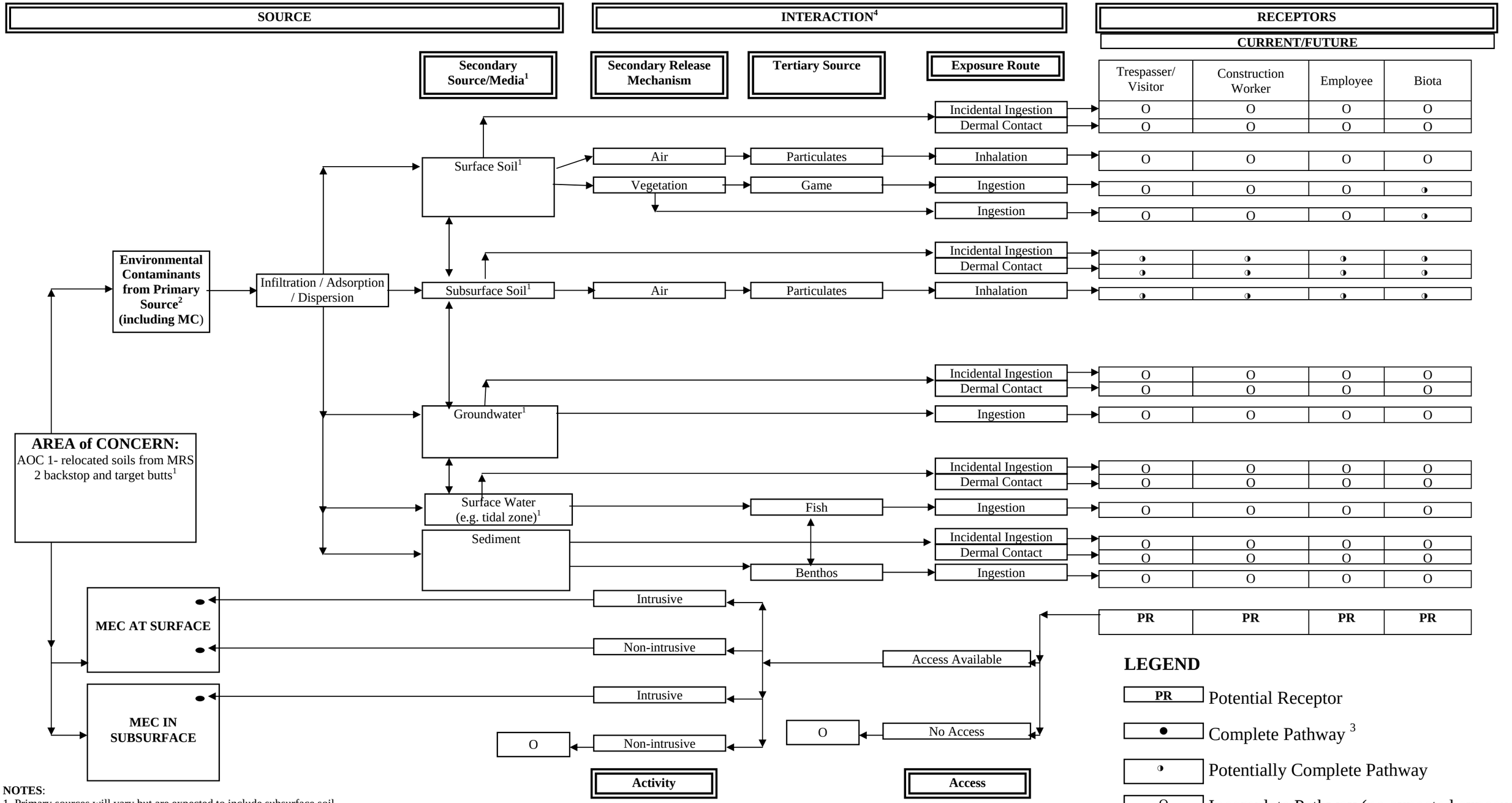
Source: U.S. Army Corps of Engineers (USACE). 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM1110-1-1200.



NOTES:
1. Impact to sediment may also occur from surface soil via runoff of particulates.
A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water or sediment may also occur from discharge of groundwater.
2. Primary sources will vary but are expected to include surface and subsurface soil.
3. CSM will be refined as more data is obtained and finalized in the Site Inspection Report.
4. 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.
5. Interaction between a potential receptor and MEC has two components: access and activity

Figure 7c- DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT NIAGARA MMRP FUDS SITE MRS 4 and MRS 5[3] (**WORKING DRAFT)**

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.* EM1110-1-1200.



NOTES:
1. Primary sources will vary but are expected to include subsurface soil.
2. CSM will be refined as more data is obtained and finalized in the Site Inspection Report.
3. 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.
4. Interaction between a potential receptor and MEC has two components: access and activity

Figure 7d- DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT NIAGARA MMRP FUDS SITE PAOI 1
(**WORKING DRAFT)**

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.* EM1110-1-1200.

Fort Niagara

Niagara Falls, New York
Niagara County

Legend

- Approximate Back Stop Area
- FUDS Boundary
- MRS - 1 Offshore Dump Site
- MRS - 2 Rifle Range / 1000" Machine Gun Range
- MRS - 3 Pistol Range / Anti-aircraft Range
- MRS - 4 Skeet Range
- MRS - 5 90-mm Firing Range
- PAOI -1 Relocated soils from MRS 2 backstop and target butts
- Surface Soil (Reduced 6010B Metals & Reduced 8330A Explosives)
- Subsurface Soil (Reduced 6010B Metals)
- Surface Soil (Reduced 8330A Explosives)
- Sediment (Reduced 8330A Explosives)
- Background Surface Soil (Reduced 6010B Metals)
- Geophysical Reconnaissance Route
- 25' geophysical clearance of sample location

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

N W E S

0 250 500 1,000 Feet

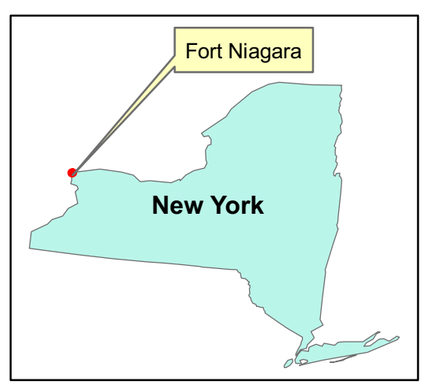


Figure 8. Proposed Geophysical Reconnaissance and Sampling Locations

APPENDIX B—DRAFT PHASE 1 MFR SHEET

Technical Project Planning

Draft Phase I MFR Worksheet

Author(s): Alion Team
Latest Revision Date: 20 February 2008
Reviewer: Roger Azar
Review Date: 21 February 2008

Location: Fort Niagara State Park, Youngstown, New York
Site(s): Fort Niagara
Project: MMRP Project Number C02NY061303

(Attach Phase I MFR to PMP)

TPP Team	**EM 200-1-2, Paragraph 1.1.1**
Decision Maker	
Customer	U.S. Army Corps of Engineers (USACE)
Project Manager	David MacPherson, CELRB
Design Team Leaders	Julie Kaiser, Program Manager, USACE Baltimore District, CENAB Liza Finley, Design Team Lead, CENAB
Team Leaders	Roger Azar, Rick Swahn, Sarah Moore — Alion Science & Technology Corporation
Regulators	New York Department of Environmental Conservation (NYSDEC) U.S. Environmental Protection Agency (USEPA), Region 2
Stakeholders	**Government agencies/regulators** • U.S. Environmental Protection Agency (Region 2) • US Army Corps of Engineers - Baltimore District • US Army Corps of Engineers - Buffalo District **State agencies** • NYS Office of Parks, Recreation, and Historical Preservation • NYS Department of Environmental Conservation **Property owners** • State of New York **Other potential stakeholders** • Old Fort Niagara Association • Alion Science and Technology Corporation

Data Types	**Data User**	**Data Gatherer**
Compliance / Regulatory (CR)	RISK (Risk Assessors) – CENAB/CELRB/USACE Huntsville Districts; NYSDEC; USEPA Region 2	Alion Science & Technology
	COMPLIANCE (Regulatory Specialists, Chemists) - NYSDEC; USEPA Region 2	
	REMEDY (Engineers, Chemists) – CENAB/CELRB/USACE Huntsville Districts	
	SAFETY (UXO Technician) – CENAB/CELRB/USACE Huntsville Districts	

Demographics/Land Use (LU)	RISK (Risk Assessors) – CENAB/CELRB/USACE Huntsville Districts; NYSDEC; USEPA Region 2	Alion Science & Technology
	COMPLIANCE (Regulatory Specialists, Chemists) - NYSDEC; USEPA Region 2	
	REMEDY (Engineers, Chemists) – CENAB/CELRB/USACE Huntsville Districts	
	SAFETY (UXO Technician) – CENAB/CELRB/USACE Huntsville Districts	
Site Conditions (SC)	RISK (Risk Assessors) – CENAB/CELRB/USACE Huntsville Districts; NYSDEC; USEPA Region 2	Alion Science & Technology
	COMPLIANCE (Regulatory Specialists, Chemists) – NYSDEC; USEPA Region 2	
	REMEDY (Engineers, Chemists) – CENAB/CELRB/USACE Huntsville Districts	
	SAFETY (UXO Technician) – CENAB/CELRB/USACE Huntsville Districts	
Munitions and Explosives of Concern (MEC)	RISK (Risk Assessors) – CENAB/CELRB/USACE Huntsville Districts; NYSDEC; USEPA Region 2	Alion Science & Technology
	COMPLIANCE (Regulatory Specialists, Chemists) – NYSDEC; USEPA Region 2	
	REMEDY (Engineers, Chemists) – CENAB/CELRB/USACE Huntsville Districts	
	SAFETY (UXO Technician) – CENAB/CELRB/USACE Huntsville Districts	

CUSTOMER'S GOALS	**EM 200-1-1, Paragraph 1.1.2**	
Future Land Use(s) @ Site	**Issues and Regulatory Compliance Status**	**Site-specific Closeout Goal (if applicable)**
Continued Recreational and Educational Research Support.	Potential for select metals and explosives in certain media as well as munitions and explosives of concern (MEC)	See Site Specific Closeout Goal
Site Closeout Statement		
Achieving the walk-away goal, or final condition of the site, as envisioned by the customer. The final condition of the site includes reasonably safe use following any remediation, maintenance, and monitoring for activities that are consistent with the current/future use of the site.		
Customer's Schedule Requirements		
See schedule.		
Customer's Site Budget		
N/A		

IDENTIFY SITE APPROACH		
EXISTING SITE INFORMATION & DATA EM 200-1-2, Paragraph 1.1.3 and 1.2.1		
Attachment(s) to Phase I MFR	**Located at Repository**	**Preliminary Conceptual Site Model**
1997 INPR	CELRB	Yes
1999 ASR	CELRB	Yes
2004 Supplemental ASR	CELRB	Yes
POTENTIAL POINTS OF COMPLIANCE EM 200-1-2, Paragraph 1.2.1.3		
NYSDEC (within boundaries of areas of concern)		
USEPA (within boundaries of areas of concern)		
MEDIA OF POTENTIAL CONCERN EM 200-1-2, Paragraph 1.2.1.4		
Surface soil/Subsurface soil and Sediment		
SITE OBJECTIVES EM 200-1-2, Paragraph 1.2.2		
See attached Project Objectives worksheets.		
REGULATOR AND STAKEHOLDER PERSPECTIVES EM 200-1-1, Paragraph 1.2.3		
Regulators	Community Interests	Others
NYSDEC – Chek Ng	TBD	TBD
USEPA – Mike Basile		
PROBABLE REMEDIES EM 200-1-2, Paragraph 1.2.4		
Detonation or removal of suspect MEC if found during the site investigation.		
Removal of residual MEC from the site, treatment of MC via removal, onsite treatment, and engineering/institutional controls as appropriate to reduce the risk to future site users.		
EXECUTABLE STAGES TO SITE CLOSEOUT EM 200-1-2, Paragraph 1.2.5		
Site Inspection (SI)		
Remedial Investigation/Feasibility Study (RI/FS)		
Proposed Plan		
Record of Decision (ROD)/Decision Document		
Remedial Design		
Remedial Action		
Removal Action (if necessary)		
Long-Term Monitoring (if necessary)		

IDENTIFY CURRENT PROJECT		
SITE CONSTRAINTS AND DEPENDENCIES **EM 200-1-2, Paragraph 1.3.1**		
Administrative Constraints and Dependencies		
SI needs to be completed by May 2009 to meet program needs.		
Acceptance of Programmatic Work Plan and Site Specific Work Plan Addendum prior to field sampling.		
Access agreements need to be in place prior to sampling.		
Technical Constraints and Dependencies		
Need MEC avoidance for sampling.		
Need to abide by Health and Safety Plan.		
Legal and Regulatory Milestones and Requirements		
Need Right of Entry agreement.		
Regulatory evaluation of SI work plan and reporting of SI results and recommendations.		
Section 106 Consultation		
Threatened and endangered (T&E) species determination		
CURRENT EXECUTABLE STAGE **EM 200-1-2, Paragraph 1.3.3**		
Site Inspection		
Basic (For Current Projects)	**Optimum** (For Future Projects)	**Excessive** (Objectives that do not lead to site closeout)
SI (MC Sample collection and MEC reconnaissance)	NDAI or RI/FS	

Acronyms

ASR – Archive Search Report
EM – Engineer Manual (see www.usace.army.mil/inet/usace-docs/)
INPR – Inventory Project Report
MC – Munitions Constituents
MEC – Munitions and Explosives of Concern
NDAI – No Department of Defense Action Indicated
RA – Removal Action
RAC – Risk Assessment Code type impact analysis conducted during INPR, ASR, and Supplemental ASR
SI – Site Inspection
TPP – Technical Project Planning
USEPA – U.S Environmental Protection Agency

PROJECT OBJECTIVES WORKSHEET

SITE: **Fort Niagara, Youngstown, New York**
PROJECT: Project Number C02NY061303

Site Objective [a]					Data Needs [d]	Data Collection Methods	Project Objective Classification [e]
Number	Executable Stage [b]		Description [c]	Source			
	Current	Future					
1	Yes		Determine if the site requires additional investigation through an RI/FS or if the site may be recommended for No Department of Defense Action Indicated (NDAI) based on the presence or absence of MEC and MC.	ASR, Public	CR, LU, SC, UXO	MEC visual inspection, analog geophysics, MC sampling	Basic
2	Yes		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.	ASR, Public	CR, LU, SC, UXO	MEC visual inspection, analog geophysics, MC sampling	Basic
3	Yes		Collect, or develop, additional data, as appropriate, in support of potential Hazard Ranking System (HRS) scoring by Environmental Protection Agency (EPA).	ASR, Public	LU, SC, UXO	MEC visual inspection, analog geophysics, MC sampling	Basic
4	Yes		Collect the additional data necessary to the complete the Munitions Response Site Prioritization Protocol (MRSPP).	ASR, Public	CR, LU, SC, UXO	MEC visual inspection, analog geophysics, MC sampling	Basic

a. Refer to EM 200-1-2, Paragraph 1.2.2
b. Refer to EM 200-1-2, Paragraph 1.2.5
c. For example, Meeting with Customer/stakeholder/Regulator, State Regulations
d. Data Needs: **CR**-Compliance/Regulatory, **LU**-Land Use/Demographics, **SC**-Site Conditions, and **UXO**-OE UXO
e. Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

Acronyms
ASR–Archive Search Report
EM–Engineer Manual (see www.usace.army.mil/inet/usace-docs/)

APPENDIX C—DATA QUALITY OBJECTIVE (DQO) WORKSHEETS AND MEASUREMENT QUALITY OBJECTIVES (MQO) TABLES

Data Quality Objective Worksheet

Site: **Fort Niagara**
Project: FUDS MMRP SI Project Number **C02NY061303**
DQO Statement Number: **1 of 4**

DQO Element Description	Site-Specific DQO Statement
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).
Data Needs Requirements:	
Data User Perspective(s)	Risk-MEC and MC, Compliance
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC
Media of Interest	MEC – Surface/Subsurface soil and Sediment MC – Surface/Subsurface soil and Sediment
Required Sampling Locations or Areas	MEC and MC: Areas where military munitions-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.
Number of Samples Required	**MEC** – A qualitative reconnaissance, including analog geophysical and visual reconnaissance data, rather than discrete sampling data, will be collected to accomplish this objective. This data will be collected using "meandering path" to and from the sampling points. The UXO Technician will collect data on an approximate 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 [TBD] ft², and the area around the sampling locations is approximately [TBD] ft² *(figure to be provided in the SS-WP).* **MC** – [A total of three surface soil, three subsurface soil, and three sediment samples.] (Three soil (collected at the surface) background samples, two sediment background samples and additional QA/QC samples.)
Reference Concentration of Interest or Other Performance Criteria	**MEC:** If historic data indicate the presence of MEC and one anomaly classified as of MPPEH, or confirmed MEC is found with the magnetometer, or if physical evidence indicating the presence of MEC is 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

Data Quality Objective Worksheet

Site: **Fort Niagara**
Project: FUDS MMRP SI Project Number **C02NY061303**
DQO Statement Number: **1 of 4**

DQO Element Description	Site-Specific DQO Statement
	discoveries, then an NDAI 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 or RI/FS. In both instances (RI/FS or NDAI), all lines of evidence (*e.g.*, historic data, field data, background concentration of metals, etc. for both MEC and MC) will be used to make a final decision for an NDAI or RI/FS. **MC:** If the maximum concentrations measured at the site exceed EPA/ Oakridge National Laboratory (ORNLs) 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 PRGs or ecological risk screening values, then an NDAI may be recommended. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data, comparison to regional background concentration ranges for metals, and comparison to state screening/cleanup criteria, will be used to make a final decision for an NDAI or RI/FS. Screening values selected for comparison at this site are specified in the chemical-specific measurement quality objective (MQO) tables.
Appropriate Sampling and Analysis Methods:	
Sampling Method and Depths	**MEC:** Geophysics with a handheld analog all-metals detector, which will used to collect related data, 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. Visual observations will provide a continuous source of additional information which will be noted in the field log book with GPS coordinates. Photographs also will 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 will be described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.
Analytical Method	**MEC:** Analytical methods are not used with analog all-metals detection. 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 Great Lakes and Ohio River Buffalo

Data Quality Objective Worksheet	
Site: **Fort Niagara** Project: FUDS MMRP SI Project Number **C02NY061303** DQO Statement Number: **1 of 4**	
DQO Element Description	**Site-Specific DQO Statement**
	District (CELRB), 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 (reduced), 8330A (mod) (reduced), Metals Methods–6010B (reduced).

Data Quality Objective Worksheet	
Site: **Fort Niagara** Project: FUDS MMRP SI Project Number **C02NY061303** DQO Statement Number: **2 of 4**	
DQO Element Description	**Site-Specific DQO Statement**
Intended Data Use(s):	
Project Objective(s) Satisfied	Determine the potential need for a Removal Action for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.
Data Needs Requirements:	
Data User Perspective(s)	Risk-MEC/MC, Compliance
Contaminant or Characteristic of Interest	MEC and/or MC in the surface/subsurface
Media of Interest	MEC – Surface/Subsurface soil and Sediment MC – Surface/Subsurface soil and Sediment
Required Sampling Locations or Areas	Areas where military munitions-related operations occurred and/or where MEC or MMPEH has been identified historically based on existing documentation and interviews. *[Map to be provided in the SS-WP]*.
Number of Samples Required	Refer to DQO 1 for MC/MEC sampling parameters.
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 all-metals detector or if physical evidence indicating the presence of MEC is found during the visual inspection, and if the item(s) is determined by a UXO-qualified 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: ***Time-Critical Removal Action (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. ***Non-Time-Critical Removal Action (NTCRA)*** **–** A 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.

Data Quality Objective Worksheet	
Site: **Fort Niagara** Project: FUDS MMRP SI Project Number **C02NY061303** DQO Statement Number: **2 of 4**	
DQO Element Description	**Site-Specific DQO Statement**
Appropriate Sampling and Analysis Methods:	
Sampling Method and Depths	**MEC:** 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 will be described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.
Analytical Method	Refer to DQO 1 for MEC and MC analytical methods to be incorporated.

Data Quality Objective Worksheet

Site: **Fort Niagara**
Project: FUDS MMRP SI Project Number **C02NY061303**
DQO Statement Number: **3 of 4**

DQO Element Description	Site-Specific DQO Statement
Intended Data Use(s):	
Project Objective(s) Satisfied	Collect, or develop, additional data, as appropriate, in support of Hazard Ranking System (HRS) scoring to be performed potentially by the Environmental Protection Agency (EPA).
Data Needs Requirements:	
Data User Perspective(s)	Risk-MC, Compliance.
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.
Media of Interest	Surface Soil/Subsurface Soil/Sediment
Required Sampling Locations or Areas	Areas where MEC has been historically found, used, or disposed as documented in interviews or existing documentation.
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).
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).
Analytical Method	Refer to DQOs 1and 2 for associated methods.

Data Quality Objective Worksheet	
Site: **Fort Niagara** Project: FUDS MMRP SI Project Number **C02NY061303** DQO Statement Number: **4 of 4**	
DQO Element Description	**Site-Specific DQO Statement**
Intended Data Use(s):	
Project Objective(s) Satisfied	Collect the additional data necessary to the complete the Munitions Response Site Prioritization Protocol (MRSPP).
Data Needs Requirements:	
Data User Perspective(s)	Risk-MEC and MC, Compliance
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.
Media of Interest	Surface soil / Subsurface Soil / Sediment
Required Sampling Locations or Areas	Areas where MEC has been identified historically and where sampling is recommended.
Number of Samples Required	Refer to DQOs 1and 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.
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).
Analytical Method	Refer to DQOs 1and 2 for associated methods.

Table 1. Potential Chemical-Specific Measurement Quality Objectives and Preferred Maximum Method Quantitation Limits for Soil

Analyte	Abbreviation	CAS #	EPA Regional Residential Soil Screening Levels (1) (mg/kg)	EPA Interim Ecological Soil Screening Levels (mg/kg)	Lowest Values (mg/kg)	Preferred Maximum Method Quantitation Limit, Soil (2) (mg/kg)	Lab Method Detection Limit (mg/kg)	Lab Reporting Limit (mg/kg)
Explosives								
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	16	30 [a]	16	8	0.012	0.04
1,3,5-Trinitrobenzene	1,3,5-TNB	99-35-4	180	-	180	90	0.0024	0.04
1,3-Dinitrobenzene	1,3-DNB	99-65-0	0.61	-	0.61	0.305	0.0048	0.04
2,4-Dinitrotoluene	2,4-DNT	121-14-2	12	30 [a]	12	6	0.0036	0.04
2,6-Dinitrotoluene	2,6-DNT	606-20-2	6.1	30 [a]	6.1	3.05	0.0097	0.04
2-Amino-4,6-dinitrotoluene	2-Am-DNT	35572-78-2	12	80 [a]	12	6	0.0056	0.04
2-Nitrotoluene	2-NT	88-72-2	78	30 [a]	30	15	0.012	0.08
3-Nitrotoluene	3-NT	99-08-1	160 [b]	30 [a]	30	15	0.012	0.08
4-Amino-2,6-dinitrotoluene	4-Am-DNT	19406-51-0	12	80 [a]	12	6	0.0077	0.04
4-Nitrotoluene	4-NT	99-99-0	30	30 [a]	30	15	0.017	0.08
Methyl-2,4,6-trinitrophenylnitramine	Tetryl	479-45-8	24	-	24	12	0.012	0.08
Nitroglycerin	**NG**	**55-63-0**	***0.61***	**-**	**0.61**	**0.305**	**0.860**	**4.0**
Metals								
Antimony	***Sb***	***7440-36-0***	***3.1***	***78*** [c]	***3.1***	***1.55***	***0.24***	***2.0***
Arsenic	**As**	**7440-38-2**	**0.39**	**18** [d]	**0.39**	**0.195**	**0.26**	**2.0**
Copper	Cu	7440-50-8	3100	28 [e]	28	14	0.068	1.0
Iron	Fe	7439-89-6	5500	-	5,500	2,750	1.91	15.0
Lead	Pb	7439-92-1	400	11 [f]	11	5.5	0.17	1.0
Nickel	Ni	7440-2-0	160	38 [g]	38	19	0.11	1.0

Notes:

- = No Standard

CAS# = Chemical Abstracts Service Number

EPA = Environmental Protection Agency

MDL = Method Detection Limit

mg/kg = milligrams per kilogram

ORNL = Oak Ridge National Laboratory

(1) EPA Regional Residential Soil Screening Levels. Dated 01 July 2008. Values of non-cancerous compounds were divided by 10. http://epa-prgs.ornl.gov/chemicals/download/master_sl_table_run_20JUNE2008.pdf

(2) Preferred Method Maximum Quantitation Limit is one half of the Lowest Value unless the Method Detection Limit or Laboratory Reporting Limit is higher than the Lowest Value.

Bolded rows indicate occurrences when the Preferred Maximum Method Quantitation Limit is less than the Method Detection Limit

Bolded italicized rows indicate occurrences when the Preferred Maximum Method Quantitation Limit is less than the Reporting Limit

Note: Chemicals that are not CERCLA hazardous substances (e.g., iron, aluminum, barium, magnesium) 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 MCs in the SI report.

a Talmage et al., 1999; values are based on 2,4,6-TNT, except for 2-Amino-4,6-dinitrotoluene and 4-Amino-2,6-dinitrotoluene
Value of Noncancerous compounds were divided by 10
b No Regional Screening value listed. EPA Region 6 Human Health MSSL Residential Soil used. Dated 08 March 2008. Values of non-cancerous compounds were divided by 10.
c EPA. 2005a. Ecological Soil Screening Level for Antimony. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 01 June 2008.
d EPA. 2005b. Ecological Soil Screening Level for Arsenic. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_arsenic.pdf. Accessed 01 June 2008.
e EPA. 2007a. Ecological Soil Screening Level for Copper. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 01 June 2008.
f EPA. 2005c. Ecological Soil Screening Level for Lead. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 01 June 2008.
g EPA. 2007b. Ecological Soil Screening Level for Nickel. Available from http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 01 June 2008.

The primary uncertainty associated with achieving PMMQLs is associated with those analytes where the standard analytical methodology fails to achieve the MDL. The impact of the individual exceedance on the overall data set will have to be evaluated, based on the magnitude of the exceedance, the analyte of concern, the likelihood that that analyte is a constituent of the munitions used at the site, and its value as target or indicator analyte in the SI Report.

MDL and RL Exceedances of the Preferred Maximum Quantitation Limit (PMMQL)
Soil
Antimony **Arsenic** **Nitroglycerine**

Table 1. Potential Chemical-Specific Measurement Quality Objectives and Preferred Maximum Method Quantitation Limits for Sediment (Freshwater)								
Analyte	**Abbreviation**	**CAS #**	**EPA Regional Residential Soil Screening Levels (1) (mg/kg)**	**EPA Interim Ecological Soil Screening Levels (mg/kg)**	**Lowest Values (mg/kg)**	**Preferred Maximum Method Quantitation Limit, Soil (2) (mg/kg)**	**Lab Method Detection Limit (mg/kg)**	**Lab Reporting Limit (mg/kg)**
Explosives								
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	160	0.09 [b]	0.09	0.045	0.012	0.04
1,3,5-Trinitrobenzene	1,3,5-TNB	99-35-4	1800	0.09 [b]	0.09	0.045	0.0024	0.04
1,3-Dinitrobenzene	1,3-DNB	99-65-0	6.1	-	0.61	0.305	0.0048	0.04
2,4-Dinitrotoluene	2,4-DNT	121-14-2	120	0.09 [b]	0.09	0.045	0.0036	0.04
2,6-Dinitrotoluene	2,6-DNT	606-20-2	61	0.09 [b]	0.09	0.045	0.0097	0.04
2-Amino-4,6-dinitrotoluene	2-Am-DNT	35572-78-	120	-	120	60	0.0056	0.04
2-Nitrotoluene	2-NT	88-72-2	780	0.09 [b]	0.09	0.045	0.012	0.08
3-Nitrotoluene	3-NT	99-08-1	1600 [a]	0.09 [b]	0.09	0.045	0.012	0.08
4-Amino-2,6-dinitrotoluene	4-Am-DNT	19406-51-	120	-	120	60	0.0077	0.04
4-Nitrotoluene	4-NT	99-99-0	300	0.09 [b]	0.09	0.045	0.017	0.08
Methyl-2,4,6-trinitrophenylnitramine	Tetryl	479-45-8	240	-	240	120	0.012	0.08
Nitroglycerin	NG	55-63-0	6.1	-	6.1	3.05	0.860	4.0
Metals								
Antimony	Sb	7440-36-0	31	2.0 [c]	2	1	0.24	2.0
Arsenic	As	7440-38-2	3.9	9.79 [d]	3.9	0.195	0.26	2.0
Copper	Cu	7440-50-8	3100	31.6 [d]	31.6	15.8	0.068	1.0
Iron	Fe	7439-89-6	55000	-	55000	27,500	1.91	15.0
Lead	Pb	7439-92-1	400	35.8 [d]	35.8	17.9	0.17	1.0
Nickel	Ni	7440-2-0	1600	22.7 [d]	22.7	11.35	0.11	1.0

Notes:

- = No Standard

CAS# = Chemical Abstracts Service Number

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mg/kg = milligrams per kilogram

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(1) EPA Regional Residential Soil Screening Levels. Dated 01 July 2008. Values of non-cancerous compounds were divided by 10. http://epa-prgs.ornl.gov/chemicals/download/master_sl_table_run_20JUNE2008.pdf

(2) Preferred Method Maximum Quantitation Limit is one half of the Lowest Value unless the Method Detection Limit or Laboratory Reporting Limit is higher than the Lowest Value.

Bolded rows indicate occurrences when the Preferred Maximum Method Quantitation Limit is less than the Method Detection Limit

Bolded italicized rows indicate occurrences when the Preferred Maximum Method Quantitation Limit is less than the Reporting Limit

Note: Chemicals that are not CERCLA hazardous substances (e.g., iron, aluminum, barium, magnesium) 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 MCs in the SI report.

[a] Since no values were available from EPA Regional Screening Values, values from EPA Region VI Medium Specific Screening Levels (MSSLs) were used.

[b] Talmage, S.S., D.M. Opresko, C.J. Maxwell, J.E. Welsh, M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic munitions compounds: Environmental effects and screening values. Reviews in Environmental Contamination and Toxicology. 161: 1-156. Except for 2-Amino-4,6-dinitrotoluene and 4-Amino-2,6-dinitrotoluene, trinitrotoluene was used as a surrogate.

b No Regional Screening value listed. EPA Region 6 Human Health MSSL Residential Soil used. Dated 08 March 2008. Values of non-cancerous compounds were divided by 10.

[c] Long, E.R. and L.G. Morgan. 1990. The potential for biological effects of sediment

[d] MacDonald, D.D., C.G. Ingersoll, and T.A. Berger. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Archives of Environmental Contamination and Toxicology, 39:20-31. Consensus-based sediment screening values.

APPENDIX D—INTERIM GUIDANCE DOCUMENT (IGD) AND MUNITIONS DATA SHEETS

Interim Guidance
Ordnance and Explosives Risk Impact Assessment

U.S. Army Engineering and Support Center, Huntsville

27 March 2001

Table of Contents

Tables

1. Purpose. Ordnance and Explosives Risk Impact Assessment (OERIA) provides a method of risk assessment that is more easily understood by, and communicated to, stakeholders. The OERIA is used during the conducting of the Ordnance and Explosives (OE) Engineering Evaluation and Cost Analysis (EE/CA). OERIA provides a qualitative risk assessment for OE sites by using direct analysis of site conditions and human issues that create OE risk. The OERIA will be used as an input to an evaluation of response alternatives under the Effectiveness Criteria.

2. Background. The use of statistically based risk assessment and analysis techniques has often caused difficulty in stakeholder communications concerning risk and the role risk plays in comparing response alternatives and selecting a response action. The OERIA provides a qualitative risk assessment in lieu of a statistically based risk assessment that will allow more effective, clear risk communication among all stakeholders.

3. Processes and Procedures

3-1. Technical Project Planning. The project team should follow the Technical Project Planning (TPP) process to establish project objectives and response alternatives. In accordance with TPP, the project team should develop project objectives with the customers, stakeholders, and the regulators. The development of project objectives ensures that the goals and needs of the customer(s), stakeholders, and regulators are the foundation for selecting and implementing a response action. Additional information on the Technical Project Planning process is provided in EM 200-1-2 and from the OE Mandatory Center of Expertise (MCX). The OE MCX is developing OE specific TPP interim guidance for publication in the near future.

3-2. OE Risk Impact Assessment. The three steps in the OERIA process are:

1. Review base factors and identify additional factors to assess.
2. Develop baseline risk assessment.
3. Assess the response alternatives.

a. Step 1 – Review Base Factors and Identify Additional Factors to Assess. Review the basic risk factor categories listed below. Add any additional risk factors that are identified by the project team for assessment.

(1) The basic risk factor categories are:

1. Ordnance and Explosives Factors
   - Type
   - Sensitivity
   - Quantity or Density
   - Depth

2. Site Characteristics Factors
   - Accessibility
   - Stability

3. Human Factors

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- Activities
- Population

(2) The characterization plan should take into account the data requirements to assess the risk factors selected from the list above for a given site.

b. Step 2. Baseline Risk Assessment. Risk Factors Requiring Assessment. Three categories of basic risk factors that should be evaluated are OE, Site Characteristics, and Human Factors. In addition, other risk factors identified in step 1 should be assessed. Only the basic risk factors are discussed below.

(1) OE. This category covers the physical characteristics (OE type, sensitivity) and location/extent (density, quantity, depth) of OE at a given site.

(a) Type. The type of OE affects the likelihood and severity of injury if OE functions when encountered by an individual. Table 1 shows the four levels of risk used for completing the baseline risk assessment in order from highest to lowest potential hazard.

(b) Sensitivity. OE Sensitivity affects the likelihood of the item functioning as designed when encountered by an individual. For purposes of completing the baseline risk assessment, Table 2 lists four levels of OE sensitivity in order from highest to lowest sensitivity. The information in Table 2 should be amplified with information on activities that could cause the OE present to function (e.g., pressure from stepping on the item, fuze activation from moving the item, etc.).

(c) Density or Quantity. OE density or quantity affects the likelihood that an individual will encounter OE at the site. Relationships exist between density/quantity and the likelihood of encountering OE on the site. The nature of the density or quantity of OE at the site (e.g., distribution, location, etc.) should be explained in as much detail as possible.

(d) Depth. OE depth, when considered along with site activities (see paragraph (3)(a) below), affects the likelihood that an individual will encounter OE present at a site. Generally speaking, the deeper the OE, the less likely anyone will encounter it. However, the site activities must also be examined to ensure this general rule holds true for a given site.

(2) Site Characteristics. This category refers to the physical conditions of the site and natural events that may occur at the site.

(a) Site Accessibility. The accessibility of the site affects the likelihood of individuals encountering OE. The presence or absence of man-made or natural barriers to the site affects the level of accessibility to a given site. Using the descriptions in Table 3, the relative accessibility of the site can be assessed. Man-made barriers can include walls and fences. Natural barriers can include the terrain or topography of the site and vegetation.

(b) Site Stability. Site stability affects the likelihood of individuals encountering OE as a result of changing conditions on the site caused by natural processes. These natural processes include recurring events (e.g., frost heave, sand movement, or erosion) or extreme, infrequent

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events (e.g., tornados, earthquakes, or hurricanes). Using Table 4, the level of site stability can be assessed based upon knowledge of natural processes present at the site.

(3) Human Factors. This category refers to the types of activities that exist on the site, the number of people that may have access, and the frequency of the access to the site on a daily basis.

(a) Site Activities. The types of activities conducted at a site are related to the likelihood of individuals encountering OE. The types of activities may be generally classified as recreational (hiking, camping, biking, etc.) and occupational (farming, industrial, etc.). The level of potential encounter for an activity can be determined using Table 5. The levels are 'Low', 'Moderate', and 'Significant', each referring to the relative probability that performing a given activity will result in an individual encountering OE. The relative probabilities in Table 5 are generally associated with the depth of intrusive actions (into the earth) caused by a given activity compared to the actual depth that OE is found at the site. The minimum depth of OE is used as input to Table 5.

(b) Population. The number of people using the site and the frequency of that use affects the likelihood of an individual encountering OE. An estimate of the number of people using a site, and the frequency of that use, is determined based on the type and location of the site, access restrictions, natural and/or man-made barriers, surrounding population, and other demographics.

(4) The assessments of the three risk factor categories are then put into the first line (Baseline Risk Assessment (Existing Conditions)) of the OERIA Table. A blank OERIA Table is shown in Table 6.

c. Step 3 – Assess the Response Action Alternatives.

(1) Overview. After completing the baseline risk assessment, the response action alternatives are assessed using the basic risk factors in the OERIA Table and other risk factors identified in step 1 for a given site. Table 7 provides an example of an OERIA Table completely filled in with baseline risk assessment and response action alternatives assessment data.

(2) Ranking of Response Action Alternatives for Each Basic Risk Factor. The response action alternatives are analyzed and ranked using each risk factor identified in the baseline risk assessment. Each response action alternative will be assigned an impact evaluation score of 'No Impact' or an alphabetical rank from 'A' to 'D' representing the relative impact of the response action alternative – with 'A' being the highest impact and 'D' being the lowest ('D' is used to notate the lowest impact when there are 4 alternatives, 'E' when there are 5 possible alternatives, etc.). This comparison provides a qualitative indication of the change in the potential for harm and level of protectiveness at the site for each response action alternative that could be implemented. For example, the response alternative of No Department of Defense (DoD) Action Indicated (i.e., a response action will not be conducted) may be compared to the response alternative of surface clearance. The OERIA will qualitatively compare the level of protectiveness and potential for harm as a result of implementing each response action

alternative, including taking no action at a given site.

(3) Overall Ranking of Response Alternatives. The project team will assign an overall alphabetical rank to each response action alternative based upon the impact ranks for each factor. The response action alternative that provides the greatest impact on risk from OE (i.e., achieves the most reduction of the risks posed by the site) will be assigned an 'A'.

(4) Reporting. The results of this qualitative review should be presented to the customer, stakeholders and other interested community members in the EE/CA report. The OERIA results should then be applied in the evaluation of removal alternatives. The OERIA results will be an input to the evaluation of the Effectiveness Criteria.

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Table 1 - OE TYPE CATEGORIES

Category	Description
3	OE that will kill an individual if detonated by an individual's activities
2	OE that will cause major injury to an individual if detonated by an individual's activities
1	OE that will cause minor injury to an individual if detonated by an individual's activities
0	Inert OE or scrap, will cause no injury

Table 2 - OE SENSITIVITY CATEGORIES

Category	OE Sensitivity
3	OE that is very sensitive
2	OE that is less sensitive
1	OE that may have functioned correctly or is unfuzed but has a residual risk
0	Inert OE or scrap, will cause no injury

Table 3 - OE SITE ACCESS LEVELS

Access Level	Access Description
No Restriction to Site	No man-made barriers, gentle sloping terrain, no vegetation that restricts access, no water that restricts access
Limited Restriction to Access	Man-made barriers, vegetation that restricts access, water, snow or ice cover, and/or terrain restricts access
Complete Restriction to Access	All points of entry are controlled

Table 4 - OE SITE STABILITY RISK LEVELS

Stability Level	Stability Description
Site Stable	OE should not be exposed by natural events
Moderately Stable Site	OE may be exposed by natural events
Site Unstable	OE most likely will be exposed by natural events

Table 5 - ACTIVITIES OE CONTACT PROBABILITY LEVELS

Examples of Activities	Actual Depth of OE	Contact Level
Child Play, Short Cuts, Hunting, Fishing, Hiking, Swimming, and Jogging,	0-6"	Significant
	6"-12"	Low
	>12"	Low
Picnic, Camping, Metal Detecting	0-6"	Significant
	6"-12"	Moderate
	>12"	Low
Construction, Archaeology, Crop Farming	0-6"	Significant
	6"-12"	Significant
	>12"	Moderate

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Table 6 - OE RISK IMPACT ASSESSMENT

	Ordnance				Site		Human		Overall Rank
Alternatives	Type	Sensitivity	Density	Depth	Access	Stability	Activity	Population	
Baseline Risk Assessment (Existing Conditions)									
No DoD Action Indicated									
Institutional Controls									
Surface With Institutional Controls									
Clearance to Detectable Depth With Institutional Controls									

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Table 7 - OE RISK IMPACT ASSESSMENT

	Ordnance				Site		Human		Overall Rank
Alternatives	Type	Sensitivity	Density	Depth	Access	Stability	Activity	Population	
Baseline Risk Assessment (Existing Conditions)	Cat 1 22 mm	Cat 2	0.18	0-6"	No restriction to site	Site stable	Significant (hiking, other recreational)	~200 per day	
No DoD Action Indicated	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	D
Institutional Controls	No Impact	No Impact	No Impact	No Impact	A	No Impact	A	A	B
Surface With Institutional Controls	No Impact	No Impact	B	B	A	No Impact	C	B	B
Clearance to Detectable Depth With Institutional Controls	A	A	A	A	No Impact	No Impact	B	C	A

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MUNITIONS LIST:

ID	NAME	DATA SHEET
CTT01	SMALL ARMS, GENERAL	YES
CTT18	90MM, HE. M71 AND HE-T, M71A1	YES
CTT22	3-INCH, MORTAR, HE, MK1	YES

CTT01

SMALL ARMS

SMALL-ARMS AMMUNITION

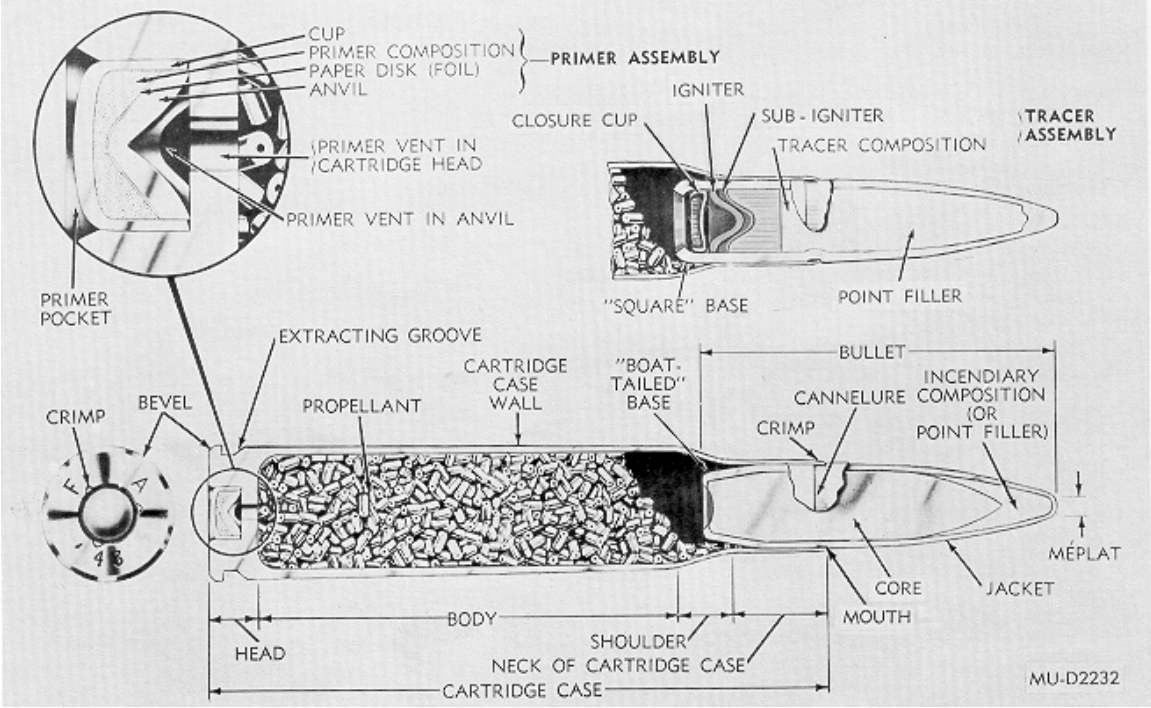


Figure 1. Typical cartridge (sectional)

General. Small-arms ammunition, as used herein, describes a cartridge or families of cartridges intended for use in various types of hand-held or mounted weapons through 30 millimeter. Within a caliber designation, these weapons may include one or more of the following: rifles (except recoilless), carbines, pistols, revolvers, machineguns and shotguns. For purposes of this publication, small-arms ammunition may be grouped as cartridges intended primarily for combat or training purposes (API, HEI, tracer or ball); for training purposes only (blank or dummy); or for special purposes (rifle grenade or spotter-tracer). Refer to TM 9-1306-200 for more detailed information on small-arms ammunition.

Cartridges. In general, a small-arms cartridge is identified as an assembly of a cartridge case, primer, a quantity of propellant within the cartridge case, and a bullet or projectile. Blank and rifle grenade cartridges are sealed with paper closure disks in lieu of bullets. Dummy cartridges are composed of a cartridge case and a bullet. Some dummy cartridges contain inert granular materials to simulate the weight and balance of live cartridges. A typical cartridge and the terminology of its components are shown in figure 1.

Case. Although steel, aluminum, zinc and plastic materials have been used experimentally, brass, a composition of 70 percent copper and 30 percent zinc, is the most commonly used material for cartridge cases. Steel, as well as brass, is an approved material for caliber .45 cartridge cases. Brass, paper and plastic are used for 12 gage shotshell bodies. Aluminum is used for military-type .410 gage shotshell bodies. Configurations of cartridges and bullets are illustrated in figures 2 through 9.

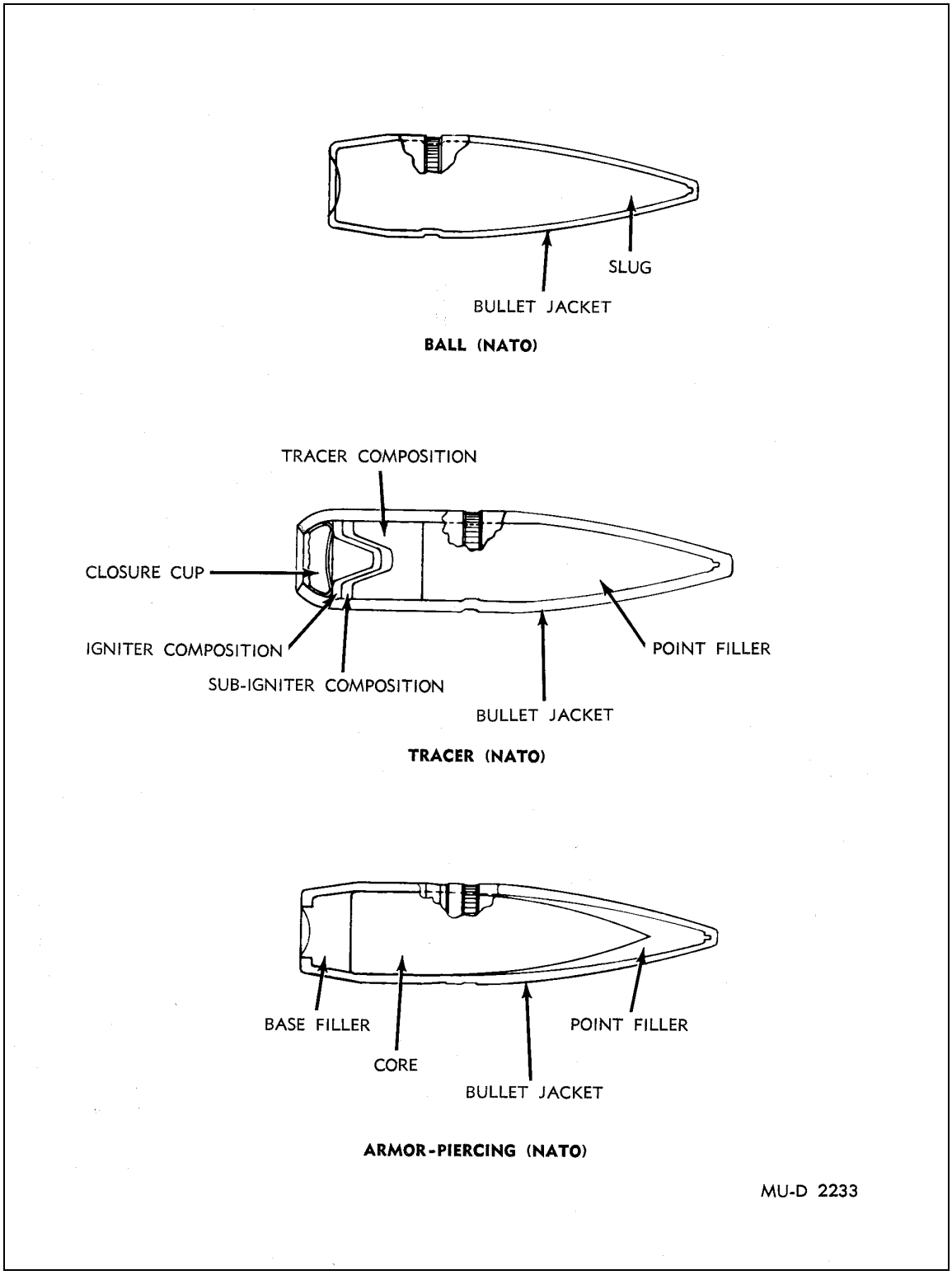


Figure 2. 7.62 mm bullets (sectional)

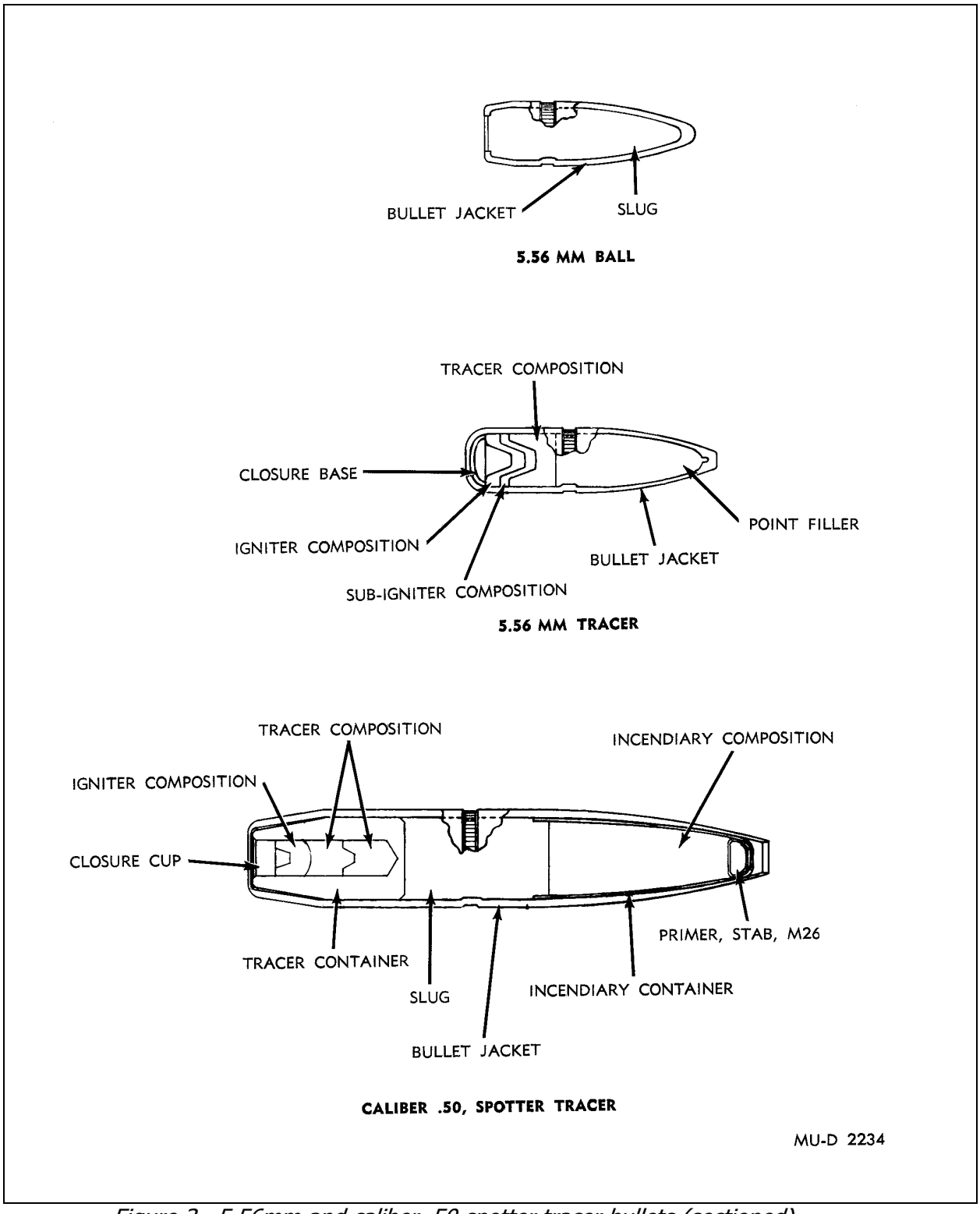


Figure 3. 5.56mm and caliber .50 spotter tracer bullets (sectioned)

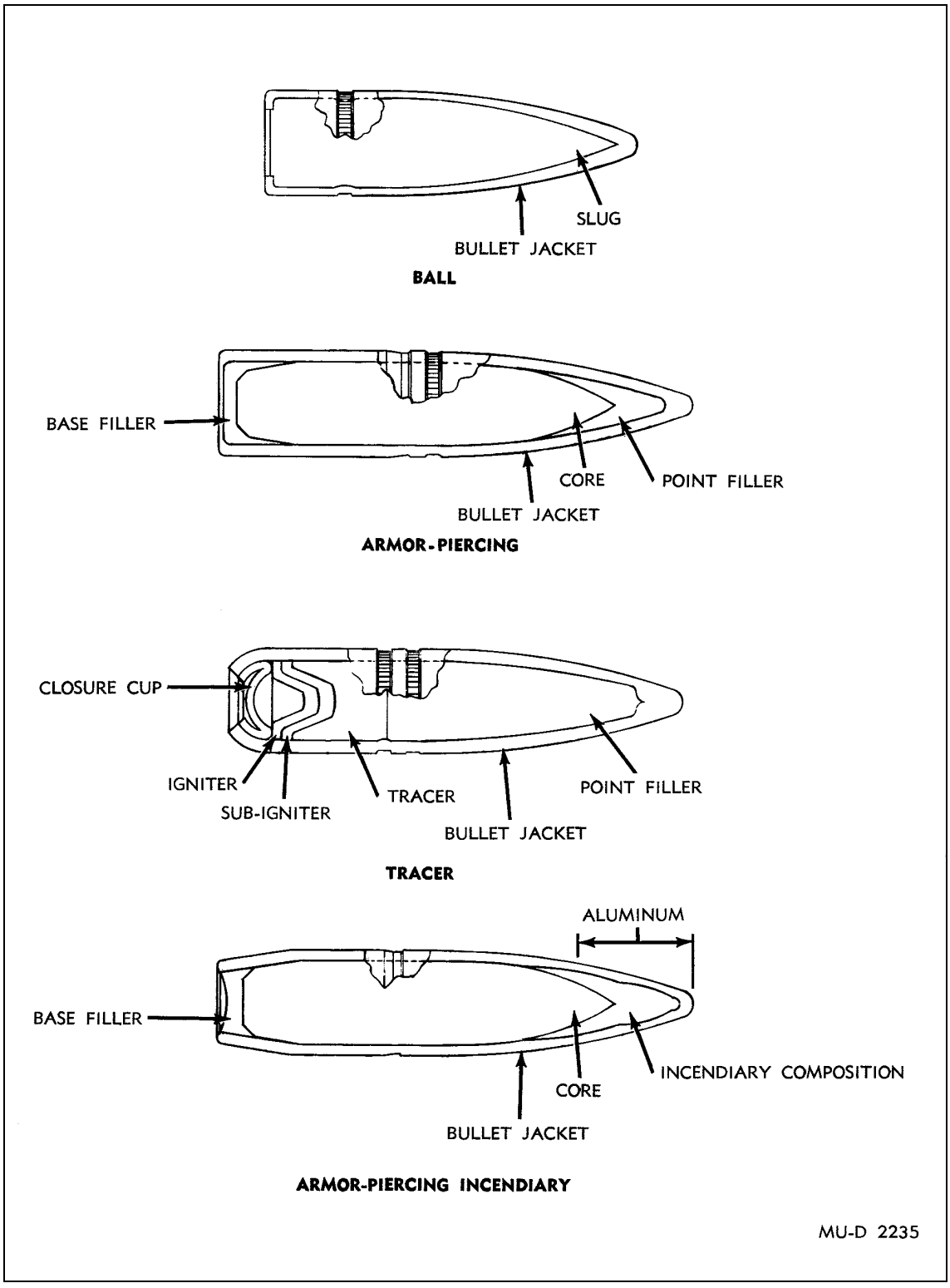


Figure 4. Caliber .30 bullets (sectional)

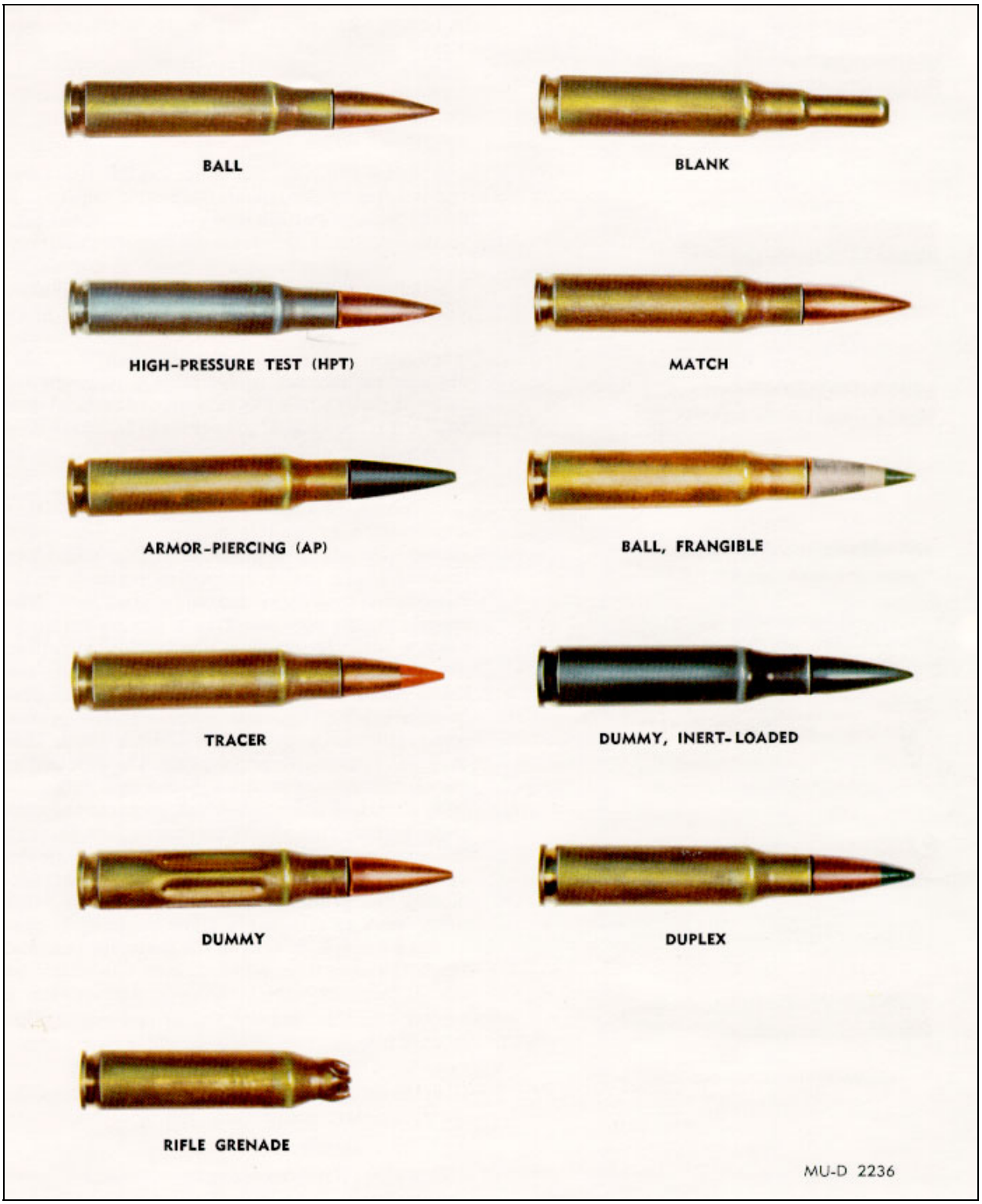


Figure 5. 7.62mm cartridges

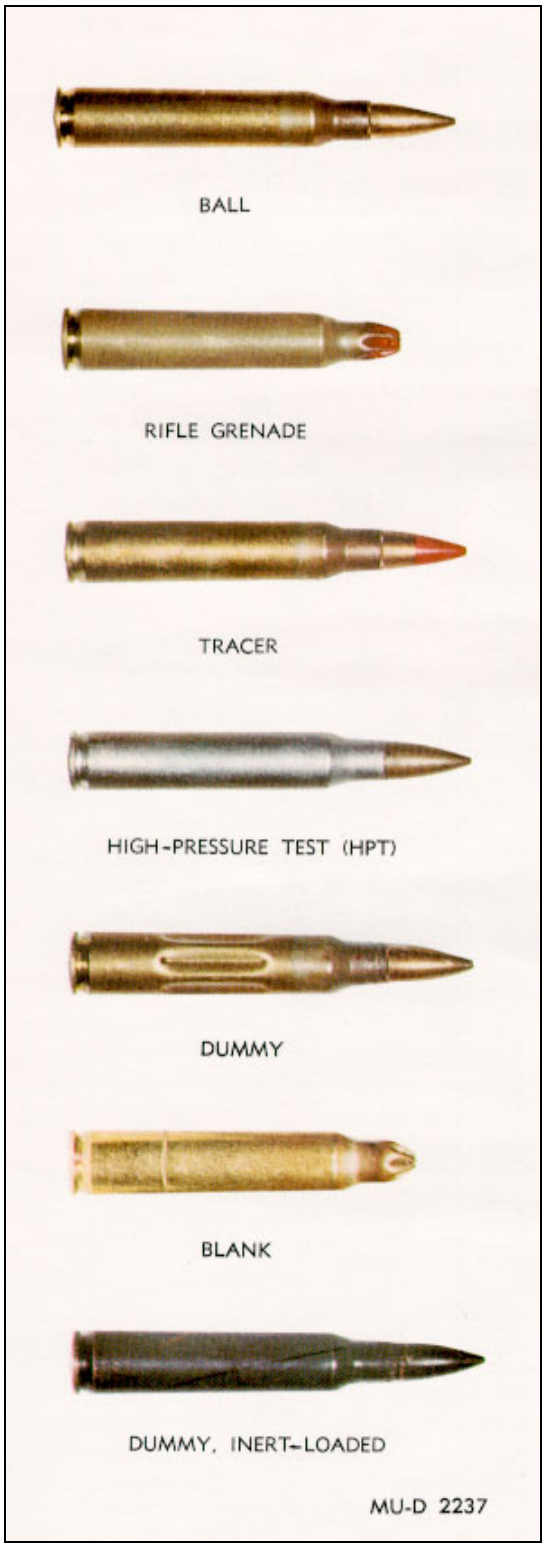


Figure 6. 5.56mm cartridges

Propellant. Cartridges are loaded with varying weights of propellant. This is to impart sufficient velocity (within safe pressures) to the projectile to obtain the required ballistic performance. These propellants are either of the single-base (nitrocellulose) or double-base (nitrocellulose and nitroglycerine) type. The propellant grain configuration may be cylindrical with a single, lengthwise perforation, spheroid (ball) or flake. Most propellants are coated with a deterrent (to assist in controlling the rate of combustion) and with a final coating of graphite (to facilitate flow of propellant and eliminate static electricity in loading cartridges).

Primer. Small-arms cartridges contain either a percussion or electric primer. The percussion primer consists of a brass or gilding metal cup that contains a pellet of sensitive explosive material secured by a paper disk and a brass anvil. The electric primer consists of an electrode button in contact with the priming composition, a primer cup assembly and insulator. A blow from the firing pin of the weapon on the center of the percussion primer cup base compresses the primer composition between the cup and the anvil. This causes the composition to explode. The function of the electric primer is accomplished by a firing pin with electrical potential, which contacts the electrode button. This allows current to flow through the energy-sensitive priming composition to the grounded primer cup and cartridge case, exploding the priming composition. Holes or vents in the anvil or closure cup allow the flame to pass through the primer vent in the cartridge case and ignite the propellant. Rimfire ammunition, such as the caliber .22 cartridge, does not contain a primer assembly. Instead, the primer composition is spun into the rim of the cartridge case and the propellant is in intimate contact with the composition. On firing, the firing pin strikes the rim of the cartridge case, compressing the primer composition and initiating its explosion.

Bullet. With few exceptions, bullets through caliber .50 are assemblies of a jacket and a lead or steel core. They may contain other components or chemicals which provide the terminal ballistic characteristics of the bullet type. The bullet jacket may be either gliding metal, gliding-metal clad steel, or copper plated steel. Caliber .30 and 7.62mm frangible bullets are molded of powdered lead and a friable plastic which pulverizes into dust upon impact with the target. The pellets used in the shotgun shells are spheres of lead alloys varying from 0.08 inch to 0.33 inch in diameter.

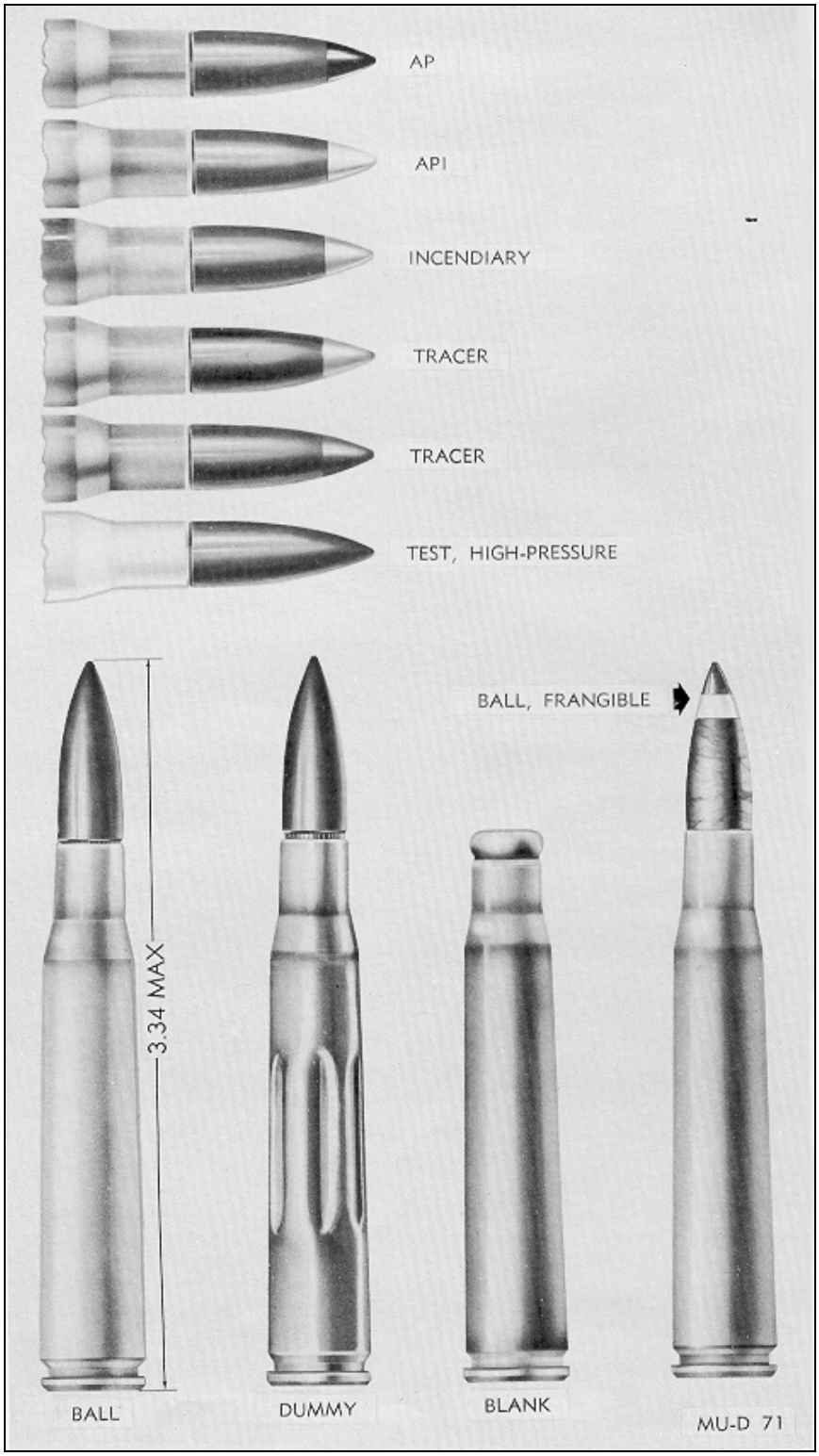


Figure 7. Caliber .30 cartridges

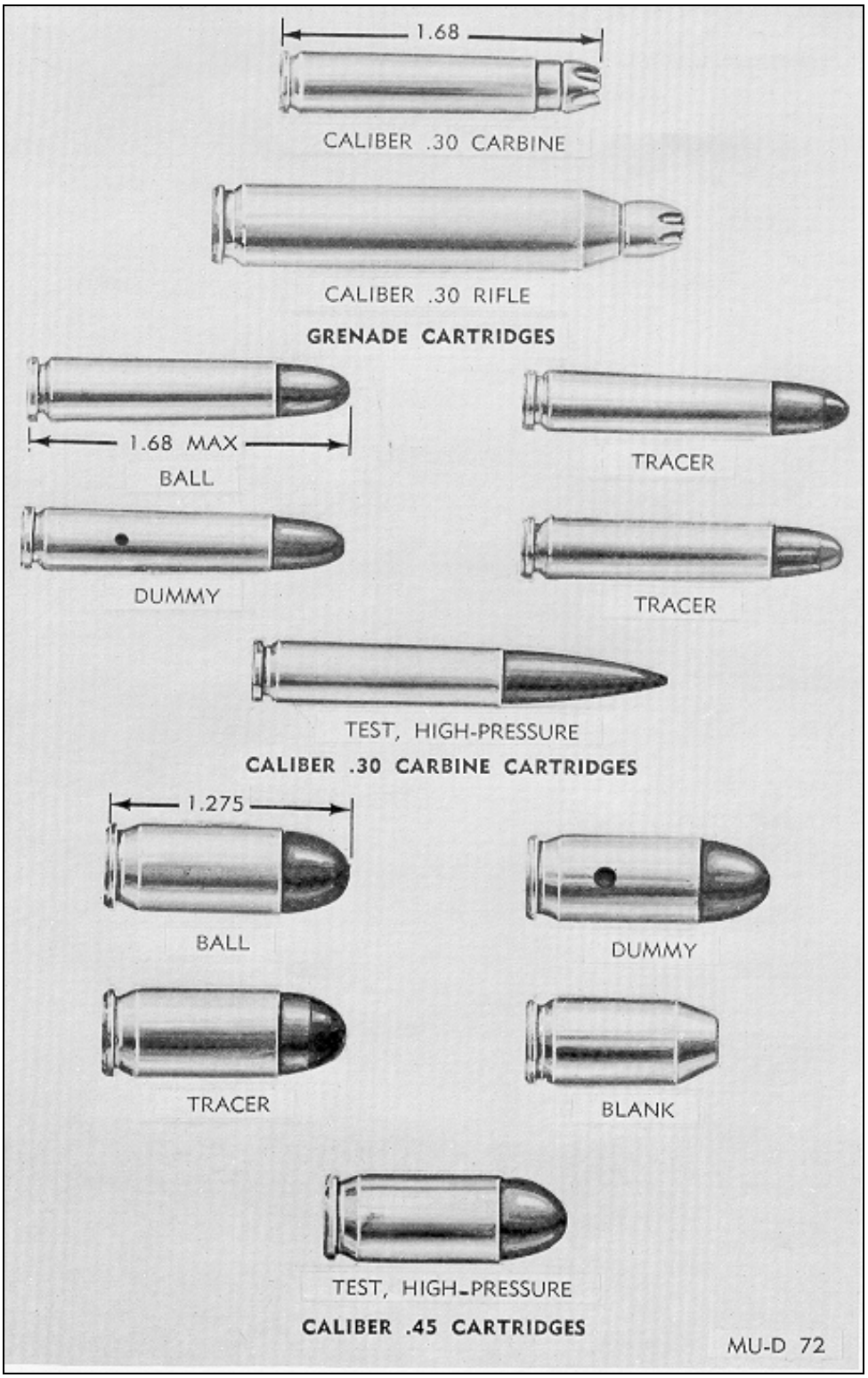


Figure 8. Caliber .30 carbine and caliber .45 cartridges

Figure 9. Caliber .50 cartridges

Ball Cartridge. The ball cartridge is intended for use in rifles, carbines, pistols, revolvers and/or machineguns against personnel and unarmored targets. The bullet, as designed for general purpose combat and training requirements, normally consists of a metal jacket and a lead slug. Caliber .50 ball bullet and 7.62-mm, Ball M59 bullet contain soft steel cores.

Tracer Cartridge. By means of a trail of flame and smoke, the tracer cartridge is intended to permit visible observation of the bullet's in-flight path or trajectory and the point of impact. It is used primarily to observe the line of fire. It may also be used to pinpoint enemy targets to ignite flammable materials and for signaling purposes. The tracer element consists of a compressed, flammable, pyrotechnic composition in the base of the bullet. This composition is ignited by the propellant when the cartridge is fired. In flight, the bullet emits a bright flame which is visible to the gunner. Trace burnout occurs at a range between 400 and 1,600 yards, depending upon the caliber of ammunition.

Match Cartridge. The match cartridge is used in National and International Match Shooting competitions. The bullet consists of a gliding-metal jacket over a lead slug. The cartridges are identified on the head face with the designation NM (National Match) or Match.

Armor-Piercing Cartridges. The armor-piercing cartridge is intended for use in machine-guns or rifles against personnel and light armored and unarmored targets, concrete shelters, and similar bullet-resisting targets. The bullet consists of a metal jacket and a hardened steel-alloy core. In addition, it may have a base filler and/or a point filler of lead.

Armor-Piercing-Incendiary Cartridge. The armor-piercing-incendiary cartridge is used in rifles or machineguns as a single combination cartridge in lieu of separate armor-piercing and incendiary cartridges. The bullet is similar to the armor-piercing bullet, except that the point filler is incendiary mixture instead of lead. Upon impact with the target, the incendiary mixture burst into flame and ignites flammable material.

Armor-Piercing-Incendiary Tracer Cartridge. The bullet of the armor-piercing- incendiary-tracer cartridge combines the features of the armor-piercing, incendiary, and tracer bullets and may be used to replace those cartridges. The bullet consists of a hard steel core with compressed pyrotechnic mixture in the cavity in the base of the core. The core is covered by a gilding-metal jacket with incendiary mixture between the core point and jacket. This cartridge is for use in caliber .50 weapons only.

Duplex Cartridge. The duplex cartridge contains two special ball type bullets in tandem. The front bullet is positioned partially in the case neck, similarly to a standard ball bullet. The rear bullet, positioned completely within the case, is held in position by a compressed propellant charge. The base of the rear bullet is angled so that in flight, it follows a path slightly dispersed from that of the front bullet.

Spotter-Tracer Cartridge. The spotter-tracer cartridge is intended for use in coaxially mounted caliber .50 spotting rifles. The bullet trajectory closely approximates that of

106mm projectiles. Thus, this cartridge serves as a fire control device to verify weapon sight settings before firing 106mm weapons. The bullet contains an impact detonator and incendiary composition which identify the point of impact by flash and smoke.

Blank Cartridge. The blank cartridge is distinguished by absence of a bullet. It is used for simulated fire, in training maneuvers, and for saluting purposes. It is fired in rifles and machineguns equipped with blank firing attachments.

Grenade Cartridge. The grenade cartridge is used to propel rifle grenades and ground signals from launchers attached to rifles or carbines. All rifle grenade cartridges are distinguished by the rose petal (rosette crimp) closure of the case mouth.

Frangible Cartridge. The caliber .30 frangible cartridge, designed for aerial target training purposes, is also used in rifles and machineguns for target shooting. Caliber .30 and 7.62mm frangible cartridges are used in tank machineguns, firing single shot, for training in tank gunnery. At its normal velocity, the bullet, which is composed of powdered lead and friable plastic, will completely disintegrate upon striking a 3/16-inch aluminum alloy plate at 100 yards from the muzzle of the gun. These cartridges are not to be used on any but well ventilated indoor ranges to preclude buildup of toxic bullet dust. Inhalation of bullet dust may be injurious to health.

Incendiary Cartridge. The incendiary cartridge was designed for aircraft and ground weapon use to ignite combustible targets (e.g., vehicular and aircraft fuel tanks). The bullet contains a compressed incendiary mixture which ignites upon impact with the target. The incendiary cartridge has been superseded by the API and APIT cartridges because of their improved terminal ballistic effects.

Special Purpose Cartridge

Cartridges of various calibers. (figures. 10 through 12), which consist of different types of projectiles and bullets, are used for training and special purposes. They include the following:

(1) Caliber .22 long rifle and caliber .38 and .45 wad-cutter cartridge for target shooting.

(2) Caliber .45 blank cartridges fired in exercises to condition dogs to gun fire.

(3) Caliber .22 hornet and .410 shotgun cartridges for firing in Air Force combination (survival) weapons for hunting purposes.

(4) Caliber.45 line-throwing cartridges for firing in caliber .45 line-throwing rifles. The Navy uses these for throwing lines from ship-to-ship. The Army Signal Corps uses these for projecting signal wires over elevated terrain.

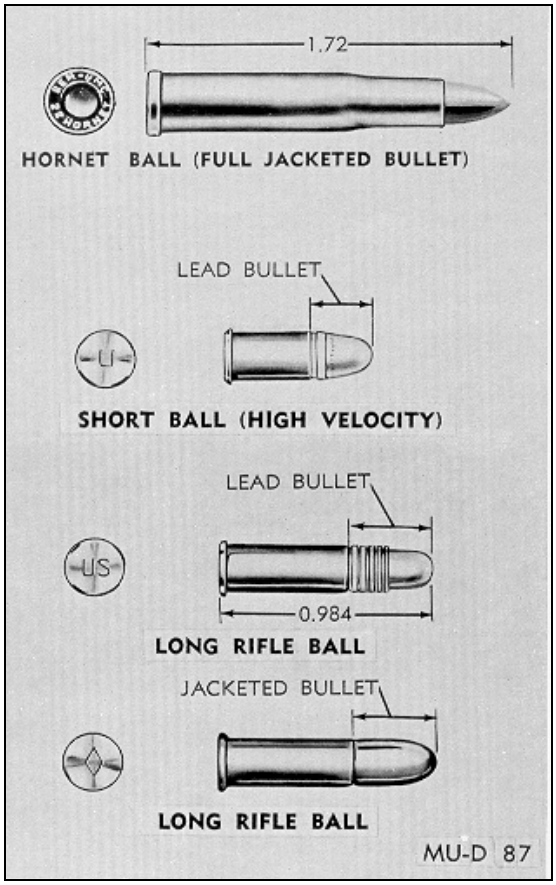


Figure 10. Caliber .22 cartridges

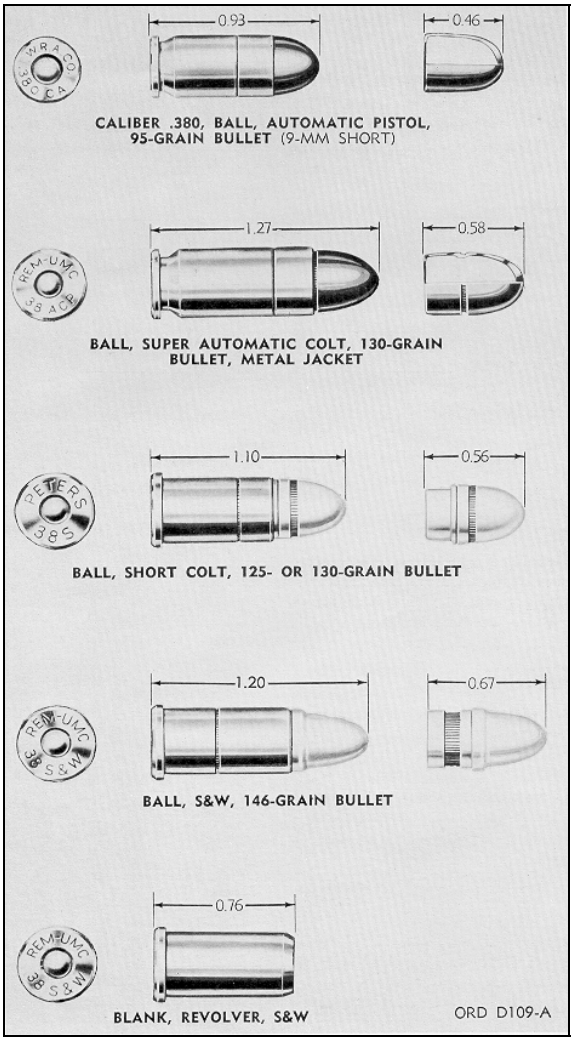


Figure 11. Caliber .38 cartridges

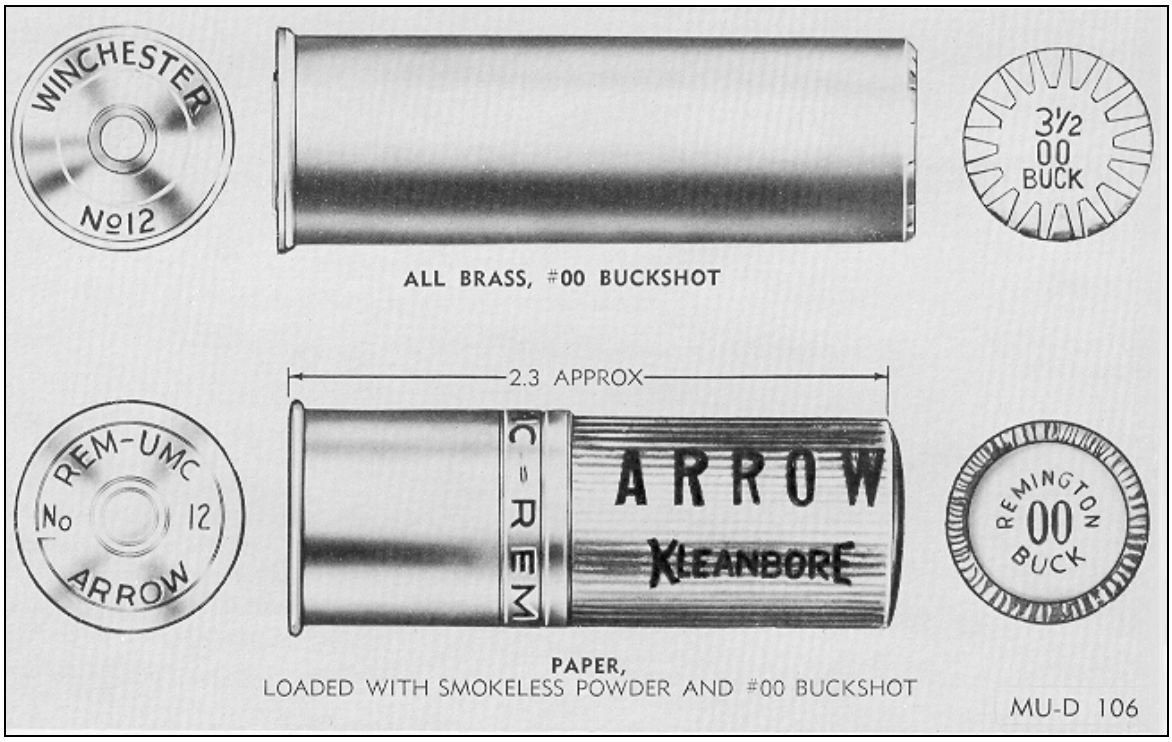


Figure 12. 12 gage shotgun shells

(5) Shotshells containing the designated shot sizes as required for the following:

12 gage #00 Buck for guard duty
12 gage #4 Buck for guerrilla purposes.
12 gage #6, 7½ and 8 shot for clay target shooting for training purposes.
.410 gage #7 shot for caliber .22/.410 survival weapons maintained by aircraft

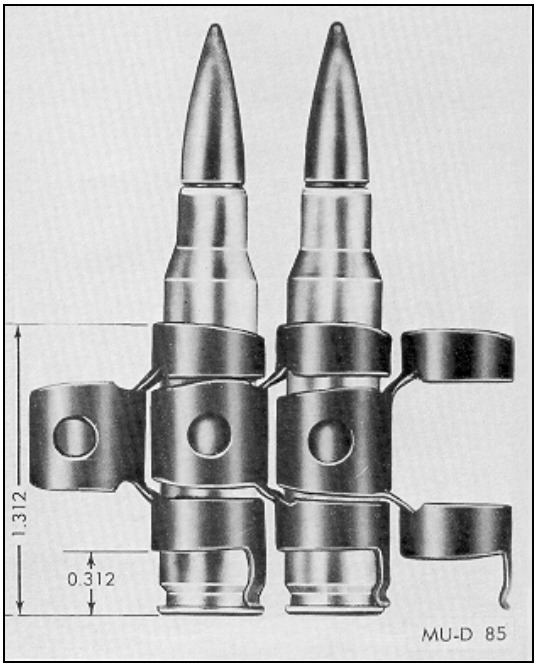


Figure 13. Linked 7.62-mm cartridges

Special purpose cartridges also include the following types of military cartridges:

(1) Dummy. The dummy cartridge is used for practice in loading weapons and simulated firing to detect flinching of personnel when firing weapons. It consists of a cartridge case and a ball bullet. Cartridge identification is by means of holes through the side of the case or longitudinal corrugations in the case and by the empty primer pocket.

(2) Dummy inert-loaded. This cartridge consists of a cartridge case, a ball bullet and inert granular material in the case simulating the weight and balance of a live cartridge. The exterior of the cartridge is identified by a black chemical finish and by the absence of a primer. This cartridge is used by installations for testing weapon function, linkage and feed chutes.

(3) High-pressure test. High-pressure test ammunition is specially loaded to produce pressures substantially in excess of the maximum average or individual pressures of the corresponding service cartridge. This cartridge is not for field issue. It is used only by armorers and weapons mechanics for proof firing of weapons (rifles, pistols, machine guns) at place of manufacture, test and repair. Because of excessive pressures developed by this type of ammunition, and the potential danger involved in firing, proofing of weapons is conducted only by authorized personnel from fixed and shielded rests by means of a lanyard or other remote control methods.

Metallic Links and Clip

Metallic links. (figures. 13 and 14) are used with caliber .30, caliber .50, 5.56mm, 7.62mm and 20mm cartridges in machine guns. The links are made of steel, surface treated for rust prevention. They are used to assemble cartridges into linked belts of 100 to 750 cartridges per belt. The links must meet specific test and dimension requirements to assure satisfactory ammunition feed and functioning in the machine gun under all training and combat service conditions.

Different configurations of cartridge clips. These permit unitized packages of ammunition. This facilitates transfer of cartridges to appropriate magazines for caliber .30, 7.62mm and 5.56mm rifles. The caliber .30 eight-round clip feeds eight cartridges as a unit into the receiver of the rifle. The caliber .45 clip feeds three cartridges as a unit into the revolver cylinder. Five-round and eight-round clips are used with caliber .30 cartridges; five-round clips with 7.62mm cartridges; ten- round clips with caliber .30 carbine and 5.56-mm cartridges; and three-round clips with caliber .45 cartridges.

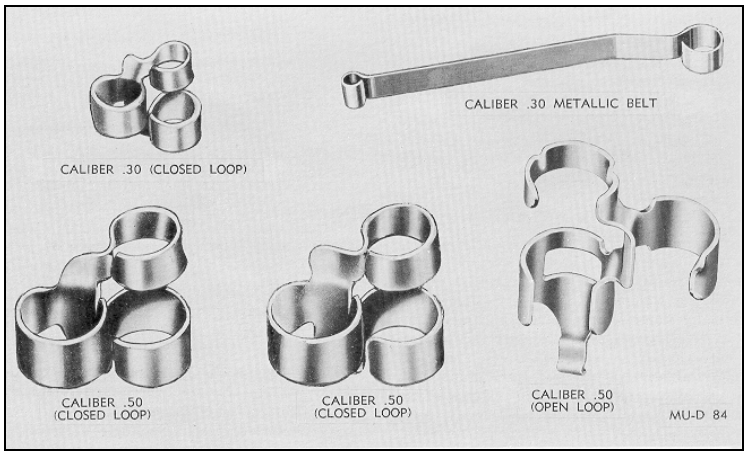


Figure 14. Links for caliber .30 and caliber .50 ammunition

Identification Markings. Each outer shipping container and all inner containers are fully marked to identify the ammunition. Wire- bound boxes are marked in black and ammunition boxes are painted olive drab, with markings in yellow. When linked ammunition is functionally packed, component lot numbers are replaced by a functional lot number. Typical packing and identification markings are illustrated in figures 15 through 17.

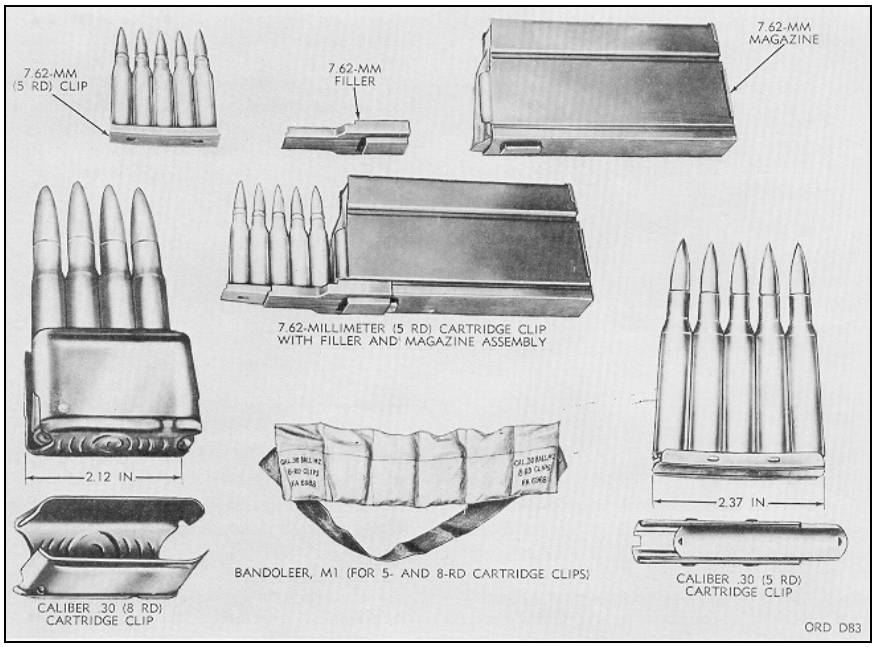


Figure 15. Cartridges, links, belt, cartons, bandoleers and ammunition box

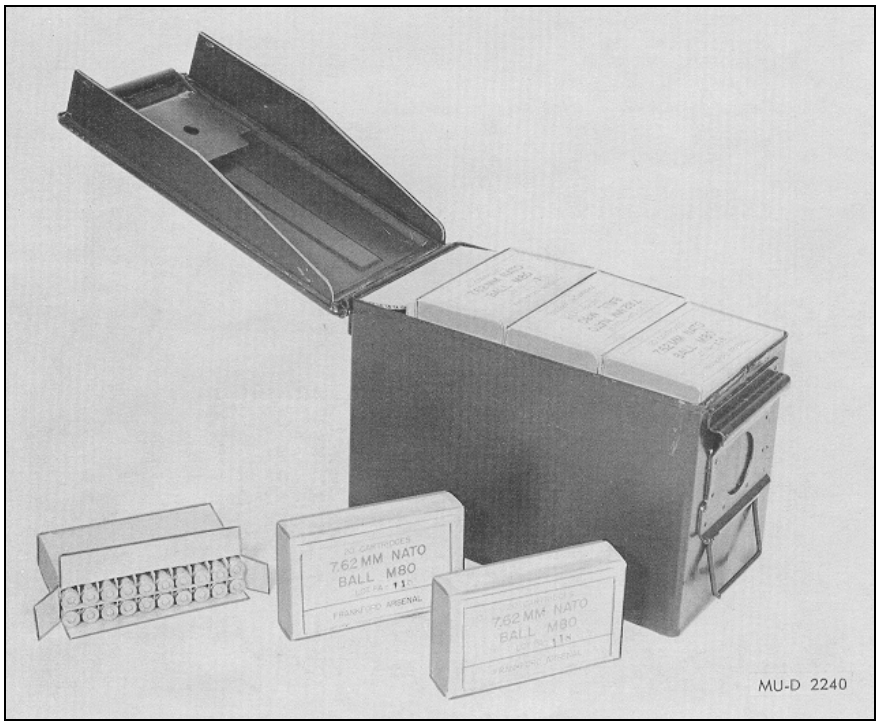


Figure 16. Cartridges, link belt, cartons, bandoleers and ammunition box

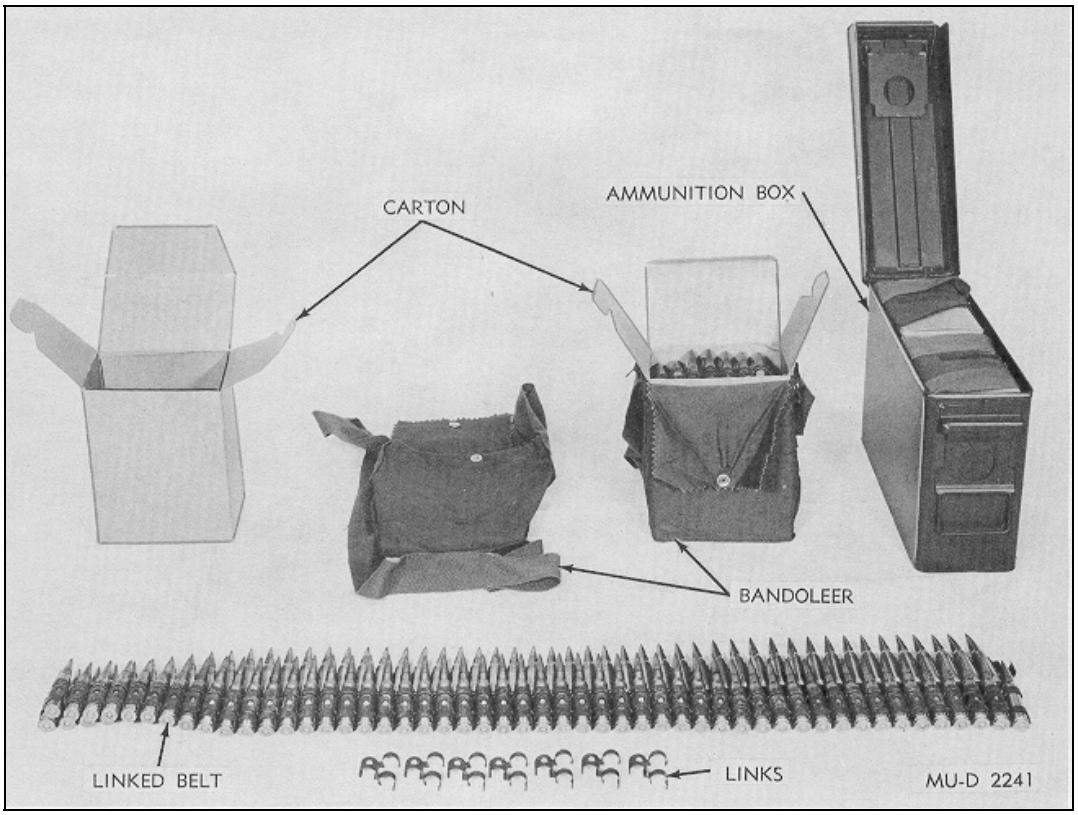


Figure 17. Cartridges, link belt, cartons, bandoleers and ammunition box

Care, Handling and Preservation

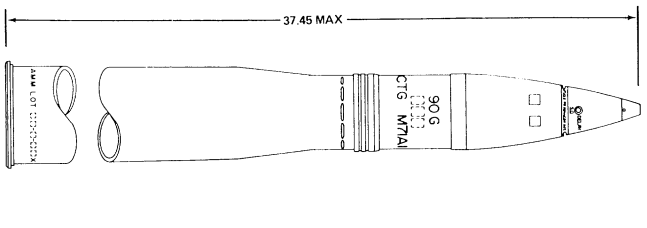
Small-arms ammunition is comparatively safe to handle. It is packed to withstand transportation, handling and storage conditions normally encountered in the field. However, consideration should be given to general handling precautions pertaining to ammunition and explosives.

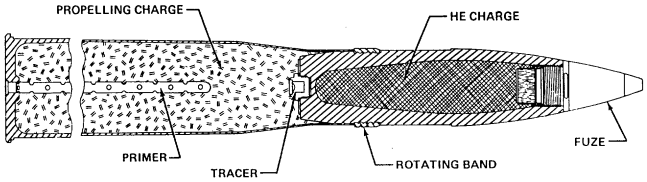
Reference: This data is a reprint of Chapter 3, TM 9-1300-200, *Ammunition General,* October 1969

CTT18

LARGE CALIBER (37MM AND LARGER), HE

CARTRIDGE, 90mm, HE, M71; HE-T, M71A1





Projectile. The hollow steel forged projectile has a boat-tailed base and a streamlined ogive. The fuze continues the streamline of the projectile. Fuze cavity may be normal or deep cavity type.

Components. The filler for this round is 2.15 pounds (1.86 pounds, deep cavity) of Composition B or TNT. A tracer is threaded into the projectile base (M71A1). A point-detonating fuze is assembled to the projectile. Loaded projectile weights fall into one of three weight zones. The loaded and fuzed projectile is assembled to an M19 or M19B1 Cartridge Case containing M1, M6, or M15 propellant.

Difference Between Models. M7A1 has a tracer; M7 does not. M7A1 has M1 propellant resulting in lower velocity; M71 has M6 or M15 propellant.

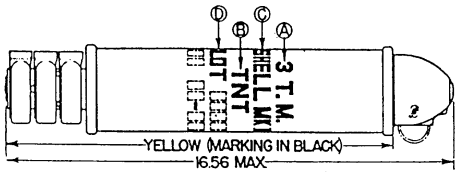
Length ..... 37.45 inches
Diameter ..... 3.62 inches
Weight ..... M7, 141.19 - 41.93 pound
M7A1, 38.80 - 39.54 pound
Filler ..... TNT or Composition B
Weight of filler
Normal Fuze well ..... 2.15 pound
Deep Cavity fuze well ..... 1.68 pounds
Fuze ..... PD M48, M48A1, M51A5, M557;
MT M43A3;
MTSQ M520 series, M564
Propelling Charge ..... M1, 5.33 pounds
M6 & M15, 7.31 pounds
Color ..... Olive Drab with yellow markings

Reference: TM 9-1300-203, *Artillery Ammunition*, April 1977

CTT22

MORTARS, HE

TRENCH MORTAR, HE, 3-INCH, MK I, MK II, AND PRACTICE MK III



A - CALIBER OF MORTAR
B - TYPE OF FILLER
C - MODEL OF SHELL
D - AMMUNITION LOT NUMBER

General: The 3-inch trench mortar is often referred to as the Stokes mortar.

Shell, Mark I. This is made up of a cylindrical steel casing, into which a forged steel base, and head, are screwed. To the base is attached a short steel tube, or cartridge container which has 16 holes drilled in it to permit the flash from the cartridge to ignite the powder rings. The head has a hole through the center which permits the insertion of the drawn steel booster casing and has a threaded recess for the fuze. This recess is plugged with a threaded fuze hole plug to protect the threads from dirt and damage during storage and shipping. Both shells are loaded with a high explosive charge of either TNT or Nitrostarch.

Shell, Mark II. This differs from the Mark I only in the shell body construction, as the casing, head, and base are welded together. Both shells are loaded with a high explosive charge of either TNT or Nitostarch.

Practice Shell, Mark III. This is made up of a cast-iron body with a threaded hole in the upper end for assembling a dummy fuze similar to the trench-mortar fuze, Mark VI. The complete round consists of one Shell, Mark III, a dummy fuze, and propellant charges as used with the high explosive round.

Fuze, Mark VI. This is an "all-ways acting" fuze, designed to function upon impact, regardless of the manner in which the shell strikes the ground. The safety pin is withdrawn by means of a safety pin ring immediately before dropping the shell into the muzzle of the gun.

Mark I Booster. This is made up in cartridge form and is placed in the body casing in the shell, upon assembling the round immediately before firing. The booster consists of a paper cartridge which supports the detonator. The detonator is a commercial detonator or a No. 8 blasting cap.

Propellant Charge. This consists of one green paper brass-tipped cartridge, loaded with 120 grains of sporting ballistite powder, and from one to three ring-shaped silk bags, each containing 110 grains of M.R. 31 ballistite powder.

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944*, Hand Book of the 3-inch Stokes Trench Mortar*, Jul 1921

APPENDIX E—SITE SPECIFIC ACCIDENT PREVENTION PLAN

Site Specific Accident Prevention Plan

The purpose of this appendix is to augment the programmatic Accident Prevention Plan (APP), Appendix D of the PWP (Alion 2005) by presenting site-specific information and any procedural deviations. The Programmatic APP will accompany this SS-WP during field activity.

SITE-SPECIFIC Accident Prevention Plan

Client: U.S. Army Corps of Engineers Baltimore

Project Name/Number: Site Inspection of Fort Niagara

Site Location/Address: Fort Niagara, Romulus, Niagara County, New York (See Figure 1a – General Installation Site Map, Appendix A)

Work Description: Site Inspection of this Formally Used Defense Site (FUDS) will include site reconnaissance, limited geophysical surveys and soil and sediment sampling.

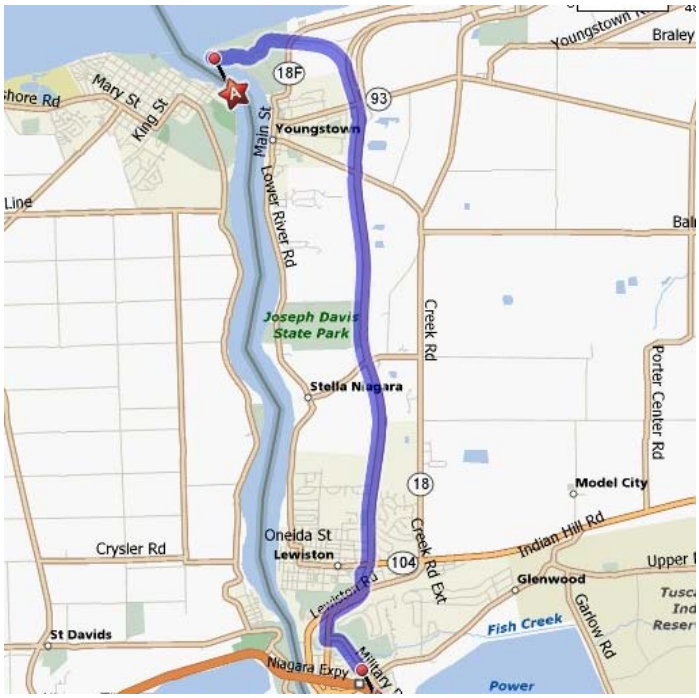
APPROVALS:

This Addendum to the project Work Plan and APP has been prepared under the supervision and review of a CIH certified by the American Board of Industrial Hygiene (ABIH).

Safety and Health Manager: Todd M Nance

Todd Nance, CIH (ABIH No. 7541CP)

Date



Hospital Route Map

MEDICAL EMERGENCY:

Distance to Nearest Hospital: 9.5 miles, 13 minutes

Emergency: Call 911
Name: Mount Saint Mary's Medical
Hospital Phone: 716-297-4800
Hospital Address: 5300 Military Road Lewiston, NY 14092

Route to Hospital:

START	**1:** Start out going EAST on SCOTT AVE.	0.2 mi
	2: Turn SLIGHT LEFT.	0.4 mi
	3: Enter next roundabout and take 2nd exit onto ROBERT MOSES STATE PKWY S.	7.3 mi
RAMP	**4:** Take the RT-104 W ramp toward I-190 W/CANADA/BUFFALO.	0.3 mi
	5: Turn SLIGHT RIGHT onto NY-104/LEWISTON RD.	0.8 mi
	6: Turn LEFT onto MILITARY RD/NY-265.	0.6 mi
END	**7:** End at 5300 Military Rd Lewiston, NY 14092	

TABLE E-1. EMERGENCY CONTACT INFORMATION:

Contacts	Name	Phone Number(s) work/cell
Program Manager	Roger Azar	Cell: 301-399-7304
Deputy Program Manager	Corinne Shia	703-259-5147 Cell: 703-217-3810
Project Manager	Rick Swahn	703-259-5286
Safety and Health Manager	Todd Nance	919-406-2119
Task Manager	Sarah Moore	703-259-5155 Cell: 703-582-1381
Site Safety and Health Officer (SSHO)	Curtis Mitchell	Cell: 301-399-7152
Client Contact	Julie Kaiser – Baltimore District	410-962-4006
	David Macpherson – Buffalo District	716-879-4294
	Liza Finley – Baltimore District	410-962-2683
	Paul Greene	410-322-2745
Regulatory Contact (NYSDEC)	Chek Ng	518-402-9620
Manager/ Property Owner	Jere Brubaker/Old Fort Niagara State Park	716-745-7611
Manager/ Property Owner	David Clarke/Office of Parks, Recreation and Historic Preservation, Fort Niagara	716-879-4263
Fort Niagara Coast Guard	1 Scott Ave. Youngstown, NY	Phone # (716) 745-3328 Fax: (716) 745-9620
Hospital	Mt Saint Mary's, Lewiston, NY	(716) 298-2325 or 716-297-4800
Poison Control		800-222-1222
National Response Center		800-424-8802
Alion/HFA Medical Services	Jody Riggs	703-918-4487

HAZARDS OF CONCERN: Check as many as are applicable. See Section 6 of Programmatic APP (Alion 2005) for Chemical, Physical and Biological Hazards.

(X) Heat Stress ( ) Reactive ( ) Oxygen Deficient **(X) Insect Bite**
(X) Cold Stress ( ) Noise ( ) Corrosive ( ) Snake Bite
( ) Explosion/Flammable ( ) Inorganic ( ) Toxic ( ) Excavations
(X) Biological ( ) Organic ( ) Inert **(X) Vegetation**
( ) Radiological ( ) Confined Space (see Section 9 of Programmatic APP)
( ) Volatile **(X) Other, specify:** Potential MEC. Site workers will practice MEC avoidance. Any suspected MEC will be left alone. A MEC avoidance team (provided by Alion/HFA) will identify routes free of anomalies to a sampling area. The MEC team will also ascertain that sample locations are free of anomalies. Once the MEC team has identified that a sampling area is free of anomalies, the MC sampling team will then collect samples for analysis. Soil samples will be collected from areas identified by CSM or the MEC survey to be suspect or contain high concentrations of MEC and/or MC. Activity Hazard Analysis tables have been completed for the proposed field work (to include Site Inspection and Reconnaissance and general sample collection) and are included at the end of this chapter.

PATHWAYS:

( ) Air **(X) Dust/Soil** ( ) Surface Water ( ) Sediment ( ) Groundwater ( ) Other

OVERALL HAZARD EVALUATION: ( ) High ( ) Medium **(X) Low** ( ) Unknown

JUSTIFICATION (brief narrative of how work activities may encounter hazards and their controls, include known or anticipated contaminant concentrations):
Site workers may be exposed to chemicals of concern (metals and explosives) present in site soil during sampling activities. Site sampling will occur in wooded/overgrown areas that may contain biting insects and/or poisonous plants.

FIRE/EXPLOSION POTENTIAL: ( ) High **(X) Medium** ( ) Low ( ) Unknown

SURROUNDING POPULATION: **(X) Residential** ( ) Industrial ( ) Rural ( ) Urban

ANTICIPATED LEVEL OF CHEMICAL EXPOSURE:

Low levels.

CONTINGENCY PLANS: Summarize below (Evacuation, assembly point, contingency leader)

During an emergency, site workers will gather at an assembly point (to be established during daily health and safety meeting). The SSHO will take the role of contingency leader.

DEVIATIONS/VARIATIONS FROM APP:

No deviations or variation from the Health and Safety Plan APP is permitted without specific written approval from the SHM, Program SSHO and PM.

Do Hazardous Waste Site Workers and Supervisor (s) have Documentation of Required Training and Medical Exams? **(X) Yes** ( ) No, Explain

Do at least two people in the field have current Cardiopulmonary Resuscitation (CPR) and First Aid qualifications? **(X) Yes** ( ) No, Explain

Sarah Moore, Ben Claus, and HFA UXO technician.

PROTECTIVE EQUIPMENT: Protective equipment should be specified by the type of task and site (e.g., soil boring and sampling at landfill). Indicate type and/or material, as necessary. Use additional pages as necessary.

Primary
TASKS: **Site Sampling, Site Reconnaissance, and Geophysical Survey**
INITIAL LEVEL: A - B - C - **(D)** - Modified (Circle applicable)
UPGRADE CRITERIA: **None – No air monitoring equipment will be used**

Respiratory: **(X) Not needed** Protective Clothing: **(X) Not Needed**

( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
( ) Other:_____

( ) Encapsulating Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Coverall: _____

Head and Eye: ( ) Not needed ( ) **Other:** _____

(X) Safety Glasses:_____
( ) Face Shield:_____
( ) Goggles: _____
( ) Hard Hat**:**_____
( ) Hearing Protection: _____
( ) Other: Specify below
_____

Gloves: ( ) Not needed
( ) Undergloves: _____
(X) Gloves: **Nitrile, during sampling**
( ) Overgloves: _____

Boots: ( ) Not Needed
Boots: **Work Boots, Steel toe boots not required during Geophysical Surveying and soil sampling**
Overboots: _____

Contingency
TASKS: **NONE**
LEVEL: A - B – **(C)** – D - Modified (Circle applicable)
UPGRADE CRITERIA: **Personal Protective Equipment (PPE) Upgrade not permitted under this /APP**

Respiratory: **(X) Not needed**
( ) SCBA, Airline: _____
( ) APR: _____
( ) Cartridge: _____
( ) Escape Mask: _____
( ) Other:_____

Head and Eye: **(X) Not needed**
( ) Safety Glasses:_____
( ) Face Shield:_____
( ) Goggles: _____
( ) Hard Hat:_____
_____
( ) Hearing Protection: _____
_____

Protective Clothing: **(X) Not Needed**
( ) Encapsulating Suit: _____
( ) Splash Suit: _____
( ) Apron: _____
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Coverall: _____
( ) Other: _____

Gloves: **(X) Not needed**
( ) Undergloves: _____
( ) Gloves: _____
( ) Overgloves: _____
( ) Other: Specify below

Boots: ( ) Not Needed
Boots:_____ Overboots:_____

MONITORING EQUIPMENT: Monitoring equipment should be specified by task and type of site. Indicate type, as necessary. Attach additional sheets, as necessary.

TASKS: **NONE**

See APP for Calibration Procedures or attach if different. See 8-1 from the Programmatic APP (Alion 2005) for specific monitoring requirements and action levels.

INSTRUMENT	ACTION GUIDELINES
Combustible Gas Indicator **(X) Not needed**	0-10% LEL Continue. 10-20% LEL Potential explosion hazard, continuous monitoring. >20% LEL Explosion hazard; interrupt task/evacuate.
Oxygen (O_2) Percentage:	20.8% - O_2 normal. <20.8% - O_2 deficient, investigate cause. <19.5% O_2 Interrupt task/evacuate.

Type _____

Photoionization Detector Specify
( ) 11.7 ev ( ) 10.2 ev ( ) 09.8 ev ( ) __ ev
Type: Photovac or MiniRAE (circle applicable or list other):
(X) Not needed

Flame Ionization Detector Specify:
Type Photovac or Organic Vapor Analyzer (OVA) (circle applicable or list other):
(X) Not needed

Detector Tubes Monitor Specify: (Chemical, Range) COMMENTS (Interferences)
Type _____
(X) Not needed

Dust Monitor Specify:
Type _____
(X) Not needed

Radiation Survey Meter

	> Background	Contact Radiation Safety Officer (RSO)/SSHO and PM
	3 x Background	Notify CIH and stop work
	2.5mrem/hr	Interrupt task/evacuate

(X) Not needed Note: Annual Exposure not to exceed 100 mrem/yr or 50 urem/hr average

Other Specify:

DECONTAMINATION PROCEDURES:

Summarize personnel decontamination/containment and disposal method
( ) Not needed

Nitrile Gloves will be disposed of after sampling as general refuse.

Summarize equipment decontamination/containment and disposal method
( ) Not needed

Sampling equipment will be dedicated and disposed of following sample collection as general refuse following sample collection.

Summarize heavy equipment decontamination/containment and disposal method
(X) Not needed

TABLE E-1 SITE INSPECTION SAMPLING (SOIL & SEDIMENT) ACTIVITY HAZARD ANALYSIS		
PRINCIPLE STEP	**POTENTIAL SAFETY/HEALTH HAZARDS**	**RECOMMENDED CONTROLS**
All Activities Related to soil sampling	Slips, Trips, Falls	Keep work area free of excess material and debris.
		Remove all trip hazards by keeping materials/objects organized and out of walkways.
		Be aware of uneven surfaces while walking around sampling locations.
		Keep work surfaces dry when possible.
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.
		Stay aware of footing and do not run.
	Heat/Cold Stress	Take breaks as needed.
		Be aware of weather conditions and dress appropriately.
		Consume adequate food/beverages.
		If possible, adjust work schedule to avoid heat/cold stresses.
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	Inspect work areas when arriving at a sampling site to identify hazard(s).
		Use insect repellant as necessary.
		Stay alert and safe distance away from biological hazards.
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if probability of encountering snakes, ticks, poison ivy or oak.
		Workers with allergies should carry antidote kits, if necessary.
	Traffic (including pedestrian)	Notify attendant and/or site owner/manager of work activities and location.
		Set up exclusion zone surrounding work area.
		Wear appropriate PPE including high visibility clothing such as reflective vest if in high traffic areas.
		Inspect area behind vehicle prior to backing and use spotter.
	Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.
		Stop work if hazardous conditions are identified.
	Physical Hazard (Electrical)	Identify electrical utility hazards prior to sampling.
		Inspect work areas for spark sources, maintain safe distances, properly illuminate work areas, and provide barriers to prevent inadvertent contact.
		Maintain minimum clearance distances for overhead energized electrical lines as specified in the GHASP.
	Physical Hazards (Weather)	Monitor radio for up-to-date severe weather forecasts.
		Discontinue work during thunderstorms and severe weather events.
	MEC Hazards	Follow established MEC avoidance protocols when performing intrusive sampling

		activities. If MEC is discovered or suspected, use existing access roads to retract from the MEC after completion of sample collection activities.
	Chemical Hazards (including MEC)	Perform environmental monitoring as required in SSHASP. Wear appropriate PPE (including nitrile gloves) as indicated in the SSHASP.
	Biological Hazards (Blood borne pathogens)	Wear proper PPE (including nitrile gloves) and a face shield or goggles when sampling sludge or sediments (if appropriate).
		Wash with soap and water as soon as PPE is removed or when contact or exposure has occurred.

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS
• Vehicle • hand tools	• Inspect PPE prior to each use • Inspect vehicle daily • Use appropriate PPE • Underground hazards require clearance prior to execution • Work area upon arrival on site • Inspect emergency equipment/supplies daily (first aid kit, eye wash, fire extinguisher)	• Use and limitations of PPE • AHA-review • SSHP-review • Valid driver's license • Use and limitations of PPE • Operator will be trained in equipment used • Lifting • AHA-review • SSHP-review • First aid/CPR—at least 2 people on site • Hazardous waste sites require 8-hour annual refresher and supervisor training

TABLE E-2 SITE INSPECTION AND RECONNAISSANCE ACTIVITY HAZARD ANALYSIS		
PRINCIPLE STEP	**POTENTIAL SAFETY/HEALTH HAZARDS**	**RECOMMENDED CONTROLS**
Driving to site and between site sampling / reconnaissance locations.	Automobile accidents/personal injury	Follow posted speed limits and obey traffic/roadway signs.
		Always wear your seat belt when driving. In some states it may be the law.
		Follow the "Rules of the Road" including: use your turn signals, use the 2-second rule[1] when following behind a vehicle, and allow vehicles the right of way when they are turning or entering intersections in front of you.
		Review/make yourself familiar with maps and driving directions before beginning the drive to the Site. Do not attempt to drive and review maps/directions at the same time. Pull over and stop your vehicle before looking at maps/directions.
		Do not perform reconnaissance or inspections while driving. Your vehicle should be parked in a safe location when viewing or surveying the Site and vicinity.
		Avoid sudden turns and stops, don't drive recklessly.
		In inclement weather, drive as road conditions allow but at least 5-10 mph below the posted speed limit.
		If feeling drowsy or sleepy do not drive. Below[2] are warning signs of drowsiness or fatigue. Pull over in a safe place if you experience any of these signs to rest.
		Never operate a vehicle under the influence of alcohol or illegal substances
		Keep your eyes on the road.
		Check mirrors on a regular basis during driving so that you aware of other vehicles behind you.
All Activities Related to Site Inspection and Reconnaissance	Slips, Trips, Falls	Keep work area free of excess material and debris.
		Remove all trip hazards by keeping materials/objects organized and out of walkways.
		Be aware of uneven surfaces while walking or getting in and out of the vehicle.
		Keep work surfaces dry when possible.
		Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces.
		Install rough work surface covers where possible.
		Stay aware of footing and do not run.
	Heat/Cold Stress	Take breaks as needed.
		Be aware of weather conditions and dress appropriately.
		Consume adequate food/beverages.
		If possible, adjust work schedule to avoid heat/cold stresses.
	Biological Hazards: Insects, Snakes, Wildlife, Vegetation	Inspect work areas when arrive at site to identify hazard(s).
		Use insect repellant as necessary.
		Stay alert and safe distance away from biological hazards.

TABLE E-2 SITE INSPECTION AND RECONNAISSANCE ACTIVITY HAZARD ANALYSIS				
PRINCIPLE STEP	**POTENTIAL SAFETY/HEALTH HAZARDS**	**RECOMMENDED CONTROLS**		
		Wear appropriate PPE including work gloves, long sleeves and pants, and snake chaps if probability of encountering snakes, ticks, poison ivy or oak.		
		Workers with allergies should carry antidote kits, if necessary.		
	Traffic (including pedestrian)	Notify attendant and/or site owner/manager of work activities and location.		
		Utilize cones, signs, flags and/or other traffic control devices as outlined in the Traffic Control Plan.		
		Set up exclusion zone surrounding work area.		
		Wear appropriate PPE including high visibility clothing such as reflective vest.		
		Inspect area behind vehicle prior to backing and use spotter.		
	Fire/Explosion	Ensure type ABC, fully charged fire extinguisher on-site.		
		Stop work if hazardous conditions are identified.		
	Physical Hazard (Electrical)	Identify electrical utility hazards prior to reconnaissance if possible.		
		Inspect work areas for spark sources, maintain safe distances, properly illuminate work areas, and provide barriers to prevent inadvertent contact.		
		Maintain minimum clearance distances for overhead energized electrical lines as specified in the GHASP.		
	Physical Hazards (Weather)	Monitor radio for up-to-date severe weather forecasts.		
		Discontinue work during thunderstorms and severe weather events.		
	MEC Hazards	Follow established MEC avoidance protocols when performing site reconnaissance activities. If MEC is discovered or suspected, use existing access roads to retract from the area containing MEC after documenting coordinates and collecting samples (if appropriate).		
EQUIPMENT TO BE USED		**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**	
• Vehicle		• Inspect PPE prior to each use • Inspect vehicle daily	• AHA-review • SSHP-review • Valid driver's license • Use and limitations of PPE • First aid/CPR—at least 2 people on site • Hazardous waste sites require 8-hour annual refresher and supervisor training	

1. "Two second rule" works by the driver choosing an object along the road in front of them. As the vehicle in front of them passes it, count aloud, slowly, "one thousand one, one thousand two." If you reach the object before you finish counting, you are following too closely. Allow the other vehicle to get further ahead. In bad weather, increase the count to three or four seconds for extra space.

TABLE E-2 SITE INSPECTION AND RECONNAISSANCE ACTIVITY HAZARD ANALYSIS		
PRINCIPLE STEP	**POTENTIAL SAFETY/HEALTH HAZARDS**	**RECOMMENDED CONTROLS**

2. Warning signs of drowsiness or fatigue:

- can't remember the last few miles driven
- have wandering or disconnected thoughts
- experience difficulty focusing or keeping your eyes open
- have trouble keeping your head up
- drift from lanes or hit a rumble strip
- yawn repeatedly
- tailgate or miss traffic signs
- find yourself jerking your vehicle back into lane

If you find yourself experiencing the above, you may be suffering from drowsiness or fatigue. Continuing to drive in this condition puts you at serious risk of being involved in a fatigue-related crash. You should pull over in a safe place and get some rest before resuming your trip.

TABLE E-3 SONAR DREDGE/DIP SPOON SAMPLING ACTIVITY HAZARD ANALYSIS		
Task	**Potential Hazards**	**Hazard Control Measures**
MOBILIZATION / DEMOBILIZATION	Physical Hazards (slips, trips, fall, cuts, etc.)	• Clear walkways, work areas of equipment, tools, debris. • Watch for accumulation of water on work surfaces. • Mark, identify, or barricade obstructions. • Wear cut-resistant work gloves when the possibility of lacerations or other injury caused by sharp or protruding objects occurs.
	Physical Hazards (Material Handling, Moving, Lifting)	• Observe proper lifting techniques. • Obey sensible lifting limits (60 lb maximum per person manual lifting). • Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads. • Use two or more persons for heavy bulk lifting.
	Physical Hazards (Vehicle and Pedestrian Traffic)	• Use orange traffic cones where necessary. • Use reflective warning vests if exposed to vehicular traffic. • Locate staging areas in locations with minimal traffic.
	Physical Hazards (Cold Stress /Heat Stress)	• Monitor of cold/heat stress as recommended in Section Appendix D of Programmatic Work Plan.
	MEC Hazard	• Practice site reconnaissance with a trained, experienced MEC specialist capable of recognizing MEC hazards. If MEC is discovered, use existing access roads to retract from the MEC.
	Biological Hazards (insects, poisonous plants, ticks)	• Wear protective outer clothing and insect repellant to avoid insect bites and ticks. • Wear long sleeve shirts when working in areas with poison ivy or oak. • Workers with allergies should carry antidote kits, if necessary.

TABLE E-3 SONAR DREDGE/DIP SPOON SAMPLING ACTIVITY HAZARD ANALYSIS		
Task	**Potential Hazards**	**Hazard Control Measures**
SAMPLING ACTIVITIES	Physical Hazards (slips, trips, fall, cuts, etc.)	• Clear walkways, work areas of equipment, tools, debris. • Watch for accumulation of water on work surfaces. • Mark, identify, or barricade obstructions. • Wear cut-resistant work gloves when the possibility of lacerations or other injury caused by sharp or protruding objects occurs.
	Physical Hazard (Electrical)	• Identify electrical utility hazards prior to sampling. • Inspect work areas for spark sources, maintain safe distances, properly illuminate work areas, and provide barriers to prevent inadvertent contact. • Maintain minimum clearance distances for overhead energized electrical lines as specified in the GHASP.
	Physical Hazards (Weather)	• Monitor radio for up-to-date severe weather forecasts. • Discontinue work during thunderstorms and severe weather events.
	Physical Hazards (Cold Stress /Heat Stress)	• Monitor of cold/heat stress as recommended in Appendix D of Programmatic Work Plan.
	MEC Hazards	• Follow established MEC avoidance protocols when performing intrusive sampling activities. If MEC is discovered or suspected, use existing access roads to retract from the MEC.
	Chemical Hazards (including MEC)	• Perform environmental monitoring as required in Appendix D of Programmatic Work Plan. Wear appropriate PPE as indicated in Appendix D of Programmatic Work Plan.

TABLE E-3 SONAR DREDGE/DIP SPOON SAMPLING ACTIVITY HAZARD ANALYSIS		
Task	**Potential Hazards**	**Hazard Control Measures**
	Biological Hazards (Bloodborne pathogens)	• Wear proper PPE including nitrile gloves and a face shield or goggles when sampling sludge. • Wash with soap and water as soon as PPE is removed or when contact or exposure has occurred.
	Biological Hazards (insects, poisonous plants, ticks)	• Wear protective outer clothing and insect repellant to avoid insect bites and ticks. • Wear long sleeve shirts when working in areas with poison ivy or oak. • Workers with allergies should carry antidote kits, if necessary.
Dip Spoon SAMPLING	Dip Spoon Sampling	• Sampling will only occur if the area can be cleared of MEC
	Physical Hazard (Slips, Trips, and Falls, including Falls Overboard)	• Monitor radio for up-to-date severe weather forecasts. • Discontinue work during thunderstorms and severe weather events.

TABLE E-4 BOATING ACTIVITY HAZARD ANALYSIS		
Task	**Potential Hazards**	**Hazard Control Measures**
MOBILIZATION / DEMOBILIZATION	Physical Hazards (slips, trips, fall, cuts, etc.)	• Clear walkways, work areas of equipment, tools, debris. • Watch for accumulation of water on work surfaces. • Mark, identify, or barricade obstructions. • Wear cut-resistant work gloves when the possibility of lacerations or other injury caused by sharp or protruding objects occurs.
	Physical Hazards (Material Handling, Moving, Lifting)	• Observe proper lifting techniques. • Obey sensible lifting limits (60 lb maximum per person manual lifting). • Use mechanical lifting equipment (hand carts, trucks, etc.) to move large awkward loads. • Use two or more persons for heavy bulk lifting.
	Physical Hazards (Boat operation)	• Observe boating rules and courtesy to other boats. • Use/have reflective life vests and other safety items (flares, etc.).
SAMPLING ACTIVITIES	Physical Hazard (Slips, Trips, and Falls, including Falls Overboard	• SSHO will inspect the boat prior to operation. The SSHO will ensure the numbers of PFD's is equal to or greater than the number of passengers on board. • No personnel will embark or disembark the vessel without the direction of the SSHO. SSHO will ensure passengers are wearing PFD's while on deck. At the request of the SSHO, personnel will be seated. • Passengers will stay seated until boat is docked. Ensure three point contact whenever possible or practical • A Type IV throwable device will be readily available onboard.
	Physical Hazards (Cold Stress /Heat Stress)	• Monitor of cold/heat stress of personnel.

TABLE E-4 BOATING ACTIVITY HAZARD ANALYSIS		
Task	**Potential Hazards**	**Hazard Control Measures**
	MEC Hazards	• Follow established MEC avoidance protocols when performing intrusive sampling activities. If MEC is discovered or suspected, egress from the area. • Sampling activities will not occur unless clearance of the sampling area has been completed.
	Chemical Hazards (including MEC)	• Perform environmental monitoring as required in SSHASP. Wear appropriate PPE as indicated in the SSHASP.
BOATING ACTIVITIES	Vessel Operation	• The Niagara Region Fishing Charters will supply an appropriate boat for the waterway geophysical survey. Field team members will follow all instructions from the boat captain when mobilizing to and conducting field activities for MRS 1. • The team will file a float plan before launching. • In the event that the Niagara Region Fishing Charters vessel is unavailable; an alternative local charter has been identified. • The team will ensure adequate communication with the emergency officials is available before leaving the dock.
	Physical Hazards (Weather)	• Monitor radio for up-to-date severe weather forecasts. • Discontinue work during thunderstorms and severe weather events.

APPENDIX F—LOGS AND FORMS USED DURING THE SITE INSPECTION

ACCIDENT PREVENTION PLAN REVIEW RECORD

SITE: Fort Niagara

Project No. C02NY061303

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

HEALTH AND SAFETY PLAN REVIEW RECORD

SITE: _____

ALION Project No._____

I have read the Health and Safety Plan (s) 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

HEALTH AND SAFETY ACTIVITY REPORT

Site: Fort Niagara Location: Niagara Falls, NY

Weather Conditions: _____ Onsite Hours: From _____ To _____

Morning Briefing Topic:

_____

_____

General Activities Complete:

_____

_____

Morning Briefing Attendance: _____ _____

_____ _____ _____

_____ _____ _____

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: _____ Date: _____

Site Health and Safety Supervisor

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

SITE ENTRY AND EXIT LOG

Project/Site : _____

Project No.: _____

Date	Name	Representing	Time In	Time Out

Alion Science and Technology Corporation

DAILY QUALITY CONTROL REPORT

Report Number:		Date:
Project Name: Fort Niagara		Contract Number: W912DY-04-D-0017
Location of Work:		
Description of Work: Conduct Site Inspection by collecting environmental samples,		
performing reconnaissance, photographing site, etc.		
Weather:	Rainfall:	Temperature: Min. Max.
1. Work performed today by Alion.		
Reconnaissance Acreage Discussion:		
Samples Collected:		
Field Tests:		
Calibration of Instruments:		
Other:		
2. Work performed today by Subcontractors.		
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)
4. List type and location of tests performed and results of these tests.
5. List material and equipment received.
6. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
7. Off-site surveillance activities, including action taken.
8. Job Safety. (Report safety violations observed and actions taken)
9. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)

Alion Science and Technology Corporation'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.

Quality Control System Manager (Sign and Print Name)

FIELD CALIBRATION FORM - YSI

(pH, CONDUCTIVITY, TURBIDITY)

Site Name:_____

CALIBRATION
DATE:
TIME:
METER ID:

pH CALIBRATION

pH STANDARD	INITIAL READING	FINAL READING
4.0		
7.0		

CONDUCTIVITY CALIBARATION

CONDUCTIVITY STANDARD	STANDARD READING	FINAL READING

TURBIDITY CALIBRATION

STANDARD	INITIAL READING	FINAL READING
0 NTU		
100 NTU		

FIELD CALIBRATION FORM (continued) - YSI

COMMENTS

SIGNATURE _____

PID AND CGI CALIBRATION LOG

Site Name: _____

INSTRUMENT:	INSTRUMENT ID No:
OPERATOR:	WEATHER:
SPAN GAS TYPE:	DATE:
CALIBRATION NOTES:	
COMMENTS:	
SIGNATURE:	DATE

WELL PURGING AND SAMPLING RECORD

WELL ID _____ SAMPLE NO. _____

WELL/SITE DESCRIPTION _____

DATE _____/_____/_____ TIME _____ AIR TEMP. _____

WELL DEPTH _____ ft CASING HEIGHT _____ ft
WATER DEPTH _____ ft WELL DIAMETER _____ in
WATER COL. HEIGHT _____ ft SANDPACK DIAM. _____ in
EQUIVALENT VOLUME OF STANDING WATER _____
(gal) (L)
PUMP RATE _____ (gpm)
(LPM)
PUMP TIME _____ min
WELL WENT DRY? ( ) Yes ( ) No PUMP TIME _____ min
VOL. REMOVED _____ (gal) (L) RECOVERY TIME _____ min
PURGE AGAIN? ( )Yes ( ) No TOTAL VOL. REMOVED _____ (gal) (L)

WELL PURGING AND SAMPLING RECORD (CONTINUED)

Date	Time	Volume Removed Unit:	pH	Cond.	Temp.	ORP	Turb.	DO	Depth to Water from TOC	Pump Rate

COMMENTS _____

_____

_____

SIGNATURE _____

APPENDIX G— STATE HISTORIC PRESERVATION OFFICE (SHPO) AND THREATENED AND ENDANGERED CONSULTATION RESPONSE LETTERS FOR THE STATE OF NEW YORK

OFFICE OF PARKS, RECREATION & HISTORIC PRESERVATION
NEW YORK STATE

David A. Paterson
Governor

Carol Ash
Commissioner

New York State Office of Parks, Recreation and Historic Preservation

Historic Preservation Field Services Bureau • Peebles Island, PO Box 189, Waterford, New York 12188-0189
518-237-8643
www.nysparks.com

August 7, 2008

Martin P. Wargo
Chief, Environmental Analysis Team
Buffalo District, CORPS of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199
(*transmitted via email*)

Re: CORPS
Fort Niagara Munitions Response Program/
Site Investigation
Fort Niagara, Niagara County
08PR01945

Dear Mr. Wargo:

Thank you for requesting the comments of the State Historic Preservation Office (SHPO). We have reviewed the project in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources. They do not include potential environmental impacts to New York State Parkland that may be involved in or near your project. Such impacts must be considered as part of the environmental review of the project pursuant to the National Environmental Policy Act and/or the State Environmental Quality Review Act (New York Environmental Conservation Law Article 8).

Based upon this review, the SHPO concurs that your project will have No Adverse Effect upon cultural resources in or eligible for inclusion in the National Register of Historic Places given the limited scope of the proposed undertaking.

The SHPO appreciates the opportunity to comment on this information. Please telephone me at ext. 3280 with any questions you may have. Please also refer to the PR# above in any future correspondence for this project.

Sincerely,

Nancy Herter

Nancy Herter
Historic Preservation Program Analyst,
Archaeology

cc. Corinne Shia, Alion Science and Technology (*transmitted via email*)

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
www.dec.state.ny.us

Alexander B. Grannis
Commissioner

August 12, 2008

Corinne Shia
Alion Science & Technology
3975 Fair Ridge Drive, Suite 125
Fairfax, VA 22033

Dear Ms. Shia:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Soil Samplings at Fort Niagara, site as indicated on the map you provided, located at Fort Niagara, Niagara County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and should not be released to the public without permission from the New York Natural Heritage Program.
PLEASE NOTE: This project is within the New York Fort Niagara State Park.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environment impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Tara Seoane

Tara Seoane, Information Services
New York Natural Heritage Program

Enc.
cc: Reg. 9, Wildlife Mgr
Reg. 9, Fisheries Mgr.
Tom Lyons, NYS OPRHP, Empire State Pl, Bldg. 1, Albany, 12238 17th floor

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

~This report contains **SENSITIVE** information that should not be released to the public without permission from the NY Natural Heritage Program.
~Refer to the User's Guide for explanations of codes, ranks and fields.
~Location maps for certain species and communities may not be provided 1) if the species is vulnerable to disturbance, 2) if the location and/or extent is not precisely known, 3) if the location and/or extent is too large to display, and/or 4) if the animal is listed as Endangered or Threatened by New York State.

Natural Heritage Report on Rare Species and Ecological Communities

OTHER

Waterfowl Winter Concentration Area

Office Use 7656

NY Legal Status:	Unlisted	**NYS Rank:**	S3S4 - Vulnerable
Federal Listing:		**Global Rank:**	GNR - Not ranked
Last Report:	1994-01-25	**EO Rank:**	Extant
County:	New York State Waters, Niagara		S
Town:	Porter, Ny State Waters, Lewiston		
Location:	Lower Niagara River		
Directions:	The concentration area is in the lower Niagara River from the Lewiston downstream to Lake Ontario.		
General Quality and Habitat:	A very large, deep riverine habitat that is comparable to open water areas in Lake Ontario. Here the river abruptly broadens from the very narrow, deep, fast flowing stretch of the gorge at the generating stations. A variety of waterfowl species also feed in the lower Niagara River rapids (upstream from the Niagara Escarpment), but concentrations are limited due to lack of resting areas. The lower rapids do not freeze over in winter providing some suitable habitat in any given year.		

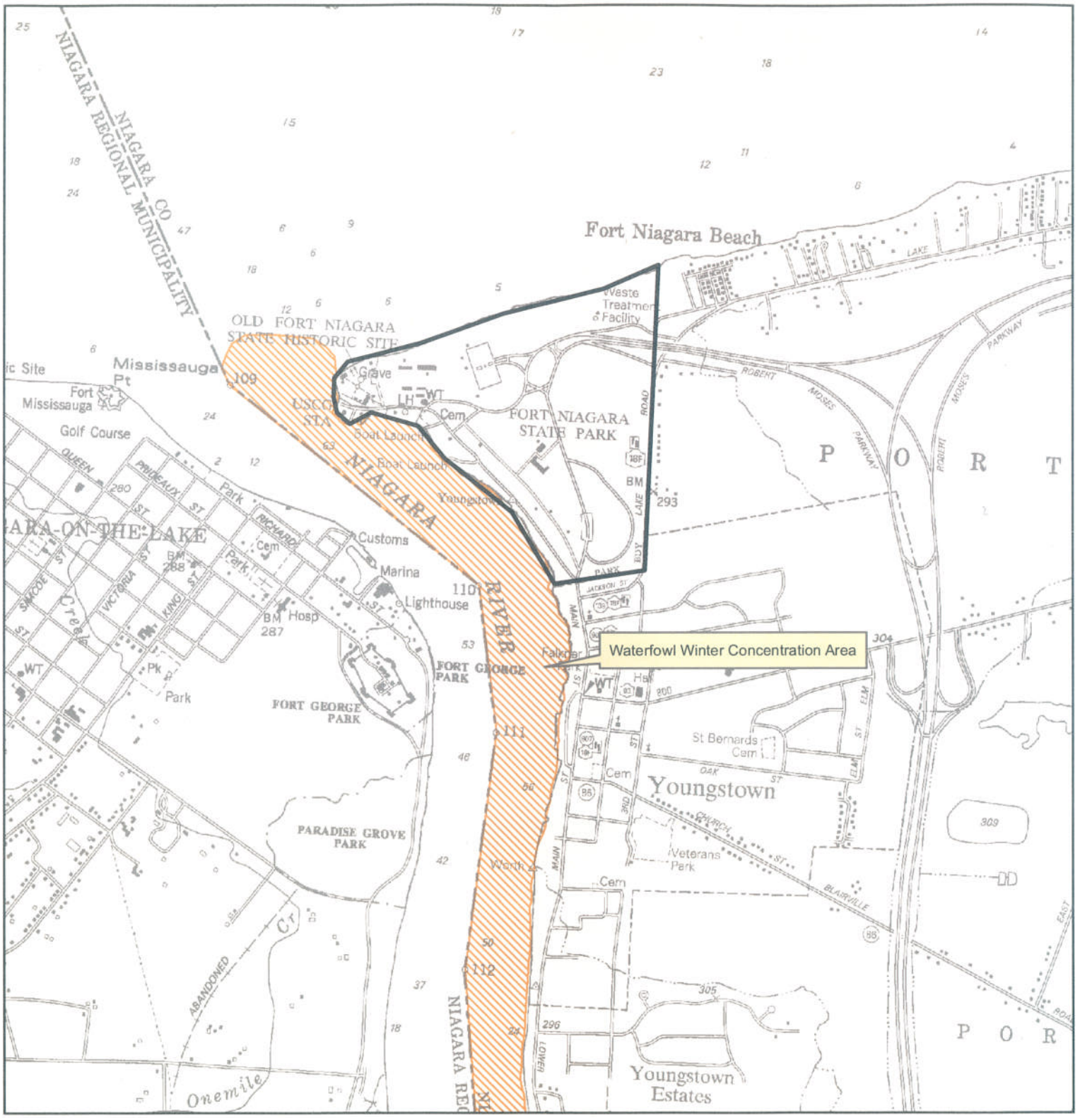
1 Records Processed

More detailed information about many of the rare and listed animals and plants in New York, including biology, identification, habitat, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org, from NatureServe Explorer at http://www.natureserve.org/explorer, from NYSDEC at http://www.dec.ny.gov/animals/7494.html (for animals), and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

More detailed information about many of the natural community types in New York, including identification, dominant and characteristic vegetation, distribution, conservation, and management, is available online in Natural Heritage's Conservation Guides at www.acris.nynhp.org. For descriptions of all community types, go to http://www.dec.ny.gov/animals/29384.html and click on DRAFT--Ecological Communities of New York State.

Natural Heritage Map of Rare Species and Ecological Communities

Prepared July 30, 2008 by the NY Natural Heritage Program, NYS DEC Albany, NY



Legend

Project Site

NY Natural Heritage Program Database Records*

Animal Assemblage

1:24,000

Miles

0 0.15 0.3 0.6 0.9 1.2

*The locations that are displayed are considered sensitive and should not be released to the public without permission.

N W E S

APPENDIX H—RIGHTS OF ENTRY (ROE) AND ADDITIONAL STAKEHOLDER CORRESEPONDANCE

W911XK-9-08-1008

RIGHT OF ENTRY
FOR
SURVEY AND EXPLORATION

DERP FUDS/Old Fort Niagara
(Project, Installation or Activity)

Fort Niagara
Youngstown, NY
(Tract Number or Other Property Identification)

THIS PERMIT, made this **15th** day of **July 2008** between THE PEOPLE OF THE STATE OF NEW YORK, acting by and through the Niagara Park Region of the Office of Parks, Recreation and Historic Preservation (hereinafter referred to as "PARKS") with offices at the Empire State Plaza, Agency Building No. 1, Albany, NY, 12238 and the United States of America visa vie the USACE (hereinafter referred to as the "Government") with offices at 1776 Niagara Street, Buffalo, NY 14207 hereby grants access upon the following terms and conditions:

1. The Parks hereby provides to the Government an irrevocable right to enter upon the land, hereinafter described, for a period of 365 days beginning on 15 July 2008 and ending on 14 July 2009, in order to survey, make test borings, and carrying out such other exploratory work as may be necessary to complete the investigation being made of said lands by the Government.

2. This Permit includes the right of ingress and egress on other lands of the Grantor not described below, provided that such ingress and egress is necessary and not otherwise conveniently available to the Government.

3. All tools, equipment, and other property taken or placed upon the land by the Government shall remain the property of the Government and may be removed by the Government at any time within a reasonable period after the expiration of this Permit.

4. The contractors hired by the Government shall hold public liability insurance of a minimum of $1,000,000 for each occurrence and a general aggregate minimum of $2,000,000 for each accident, and shall name PARKS as an additional insured. The Government shall be responsible to provide a copy of the Certificate of Liability Insurances to PARKS. The following exact language shall appear on the insurance certificates in the additional insured designation: "THE PEOPLE OF THE STATE OF NEW YORK, NEW YORK STATE EXECUTIVE DEPARTMENT, OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION, REGION 1, THEIR OFFICERS, AGENTS OR EMPLOYEES."

5. All government personnel and contractors, survey crews, etc., shall contact the Park Manager at Fort Niagara State Park (Dave Clark @ 716-745-7273) upon entering the park and sign in at the toll booth when summer season begins, on each and every work day.

6. Government or contractors shall promptly report any and all unusual incidents directly to the Park Manager or Park Police. Unusual incidents include, but are not limited to, damage to Park's property, accidents, personal injuries, and emergencies involving medical personnel. Phone number for the Park Police is 716-278-1777.

7. No spoils, waste or excess materials of any kind shall be left on park property at job completions. Any disturbed areas shall be graded and seeded to the satisfaction of the Park Manager.

8. If any action of the Government's employees or agents in the exercise of this right of entry result in damage to the real property, the Government will, at its option, either repair such damage or make an appropriate and mutually acceptable settlement with the Owner. In no event shall such repair or settlement exceed the fair market value of the fee interest of the real property at the time immediately preceding such damage. The Government's liability under this clause may not exceed the appropriations available for such payment and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet deficiencies. The provisions of this clause are without prejudice to any rights the Owner may have to make a claim under applicable laws for any other damages than those provided for herein.

9. The Government's liability for damages, claims, suits, costs, and expenses that arise from the activities of the Government under this Right of Entry shall be governed by the Federal Tort Claims Act, 28 USC 1346(b), CERCLA, 42 U.S.C. Sections 9601-9675 and other applicable federal laws.

10. The land affected by this Permit is located in the State of New York, County of Niagara, Village of Youngstown, and is shown on the attached drawing:

WITNESS MY HAND AND SEAL this 9th day of July, 2008.

GRANTOR

Laurel J. Reasinger

LAUREL J. REASINGER
Notary Public, State of New York
No. 01RE5054875
Qualified in Niagara County
Commission Expires Jan. 29, 2010

Mark W Thomas (SEAL)

Director, Western District (SEAL)
[Type or Print Title]

Accepted:

UNITED STATES OF AMERICA

By: _____
for VICTOR L. KOTWICKI
Chief, Real Estate Division
Detroit District

Buffalo State
State University of New York
School of Arts and Humanities

Art Conservation Department
Rockwell Hall 230
1300 Elmwood Avenue
Buffalo, NY 14222-1095

Tel: (716) 878-5025
Fax: (716) 878-5039
artcon@buffalostate.edu
www.buffalostate.edu

August 7, 2008

Martin P. Wargo
Chief, Environmental Analysis Team
Department of the Army, Corps of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199

RE: Military Munitions Response Program – Fort Niagara, Niagara County, New York

Dear Mr. Wargo:

Thank you for your letter, which was undated but was received in my office on Tuesday, August 5.

It is my understanding that your planned sampling will involve a total of 14 subsurface tests, ranging from 0 to 18 inches in depth below the vegetative cover. Most of your proposed sampling locations are outside of the historic fort outline; however, because the entire Fort Niagara property is historically significant, my archaeological co-director, Dr. Susan Maguire, and I would like to be present during your testing process.

We would appreciate it if you would advise us regarding project scheduling.

Sincerely,

Elizabeth S. Peña

Elizabeth S. Peña, Ph.D.
Director and Professor
Art Conservation Department
Buffalo State College

Co-Director, Archaeology
Old Fort Niagara State Historic Site

cc: Corrine Shia, Alion Science and Technology
Robert Emerson, Old Fort Niagara
Dr. Susan Maguire, Buffalo State College

From: Gail Thompson [gail.thompson@sni.org]

Sent: Thursday, August 21, 2008 9:36 AM

To: MacPherson, David R LRB

Subject: RE:Military Munitions Response Program - Fort Niagara, Niagara Co., NY

RE:Military Munitions Response Program - Fort Niagara, Niagara Co., NY

Dear Mr. MacPherson:

Thank you for the information regarding the above referenced project. Based on that information, our office has no concerns with the project at this time.

Respectfully,

Gail Thompson

SNI Tribal Archaeologist

467 Center Street

Salamanca, NY 14779

716-945-9427

APPENDIX I—RESPONSE TO STAKEHOLDER COMMENTS

PROJECT: Fort Niagara MMRP SI - Site Specific Work Plan Addendum

New York State Department of Environmental Conservation (NYSDEC)

DESIGN REVIEW COMENTS

Document reviewed: Draft Site-Specific Work Plan Addendum to the Programmatic Work Plan for the Formerly Used Defense Sites Military Munitions Response Program Site Inspection of Fort Niagara, Niagara County, New York, prepared by Alion Science and Technology, Durham, NC, July 2008

AREAS of REVIEW: SS-WP
DATE of REVIEW: 29 July 2008
NAME of REVIWER: Check Ng - NYSDEC

ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	In the analysis of the soil and sediment results, the soil analysis should be compared to New York State 6 NYCRR Part 375 Soil Cleanup Objectives for Unrestricted Use (Website: hnp://www.dec.nv.gov/docs/remediation hudson pdf/techsuppdoc.pdD. If sediment samples are taken, they should be compared to NYSDEC Division of Fish, Wildlife and Marine Resources Technical Guidance for Screening Contaminated Sediments (Table 2) (Website: http://www.dec.ny.gov/docs/wildlife.pdf/scddoc.pdD. A copy of both standards is included in the attachment to this letter. If New York State's standards are found to be the most stringent, the comparison of the soil and sediment results should be made in accordance with New York State's standards	N-NONCONCUR. Consistent with USACE direction on the MMRP SIs, federal criteria are used during the SI screening-level risk assessment. Other criteria, such as those referenced by the reviewer are considered applicable or relevant and appropriate requirements (ARARs), which are applied during remedial investigations/feasibility studies (RI/FSs). Thie SI approach is documented in the DQO 1: MC: If the maximum concentrations measured at the site exceed EPA human health screening criteria based on current and future land use and/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

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		AREAS of REVIEW: SS-WP DATE of REVIEW: 29 July 2008 NAME of REVIWER: Check Ng - NYSDEC	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
			at the site do not exceed human health screening criteria or ecological risk screening values, then an NDAI may be recommended. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data, comparison to regional background concentration ranges for metals, and comparison to state screening/cleanup criteria, will be considered when making a final decision for an NDAI or RI/FS. Screening values selected for comparison at this site are specified in the chemical-specific measurement quality objective (MQO) tables.
2	Page 1-4	On page 1-4 of the work plan, it is mentioned that elevated levels of Volatile Organic Compounds (VOCs), Semi-Volatile Organic Compound (SVOCs), and Polychlorinated Biphenyls (PCBs) were found in the sludge mud between Building 41 and 102 off of Quarter Master court. Are there VOCs, SVOCs, and PCBs associated with the munitions use at Fort Niagara? If not, please clarify	A-Accept/Concur. Text has revised to clarify that the VOCs, SVOCs and PCBs are not associated with the munitions at Fort Niagara.

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		AREAS of REVIEW: SS-WP DATE of REVIEW: 29 July 2008 NAME of REVIWER: Check Ng - NYSDEC	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
		this in the text.	

PROJECT: Fort Niagara MMRP SI - Site Specific Work Plan Addendum			
New York State Office of Parks, Recreation, Historic Preservation (OPRHP) DESIGN REVIEW COMENTS Document reviewed: Draft Site-Specific Work Plan Addendum to the Programmatic Work Plan for the Formerly Used Defense Sites Military Munitions Response Program Site Inspection of Fort Niagara, Niagara County, New York, prepared by Alion Science and Technology, Durham, NC, July 2008			
		AREAS of REVIEW: SS-WP DATE of REVIEW: 19 August 2008 (sent via email) NAME of REVIWER: David Clark - OPRHP	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	I don't see the need to make any comment. The document is very comprehensive and appears to cover all necessary contingencies.	No action required.

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		AREAS of REVIEW: SS-WP DATE of REVIEW: 28 August 2008 (via phone) NAME of REVIWER: Jere Brubaker - Old Fort Niagara	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	Reviewed document, no further comment.	No action required.

PROJECT: Fort Niagara MMRP SI - Site Specific Work Plan Addendum			
New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) DESIGN REVIEW COMENTS Document reviewed: Draft Site-Specific Work Plan Addendum to the Programmatic Work Plan for the Formerly Used Defense Sites Military Munitions Response Program Site Inspection of Fort Niagara, Niagara County, New York, prepared by Alion Science and Technology, Durham, NC, July 2008			
		AREAS of REVIEW: SS-WP DATE of REVIEW: 28 August 2008 (via phone) NAME of REVIWER: Rolfe Steck - NYSOPRHP	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION

PROJECT: Fort Niagara MMRP SI - Site Specific Work Plan Addendum

New York State Office of Parks, Recreation, and Historic Preservation (OPRHP)

DESIGN REVIEW COMENTS

Document reviewed: Draft Site-Specific Work Plan Addendum to the Programmatic Work Plan for the Formerly Used Defense Sites Military Munitions Response Program Site Inspection of Fort Niagara, Niagara County, New York, prepared by Alion Science and Technology, Durham, NC, July 2008

AREAS of REVIEW: SS-WP
DATE of REVIEW: 28 August 2008 (via phone)
NAME of REVIWER: Rolfe Steck - NYSOPRHP

ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	Pg vii- NYSOP is provided Pg viii- OPRHP is provide	The discrepancy above should be corrected to be more accurate as NYSOPRHP = New York State Office of Parks, recreation and Historic Preservation.	A-Accept/Concur. The text has been revised.
2		Then in the report that follows the acronym should be corrected appropriately, i.e., page 17 of 161, Section 1-3 for example uses NYSOP.	A-Accept/Concur. The text has been revised.
3	Pg 23 of 161	Dave Clark's name misspelled as Clarke; address should be Fort Niagara State Park, One Maintenance Road, Youngstown, NY 14174.	A-Accept/Concur. The table has been revised to update Mr. Clark's information.
4	pg 24 of 161	Nancy Herter's name is not provided as a contact. She works for NYSOPRHP in the Historic Preservation Office @ Pebbles Island, NY. The address previously used for Dave Clark is Nancy's address.	A-Accept/Concur. The table has been updated to include Ms. Herter's information.
5	pg 24 of 161	The Executive Director of the OFN Association is Robert Emerson.	A-Accept/Concur. The table has been updated with this information.
6		My phone number should be 716-628-6543. My role is Associate Park Engineer, Niagara Region.	A-Accept/Concur. Table 1-1 was updated with the corrected phone number and role.
7	pg 30 of 161, Section 2-4	A bad sentence noted, i.e., "Fort Niagara State Park is adjacent to Old Fort Niagara State Park..." is in error. I believe you meant to say "Old Fort Niagara is adjacent to Fort Niagara State Park."	A-Accept/Concur. The text edited to read, "Fort Niagara State Park is

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		AREAS of REVIEW:	SS-WP
		DATE of REVIEW:	28 August 2008 (via phone)
		NAME of REVIWER:	Rolfe Steck - NYSOPRHP
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
			adjacent to Old Fort Niagara…”.