FINAL
CONSTRUCTION FIELD PLANS

REMEDIATION OF SOILS AT LOAD LINE 1, 2, 3, AND 4
AT THE
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

US Army Corps
of Engineers ®
Louisville District

CONTRACT NO. DACA45-03-D-0026
DELIVERY ORDER 001

NOVEMBER 2006

Shaw® Shaw E & I

FINAL

Sampling and Analysis Plan Addendum No. 1
for the
Remediation of Soils at Load Lines 1, 2, 3 and 4
at the
Ravenna Army Ammunition Plant
Ravenna, Ohio

Contract Number DACA45-03-D-0026
Task Order 0001

Prepared for:

United States Army Corps of Engineers
Louisville District

Prepared by:

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November 2006

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FINAL SAMPLING AND ANALYSIS PLAN ADDENDUM NO. 1
Remediation of Soils at Load Lines 1, 2, 3 and 4
Ravenna Army Ammunition Plant
Ravenna, Ohio

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LIST OF ACRONYMS

AOC	Area of Concern
COCs	Constituents of Concern
DCQCR	Daily Chemical Quality Control Report
DOT	Department of Transportation
DQOs	Data Quality Objectives
FPRI	Fixed-Price Remediation Services with Cost Cap Insurance
FSA	Field Staging Area
FSAP	Facility-wide Sampling Plan
FSP	Field Sampling Plan
GPS	Global Positioning System
IDW	Investigation-Derived Waste
LL #	Load Line 1, 2, 3 or 4
MEC	Munitions and Explosives of Concern
OhioEPA	Ohio Environmental Protection Agency
OIPs	Other Interested Parties
PCBs	Polychlorinated Biphenyls
PMP	Project Management Plan
QA/QC	Quality Assurance/Quality Control
QAMP	Quality Assurance and Management Plan
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SHERP	Safety, Health and Emergency Response Plan
SVOCs	Semi-Volatile Organic Compound
TSCA	Toxic Substances Control Act
TCLP	Toxicity Characteristic Leaching Potential
USACE	United States Army Corps of Engineers
VOCs	Volatile Organic Compounds
WMMP	Waste Management and Minimization Plan

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) was contracted by the United States Army Corps of Engineers (USACE) Omaha District to perform remediation activities associated with impacted soils and dry sediments in Load Lines 1, 2, 3 and 4 (LLs 1-4) at the Ravenna Army Ammunition Plant (RVAAP) under the Fixed-Price Remediation Insured (FPRI) Indefinite Delivery/Indefinite Quantity Contract No. DACA45-03-D-0026. Work by Shaw at the Ravenna facility in LLs 1-4 will be performed under Task Order 0001 of the above referenced contract. As part of the remediation activities, Shaw has been tasked with preparing an addendum to the Facility-wide Sampling and Analysis Plan (FSAP) prepared by Science Applications International Corporation (SAIC, 2001a) document specific procedures for completion of remedial work under this Task Order. The Sampling and Analysis Plan (SAP) Addendum will reference and adhere to existing facility-wide and FPRI project specific work plans, but it is not an element of the Remedial Action Work Plans that is forthcoming under the FPRI.

This SAP Addendum is composed of two parts: the Field Sampling Plan (FSP) Addendum and the Quality Assurance Project Plan (QAPP) Addendum. The FSP Addendum details the expected sampling methods, equipment, and procedures; sample custody/documentation requirements; sample packaging, shipping and handling requirements; generic management of investigation derived wastes; chemical quality control requirements; field documentation; data reporting; and corrective actions. The QAPP Addendum addresses analytical data quality objectives (DQOs) and specific quality assurance/quality control (QA/QC) procedures to be used in the collection and analyses of samples. Other documents referenced in the development of this SAP Addendum include the following:

- "Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," Science Applications International Corporation (SAIC), August 1999 (SAIC 1999);
- "Final Sampling and Analysis Plan Addendum No. 2 for the Phase II Remedial Investigation of Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," SAIC, September 2000 (SAIC 2000b); and
- "Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of Load Lines 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," SAIC, July 2001 (SAIC 2001b).

The FSAP, to which this SAP is an addendum, includes Site History and Contaminants (Section 1.1), Environmental Setting (Section 1.2); Summary of Site Data (Section 1.3). The history and contaminants specific to LLs 1-4 are documented in detail in the following reports:

- "Final Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (SAIC 2003);
- "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (Shaw 2004b);
- "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (Shaw 2004c); and

- "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (Shaw 2004d).

This SAP Addendum will focus specifically on the remediation of soil and dry sediment at LLs 1-4 and long-term groundwater monitoring to evaluate remediation performance. Sediment to be addressed will include those located in existing drainage and containment structures, dry sediments located proximate to discharge structures (i.e., headwalls and outfalls), and sediments located within conveyance ditches and swales that do not have significant water flow on a continuous basis. Based upon the results presented in the remedial investigation (RI) reports identified above, the constituents of concern (COCs) in soils and dry sediment at LLs 1-4 include metals, explosives, pesticides, polychlorinated biphenyls (PCBs), and semi-volatile organic compounds (SVOCs). Concentrations of COCs that exceed cleanup goals are primarily located at the perimeter of buildings, within catch basins of the sewer system, and drainage ditches and outfalls.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Shaw will designate personnel to fulfill the roles and responsibilities identified in Section 2.0 of the FSAP (SAIC 2001a). As detailed in Shaw's Project Management Plan (PMP; Shaw 2004a) and in accordance with the FSAP (SAIC 2001a), this project will be executed under the technical direction of the Shaw Project Manager who reports directly to the Shaw Program Manager. The PMP contains a complete and updated listing of key project personnel, as well as other interested parties. Of particular importance in this document are the Shaw QA/QC Officer and Shaw Health and Safety Officer. The Field Superintendent will manage field work, be responsible for execution of the field activities, and be responsible for implementation of the Safety, Health and Emergency Response Plan (SHERP) (Shaw 2004e) for Shaw and its subcontractors.

Shaw will subcontract a laboratory to perform analytical work as identified in detail in the QAPP Addendum. The Shaw Laboratory Coordinator will work with the laboratory QA/QC Manager to ensure the goals and objectives of the project are met. Shaw will manage subcontractors as identified in the PMP (Shaw 2004a).

3.0 PROJECT SCOPE AND OBJECTIVES

The recommended alternative for remediation activities at LLs 1-4 is excavation and off-site disposal. This remedial alternative addresses shallow soils and dry sediments found to be exceeding applicable cleanup levels in LLs 1-4. The Scope of Work under this Task Order does not include designation and clearing of Munitions and Explosives of Concern (MEC), but will address soils and dry sediments found to be impacted by explosives contaminants.

Areas to be excavated in LLs 1-4 will be delineated based on available data (*e.g.,* RI data tables and supplemental sampling data) and confirmation sampling activities. Based on the information provided in the RIs (SAIC 2003; Shaw 2004b, c, and d), Shaw estimates 14,567 cubic yards of dry sediment and soil will require excavation and off-site disposal. The actual disposal volumes will be dependent upon the size and depth of excavation areas as defined by subsequent confirmatory sampling by Shaw. Off-site disposal facilities will be selected based on waste characterization data collected from soil samples collected from areas expected to be excavated as well as other stockpiled materials when practical. It is Shaw's intention to pre-characterize the soil for waste disposal to facilitate direct loading and disposal of the soil. However, if an area is encountered that requires excavation that was not pre-characterized; the material will be excavated and stockpiled on-site. Samples of the stockpile will be collected and analyzed for waste characterization profiling. Once the disposal option has been approved, the soil will be loaded and transported for disposal. The specific procedures for handling and disposing of wastes generated during the proposed remediation are further detailed in the Waste Management and Minimization Plan (WMMP) (Shaw 2006a).

The project objective is to remediate accessible shallow soils and dry sediment containing COCs that exceed cleanup goals at LLs 1-4 at the RVAAP. As part of the remedial action, Shaw will conduct sampling to confirm the extent of contamination above cleanup levels in soil and dry sediment at LLs 1-4 is removed, characterize soils for disposal and determine the potential impact of remediation on local groundwater. The sampling phases of this effort and the associated objectives are as follows:

- Pre-Excavation Waste Characterization Sampling: Collect samples prior to excavation to characterize soils as hazardous or non-hazardous for direct loading for disposal off-site.
- Post-Excavation Sampling: Confirm the effectiveness of the excavations with field and laboratory analysis to confirm that soil and dry sediment contaminated above cleanup levels have been removed.
- Waste Characterization Sampling for Stockpiled Material: Characterize stockpiled soils that have not already been characterized as part of pre-excavation waste sampling as hazardous or non-hazardous for off-site disposal.
- Long-Term Groundwater Monitoring: Evaluate the performance of the remedial action and impact on COC concentrations in local groundwater.

The data quality objectives (DQOs) for investigations at the RVAAP are established in Section 3.0 of the FSAP (SAIC 2001a). Project-specific DQOs are evaluated within the discussion of each task below, including the rationales related to sample location, discrete or composite soil sampling requirements, sample collection, field and laboratory analyses, QA/QC sample collection and frequency.

4.0 FIELD ACTIVITIES

Shaw intends to conduct each of the soil and sediment sampling phases of the field work at one time across the four load lines to provide a more efficient remedial implementation. The groundwater monitoring will be conducted after the remediation efforts are complete. Prior to the removal, a baseline set of groundwater data will be obtained. The field activities described in the following sections will be conducted in accordance with the general guidelines identified in the FSAP (SAIC 2001a) in Section 4.3 for Groundwater, Section 4.4 for Subsurface Soil, and in Section 4.5 for Surface Soil and Sediment.

4.1 Field Testing and Post-Excavation Sampling

Shaw will start excavation from the area of the highest COC concentrations detected and move outward from the assumed source location. This will serve to remove the most potentially grossly impacted soils first to minimize the generation of hazardous wastes in accordance with Shaw's WMMP (Shaw 2006a). Once the "hot spot" areas are removed, Shaw will methodically excavate in areas designated for excavation, using field test kits to guide further excavation. Once the field test kits indicate that the soil exceeding cleanup levels is removed, confirmatory samples will be collected using multi-increment sample procedures as presented in the Guidance for Multi-Increment Sampling in Appendix B of this FSP Addendum and sent to an approved laboratory for analysis. Shaw will manage the field work such that the analytical results will be received prior to demobilization of the excavation equipment, allowing for further excavation based on the laboratory results, if necessary. Shaw will develop a correlation between the results of the field analyses and the laboratory analyses to improve the accuracy of the selection of the extent of excavation.

To ensure that remedial objectives are achieved by the planned excavation activities, post-excavation soil sampling will be conducted throughout excavation activities within each excavation area. This plan outlines the procedures to be followed to ensure that samples are collected and analyzed in a way that provides accurate and representative data for completion of the remedial action and fulfills the applicable regulatory requirements.

The following sections describe the sampling frequency, methodology, analyses and results interpretation.

4.1.1 SAMPLE LOCATION AND FREQUENCY

4.1.1.1 Field Screen Samples

Field screening soil samples will be collected within the excavation area from the floor and sidewalls and analyzed in the field. The planned sampling frequency will depend on the size of the excavation and may be manipulated based on field test results. The method of sample collection from the sidewall depends on the depth of the excavation. If the excavation reaches refusal (*i.e.*, foundations, rock) samples will be collected to the extent practical and areas and depths of refusal where no sample could be collected will be denoted in the field notes per the requirements of Section 5.0 in this FSP Addendum. If the field test indicates the edge of the excavation has been reached (*i.e.*, COCs < cleanup levels), excavation will cease in that direction or depth. If the field test results indicate otherwise (*i.e.*, COCs > cleanup levels) then the

excavation will continue until the field test results indicate that cleanup levels are met or conditions prevent further excavation (i.e., building foundations, subsurface obstructions, etc.)

4.1.1.2 Post-Excavation Samples

Once field screen results have fully indicated contaminated soil to have been removed from an excavation area, a post-excavation sample shall be collected in accordance with Appendix B of this FSP Addendum. Post-excavation sampling will consist of the collection of a series of grab samples as part of multi-increment sampling within the excavated area. Locations and depths of the samples will be logged in a field book and flagged in the excavation area. These samples will be composited to create one representative sample and submitted to an environmental chemistry laboratory for analysis.

4.1.2 SAMPLE DESIGNATION

Section 5.3 of the FSAP (SAIC 2001a) identifies the required location/sample identification naming conventions to be used to the extent possible to identify samples collected at the RVAAP and submitted for laboratory analysis. A modified version of the USACE-Louisville District location/sample identification naming conventions will be used for samples collected from within the excavation area and is shown in Table 4-1.

Table 4-1
Sample Naming System for Post-Excavation Sampling

Sample Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		SD	- Sediment Sample Location
		SS	- Surface Soil Location
NNN	= Discrete Excavation Number (three-digit number unique to excavation area across the four load lines)		
Random Sample Point Identification: XXXmm-NNN-LL			
LL	= Random multi-increment sample location (#01 – 30) within the post-excavation area		

Field personnel will identify the sample location identification in a field log book and the random multi-increment sample locations will be staked so that they can be surveyed using a Trimbal ProXRS (or approved equal) Global Positioning System (GPS) with an accuracy determination capable of within one meter. At a minimum, random sample locations will be surveyed on a bi-weekly basis. The sample locations will be downloaded and identified on plans to be prepared by Shaw.

4.1.3 SAMPLING EQUIPMENT AND PROCEDURES

Post-excavation samples shall be collected from the excavated area to delineate compliance with closure criteria. Post-excavation samples will be collected using the equipment and procedures

presented in the Guidance for Multi-Increment Sampling in Appendix B of this FSP Addendum. Sampling devices will be inspected prior to use to ensure that there is no corrosion or wear that would increase the likelihood of COC sorption to the sampling equipment. Reusable sampling equipment will be thoroughly decontaminated between uses as described in Section 4.4.2.8 of the FSAP (SAIC 2001a) to prevent cross contamination.

4.1.4 Sample Handling and Analysis

Sample preservation methods for each analytical approach are described in the QAPP Addendum as part of this SAP Addendum, along with a description of sample handling, chain-of-custody and other quality assurance procedures.

The field test kits will be used to analyze for explosives and metals, as well as PCBs, where previous investigation identified the presence of PCBs. The field test kits will be used to guide the excavation only. Laboratory analysis will be used for confirmatory samples. The specific methods are described in the QAPP Addendum. The parameters for laboratory analysis of post-excavation samples will be selected based upon RI and pre-excavation characterization results. Parameters may include PCBs, metals, explosives, pesticides and SVOCs.

4.1.5 Sample Analysis and Interpretation

If the field analysis results indicate that concentrations of COCs exceed cleanup levels, excavation will continue in the direction from where the sample was collected until exceedances are not detected. When the sidewall samples and the floor sample(s) do not exceed the cleanup levels, the excavation will be considered temporarily complete pending the results of the laboratory confirmation results.

Should the laboratory analysis indicate that the concentrations of COCs in a sample are less than the target cleanup levels, then the excavation from which that sample was collected will be backfilled with certified clean fill from an approved off-site source. Should the sample indicate a concentration greater than or equal to cleanup levels, then excavation in the area will recommence and the sampling program for that area will proceed from there.

4.2 Waste Characterization Sampling

Prior to excavation activities, Shaw may collect pre-excavation samples for waste characterization purposes. Pre-excavation samples will be collected in accordance with the Guidance for Multi-Increment Sampling presented in Appendix B. The proposed excavation areas will be measured for horizontal location prior to the initiation of the sampling activities and delineated with wooden stakes to ensure that the pre-excavation samples are collected from within the limits of contamination.

Soils that require excavation that were not characterized during the pre-excavation sampling will be consolidated at a temporary central stockpile area within each load line. The soils at the central stockpile locations will be segregated based on existing sample data provided in the RIs. Samples shall be collected from each stockpile and submitted for waste characterization analyses prior to off-site disposal as discussed further in this section.

4.2.1 SAMPLE LOCATION AND FREQUENCY

4.2.1.1 Pre-Excavation Locations

Samples to be collected from pre-excavation locations will be analyzed in accordance with disposal requirements identified in the WMMP (Shaw 2006a). In general, pre-excavation sampling will consist of the collection of a series of grab random samples as part of multi-increment sampling within the pre-excavation area. Locations and depths of the samples will be logged in a field book and flagged in the pre-excavation area. These samples will be composited to create one representative waste characteristic sample to submit to an environmental chemistry laboratory for analysis in accordance with Appendix B of this FSP Addendum. The number of samples required for waste characterization will be determined in consultation with the Ohio Environmental Protection Agency (OhioEPA) and in accordance with disposal facility acceptance criteria and state and federal requirements.

4.2.1.2 Soil Stockpiles

Soil samples to be collected from the stockpiles will be analyzed in accordance with disposal requirements identified in the WMMP (Shaw 2006a). In general, stockpile sampling will consist of the collection of a series of grab random samples as part of multi-increment sampling within the stockpile. Locations and depths of the samples will be logged in a field book and flagged in the stockpile to the extent possible. These samples will be composited to create one representative waste characteristic sample to submit to an environmental chemistry laboratory for analysis in accordance with Appendix B of this FSP Addendum. The number of samples required for waste characterization will be determined in consultation with the OhioEPA and in accordance with disposal facility acceptance criteria and state and federal requirements.

4.2.2 SAMPLE DESIGNATION

The USACE-Louisville District location/sample identification naming conventions presented in Section 5.3 of the FSAP (SAIC 2001a) will be used to identify samples collected at the RVAAP and submitted for laboratory analysis. A modified version of the USACE-Louisville District location/sample identification naming conventions will be used for samples collected from pre-excavation areas and stockpiles of excavated soil and sediment. The modified naming systems for waste characterization samples collected from the pre-excavation areas and stockpile locates are shown in Table 4-2.

Field personnel will identify the waste sample location identification in a field log book and the random multi-increment sample locations will be staked within the pre-excavation area of stockpile location so that they can be surveyed using a Trimbal ProXRS (or approved equal) GPS with an accuracy determination capable of within one meter. At a minimum, random sample locations will be surveyed on a bi-weekly basis. The sample locations will be downloaded and identified on plans to be prepared by Shaw.

Table 4-2
Sample Naming System for Waste Characterization Sampling

Sampling Location Identification: XXX-NNN-###		
XXX	= Area Designator	Examples LL1 - Load Line 1 LL4 - Load Line 4
NNN	= Discrete Excavation or Stockpile Number (three-digit number unique to excavation area or stockpile across the four load lines)	
###	= Sequential Sample Number (only if more than one sample required from discrete excavation or stockpile location)	
Random Sample Point Identification: XXX-NNN-####-LL		
LL	= Random multi-increment sample location (#1 – 30) within the discrete excavation or stockpile area.	

4.2.3 SAMPLING EQUIPMENT AND PROCEDURES

Waste characterization samples shall be collected from both the pre-excavation and stockpile areas using multi-increment sampling to adequately provide a representative analysis of the contaminated areas using the procedures presented in Appendix B of this FSP Addendum. Sampling devices will be inspected prior to use to ensure that there is no corrosion or wear that would increase the likelihood of COC sorption to the sampling equipment. Reusable sampling equipment will be thoroughly decontaminated between uses as described in Section 4.4.2.8 of the FSAP (SAIC 2001a) to prevent cross contamination.

4.2.4 SAMPLE HANDLING AND ANALYSIS

Sample preservation methods for each analytical approach are described in the QAPP Addendum included as part of this SAP Addendum, along with a description of sample handling, chain-of-custody and other quality assurance procedures. The waste samples will be submitted to the laboratory for analysis of COCs and other parameters required by the disposal facilities in a short turnaround. The laboratory will likely analyze the samples for SVOCs, PCBs, explosives, pesticides, metals, corrosivity, pH, reactivity and flash; however, the accepting disposal facilities will ultimately dictate the required waste characterization sample requirements.

4.2.5 SAMPLE ANALYSIS AND INTERPRETATION

If the results indicate the metals concentration exceeds Toxicity Characteristic Leaching Procedure (TCLP) characteristics, the soil in the associated excavation area or stockpile will be disposed of as hazardous waste. If TCLP characteristics are not exceeded, and the soil is not a characteristic waste, then the soil will be disposed of off-site as non-hazardous, but contaminated. All generated soil/sediments will also be evaluated to determine if it should be handled as a waste under the Toxic Substances Control Act (TSCA).

4.3 Long-Term Groundwater Monitoring

Groundwater monitoring will be conducted to evaluate the impact of the source removal action. Prior to the removal, a baseline set of groundwater data will be obtained. Groundwater monitoring will also be conducted after remediation activities have been completed.

4.3.1 Sample Location and Frequency

The proposed sampling locations, frequency and term of groundwater monitoring will be determined through discussions with the Ohio Environmental Protection Agency (OhioEPA).

4.3.2 Sample Designation

The USACE-Louisville District location/sample identification naming conventions presented in Section 5.3 of the FSAP (SAIC 2001a) will be used to the extent possible to identify samples collected at the RVAAP and submitted for laboratory analysis. Shaw will utilize a modified version of the USACE-Louisville District location/sample identification naming conventions for groundwater samples collected as part of groundwater monitoring activities. A summary of these modified naming conventions is presented in Table 4-3.

Table 4-3
Sample Naming System for Groundwater Sampling

Sampling Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		MW	- Groundwater Monitoring Well
NNN	= Sequential Location Number (three-digit number unique to designator)		
Sample Identification: XXXmm-NNN-####-tt			
####	= Sequential Sample Number (four-digit number unique to site)		
tt	= Sample Type	Examples	
		GW	- Groundwater Sample (unfiltered)
		GF	- Groundwater Sample (filtered)
		FB	- Field Blank
		ER	- Equipment Rinsate

The sample numbers noted with a '####' in Table 4-3 will begin at the value one greater than that assigned to the last sample collected in each of the load lines. The location and sample will be assigned matching numbers.

4.3.3 Sampling Equipment and Procedures

The sampling methods identified in the FSAP (SAIC 2001a) will be used to collect the groundwater monitoring samples. Field measurement procedures and criteria are described in Section 4.3.3 of the FSAP (SAIC 2001a). Monitoring well purging and groundwater sampling will be conducted with a Teflon® bailer or bladder pump as described in Section 4.3.4 (and 4.3.5 for filtered samples) of the FSAP (SAIC 2001a).

Sampling devices will be inspected prior to use to ensure that there is no corrosion or wear that would increase the likelihood of COC sorption to the sampling equipment. Reusable sampling equipment will be thoroughly decontaminated between uses as described in Section 4.3.8 of the FSAP (SAIC 2001a).

4.3.4 SAMPLE HANDLING AND ANALYSIS

Groundwater samples will be analyzed for the full suite of analytical parameters

4.3.5 SAMPLE ANALYSIS AND INTERPRETATION

The criteria for evaluating the performance of the proposed remediation approach through groundwater monitoring will be established in discussions with the OhioEPA. Potential criteria include reduced concentrations of COCs in groundwater in the vicinity of excavations.

5.0 SAMPLE CHAIN OF CUSTODY/DOCUMENTATION

Sample chain-of-custody and documentation procedures for the Site are identified in Section 5.0 of the FSAP (SAIC 2001a). Project-specific procedures are identified in the following sections.

5.1 Field Logbook

Field logbook information will follow structures identified in Section 5.1 of the FSAP (SAIC 2001a).

5.2 Photographs

Information regarding the documentation of photographs for the project is presented in Section 4.3.2.4.3 of the FSAP (SAIC 2001a). Photographs will be taken of the excavation activities and any significant observations that are made during the field effort. Photographs will be suitable for presentation in a public forum, as well as documenting scientific information.

5.3 Sample Numbering System

Sample numbering will be based on structures identified in Section 5.3 of the FSAP (SAIC 2001a). Specific sample designation for each type of sampling activity is discussed in Sections 4.1.2, 4.2.2, and 4.3.2 of this FSP.

5.4 Sample Documentation

Sample label, logbook, field record, and field form information will follow structures identified in Section 5.4 of the FSAP (SAIC 2001a).

5.5 Documentation Procedures

Documentation and tracking of samples and field information will follow structures identified in Section 5.5 of the FSAP (SAIC 2001a).

5.6 Corrections to Documentation

Corrections to documentation will follow structures identified in Section 5.6 of the FSAP (SAIC 2001a).

5.7 Reporting

Shaw will provide USACE with monthly reports summarizing field activities during the remediation effort. During the long-term groundwater monitoring program, reports will be submitted after each sampling event. The reports will be based on daily field activity reports prepared by on-site Shaw personnel for internal record keeping purposes. Other required reports will include the content identified in Section 5.7 of the FSAP (SAIC 2001a) during activities under this FSP Addendum.

6.0 SAMPLE PACKAGING AND SHIPPING REQUIREMENTS

Sample packaging and shipping shall generally follow Section 6.0 of the FSAP (SAIC 2001a). For laboratories located within reasonable driving distance, the contract laboratory will provide courier service for coolers containing samples. This will reduce the need for some of the packaging measures described in the FSAP (SAIC, 2001a), which are intended for air-shipped coolers. Specifically:

- Chain-of-custody forms can be hand-carried by the courier to the laboratory;
- No air bills will be attached to couriered coolers; and
- "THIS END UP" and "FRAGILE" stickers will not be required for containers transported by courier.

Coolers containing QA samples that are shipped to the USACE contract laboratory for independent analysis will be prepared and shipped in accordance with the FSAP (SAIC 2001a). On all shipments to all laboratories, a chain-of-custody form will be prepared for each cooler and the cooler number will be recorded on the chain-of-custody form. A custody seal will be affixed to the outside of the cooler in such a way that it would break if the cooler were opened.

Analytical support for the proposed work will be assigned to a USACE Louisville-approved laboratory. The addresses and points of contacts for the assigned laboratory will be provided for USACE and OhioEPA concurrence prior to mobilization.

7.0 INVESTIGATION-DERIVED WASTE

Investigation-derived waste (IDW), including auger cuttings, personal protective equipment (PPE), disposable sampling equipment, decontamination fluids, and purge water, will be properly handled, labeled, characterized and managed in accordance with the following documents:

- Section 7.0 of the FSAP (SAIC 2001a),
- RVAAP Installation Hazardous Waste Management Plan,
- Shaw's WMMP (Shaw 2006a), and
- Federal and State of Ohio large-quantity generator requirements.

Five types of IDW, which will be contained separately, are anticipated for the activities under this FSP Addendum. The types and estimated quantities for each include:

1. Soil and sediment from depths less than three feet, including residual surface and subsurface soil and dry sediment, following waste characterization and post excavation sample homogenization and collection. An estimated one 55-gallon drum of soil and sediment IDW are anticipated for each load line.
2. Decontamination fluids, including those derived from the decontamination of heavy equipment and sampling equipment. An estimated one 55-gallon drum of decontamination fluid is anticipated for each load line.
3. Field colorimetric kit liquid wastes, including spent reagents and decontamination water. An estimated one 55-gallon drum of this type of IDW is anticipated.
4. Expendables/solid wastes, including PPE and disposable sampling equipment. One 55-gallon drum of expendable IDW is anticipated.
5. Purge water from groundwater monitoring activities. The quantity will be dependent on the number of wells included in the program and the selected sampling, method (i.e., bailer or bladder pump).

7.1 IDW Collection and Containerization

Indigenous soil IDW (soil and sediment) will be collected and segregated by load line. Soil and sediment will be contained in a labeled Department of Transportation- (DOT) approved, open top, 55-gallon drum equipped with plastic drum liners and sealed with bung-top lids.

Solid non-indigenous (disposable sampling equipment and trash) IDW will be segregated as non-contaminated and potentially contaminated material. Potentially contaminated and non-contaminated solid non-indigenous IDW will be identified in the field on the basis of visual inspection (e.g., soiled versus non-soiled), usage of the waste material (e.g., outer sampling gloves versus glove liners), and field screening of the material using available field instrumentation (e.g., organic vapor analyzer). Non-indigenous solid IDW will be contained in trash bags with potentially contaminated non-indigenous solid IDW contained in labeled DOT-approved open-top 55-gallon drums equipped with plastic drum liners and sealed with bung-top lids.

Indigenous liquid waste (groundwater) generated during well point and monitoring well purging will be segregated by load line and contained in labeled, DOT-approved, closed-top 55-gallon drums.

Liquid non-indigenous (decontamination rinse water) IDW will be segregated by waste stream (e.g., soap/water rinse from methanol and hydrochloric acid rinses) and contained in labeled DOT-approved closed-top 55-gallon drums. Known potentially hazardous liquid non-indigenous IDW steams, such as methanol, hydrochloric acid rinses, and acetone waste from field laboratories will be contained separately in labeled, DOT-approved, closed top 55-gallon drums.

7.2 Waste Container Labeling

IDW storage containers will be labeled prior to placing IDW in them. IDW containers (drums) will be labeled in accordance with Section 7.2 of the FSAP (SAIC 2001a).

7.3 IDW Field Staging

The Shaw Field Operations Manager will designate a Field Staging Area (FSA) within each load line prior to pre- and post-excavation activities to store IDW generated from each load line pending characterization and disposal. The location(s) will be approved by the RVAAP Environmental Coordinator. The FSA will be managed in accordance with Section 7.3 of the FSAP (SAIC 2001a).

7.4 IDW Characterization and Classification for Disposal

Indigenous IDW (soil, sediment and groundwater) will be characterized for disposal on the basis of analytical results from associated environmental samples. Non-indigenous IDW (decontamination fluids and laboratory residuals), except for PPE and disposable sampling equipment, will be characterized for disposal on the basis of composite samples collected from storage containers. Procedures for composite waste sampling are described in Sections 7.4.1 and 7.4.2 of the FSAP (SAIC 2001a). PPE and disposable sampling equipment will be managed in accordance with Section 7.4 of the FSAP (SAIC 2001a).

Letter reports will be submitted to the USACE, OhioEPA and RVAAP Environmental Coordinator monthly (Section 5.7) documenting characterization and classification of the IDW. The reports will also identify a disposal plan.

7.5 IDW Disposal

Upon approval of IDW classification reports by USACE, solid and liquid IDW will be disposed of by a licensed waste disposal contractor in accordance with Section 7.5 of the FSAP (SAIC 2001a), Shaw's WMMP (Shaw 2004f), and applicable State, Federal and local rules, laws and regulations. Disposal of IDW will be coordinated with remediation activities. Shipment of IDW off-site will be coordinated through the RVAAP Environmental Coordinator.

8.0 CONTRACTOR CHEMICAL QUALITY CONTROL

Shaw will conduct field work in accordance with the quality control procedures identified in Section 8.0 of the FSAP (SAIC 2001a) and, more specifically for this Task Order, the Quality Assurance and Management Plan (QAMP) (Shaw 2006b).

9.0 DAILY CHEMICAL QUALITY CONTROL REPORTS

As identified in Section 9.0 of the FSAP (SAIC 2001a), a Daily Chemical Quality Control Report (DCQCR) will be prepared, signed and dated by the Shaw Field Superintendent, or designee. The DCQCRs will be submitted to USACE as part of the monthly report as described in Section 5.7 of this FSP Addendum. The DCQCR submittal will be prepared in accordance with the specifications identified in Section 9.0 of the FSAP (SAIC 2001a).

10.0 CORRECTIVE ACTIONS

Corrective actions will be implemented in the event that a discrepancy is discovered by field personnel, laboratory personnel, or during a field or desk audit. The steps to evaluating and implementing corrective action are described in Section 10.1 – Sample Collection and Field Measurements and Section 10.2 – Laboratory Analyses of the FSAP (SAIC 2001a).

11.0 FIELD WORK SCHEDULE

The preliminary field work schedule is provided in Appendix A. This schedule is subject to change, and will be updated in the periodic status reports while field work is in progress. Changes in the schedule will be communicated verbally during the regularly scheduled conference calls.

As indicated in the PMP (Shaw 2004a), assumed contingencies include the soil volume variance, monitoring well purge water variance, unexpected COCs and hazards, delays by others, and disaster impacts.

11.1 Site Security

Shaw employees will be familiar with the Facility-wide Security Plan and Shaw's Security, Emergency Response, and Contingency Plan (Shaw 2004f) for the proposed work. All personnel will coordinate with the applicable security requirements outlined in Section 7.3 of the PMP (Shaw, 2004a), prior to coming on site.

11.2 Health and Safety

Shaw employees will read, understand and sign the Facility-wide Safety and Health Plan (SAIC 2000) and Shaw's SHERP (Shaw 2004e) for the proposed work. The Shaw Field Superintendent and Health and Safety Officer will be jointly responsible for implementation of the SHERP.

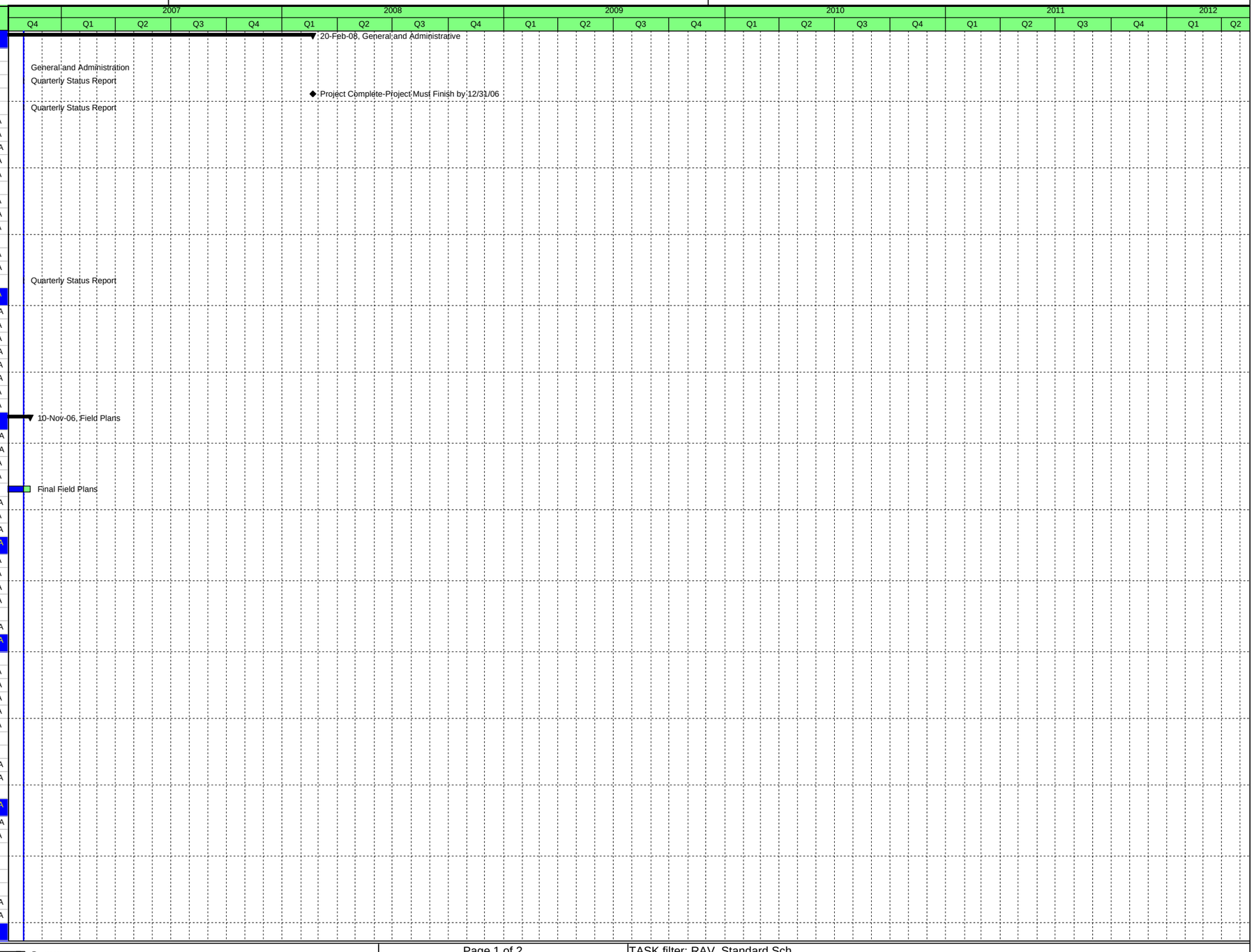
12.0 REFERENCES

1. Science Applications International Corporation (SAIC) 1999. “Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. August 1999.
2. SAIC 2000a. “Facility-Wide Safety and Health Plan for Environmental investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. July 2000.
3. SAIC 2000b. “Final Sampling and Analysis Plan Addendum No. 2 for the Phase II Remedial Investigation of Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. September 2000.
4. SAIC 2001a. “Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. March 2001.
5. SAIC 2001b. “Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of Load Lines 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. July 2001.
6. SAIC 2003. “Final Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. June 2003
7. Shaw Environmental, Inc. (Shaw) 2004a. “Project Management Plan, Remediation of Soils at Load Lines 1-4, Ravenna Army Ammunition Plant, Ravenna, Ohio”. April 2004.
8. Shaw 2004b. “Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. July 2004.
9. Shaw 2004c. “Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. July 2004.
10. Shaw 2004d. “Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. September 2004.
11. Shaw 2004e. “Final Safety, Health, and Emergency Response Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. November 2004.
12. Shaw 2004f. “Final Security, Emergency Response, and Contingency Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. November 2004.
13. Shaw 2006a. “Final Waste Management and Minimization Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. November 2006.
14. Shaw 2006b. “Final Quality Assurance and Management Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio”. November 2006.
15. U.S. Army Corps of Engineers (USACE) 2001. “Requirements for the Preparation of Sampling and Analysis Plans”. EM 200-1-3. February 2001.

APPENDIX A

PRELIMINARY FIELD WORK SCHEDULE

Activity ID	Activity Name	Original Duration	Start	Finish
General and Administrative		1173	25-Aug-03 A	20-Feb-08
000	Bid Submitted	0	25-Aug-03 A	
1005	General and Administration	1132	18-Nov-03 A	31-Oct-06
1006	Quarterly Status Report	1	31-Oct-06*	31-Oct-06
1007	Project Complete-Project Must Finish b...	0		20-Feb-08
1016	Quarterly Status Report	1	31-Oct-06*	31-Oct-06
160	Notice to Proceed	0		24-Oct-03 A
161	Insurance	1	24-Oct-03 A	24-Oct-03 A
170	Kick Off Meeting	0	18-Nov-03 A	19-Nov-03 A
215	Quarterly Status Report	1	07-Jan-04 A	07-Jan-04 A
251	Quarterly Status Report	1	07-Apr-04 A	07-Apr-04 A
259	Quarterly Status Report	1	07-Jul-04 A	07-Jul-04 A
331	Quarterly Status Report	1	07-Oct-04 A	07-Oct-04 A
401	Quarterly Status Report	1	07-Jan-05 A	07-Jan-05 A
431	Quarterly Status Report	1	07-Apr-05 A	07-Apr-05 A
691	Quarterly Status Report	1	25-Jul-05 A	25-Jul-05 A
721	Quarterly Status Report	1	09-Oct-05 A	09-Oct-05 A
871	Quarterly Status Report	1	10-Jan-06 A	10-Jan-06 A
911	Quarterly Status Report	1	31-Oct-06*	31-Oct-06
Project Management Plan		154	27-Oct-03 A	29-Apr-04 A
180	Draft Base Time Line Schedule	30	27-Oct-03 A	26-Nov-03 A
190	Draft Base Coordination Plan	30	27-Oct-03 A	19-Jan-04 A
200	Draft Base Project Management Plan	30	27-Oct-03 A	19-Jan-04 A
210	Army Review of Time Line/Coordinatio...	16	20-Jan-04 A	02-Feb-04 A
220	Revise Base Time Line/Coordination/M...	10	03-Feb-04 A	13-Feb-04 A
230	OEPA/Army/OIP Review Time Line/Co...	45	16-Feb-04 A	04-Mar-04 A
240	Revise Base Final Time Line/Coord/Mg...	7	05-Mar-04 A	12-Apr-04 A
250	OEPA/Army/OIP Review Final Time Lin...	45	13-Apr-04 A	29-Apr-04 A
Field Plans		556	12-Mar-04 A	10-Nov-06
252	Pre-Draft Field Plans	30	12-Mar-04 A	07-May-04 A
253	Army Review Pre-Draft Field Plans	16	07-May-04 A	24-May-04 A
254	Prep Draft Field Plans	10	24-May-04 A	24-Jun-04 A
255	OEPA/Army/OIP Review Draft Field Pl...	45	30-Jun-04 A	11-Oct-04 A
256	Final Field Plans	30	03-Oct-05 A	10-Nov-06
258	RI Investigation Work	24	08-Nov-04 A	06-Dec-04 A
268	Field Sampling Plans	28	14-Sep-04 A	11-Oct-04 A
278	OEPA/OIP Review	45	12-Oct-04 A	08-Nov-04 A
Human Health/Ecological Risk		145	26-Jan-04 A	14-Aug-04 A
260	Internal Draft Human Health/Eco Risk ...	30	26-Jan-04 A	27-Apr-04 A
260C	Prep Draft HH/ERA Plan	7	20-Apr-04 A	27-Apr-04 A
270	OEPA/Army/OIP Review Draft HH/ERA...	45	28-Apr-04 A	11-Jun-04 A
270A	Comment Response Meeting	0		19-Jun-04 A
280	Revise Final HH/ERA Plan	10	21-Jun-04 A	01-Jul-04 A
280A	OEPA/Army/OIP Review Final HH/ERA...	45	01-Jul-04 A	14-Aug-04 A
Remedial Investigation Plan		170	26-Jan-04 A	13-Sep-04 A
262	Comment Response Meeting LL 2, 3, 4	0	19-Apr-04 A	
272	Prep Draft RI LL 2, 3, 4	35	20-Apr-04 A	21-Apr-04 A
272A	Receive LL 2	0		02-Jun-04 A
272B	Receive LL 3	0		04-Jun-04 A
272C	Receive LL 4	0		08-Jun-04 A
320	Comment Response Phase II RI Load ...	115	26-Jan-04 A	19-Apr-04 A
350	OEPA/Army/OIP Review Draft RI Plan	30	08-Jun-04 A	09-Jul-04 A
360	Revise Final RI Plan	10	01-Jul-04 A	29-Jul-04 A
360A	OEPA/Army/OIP Review Final RI Plan	45	30-Jul-04 A	13-Sep-04 A
360B	Revise Final RI	7	13-Sep-04 A	13-Sep-04 A
370	Comment Response Prep	10	12-Jul-04 A	19-Jul-04 A
RGO Document		106	17-May-04 A	22-Sep-04 A
381	RGO Meeting	1	17-May-04 A	17-May-04 A
382	RGO Prep	30	18-May-04 A	25-Jun-04 A
383	Army Review RGO	16	28-Jun-04 A	06-Jul-04 A
384	Prep Draft RGO	7	07-Jul-04 A	14-Jul-04 A
385	Army/OEPA/OIP Review RGO	0	15-Jul-04 A	22-Jul-04 A
386	Comment Response - RGO	10	22-Jul-04 A	23-Jul-04 A
396	Prep Final RGO	21	21-Sep-04 A	21-Sep-04 A
436	Submit Final RGO Document	0		22-Sep-04 A
Feasibility Study		598	18-Feb-04 A	29-Jul-05 A



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

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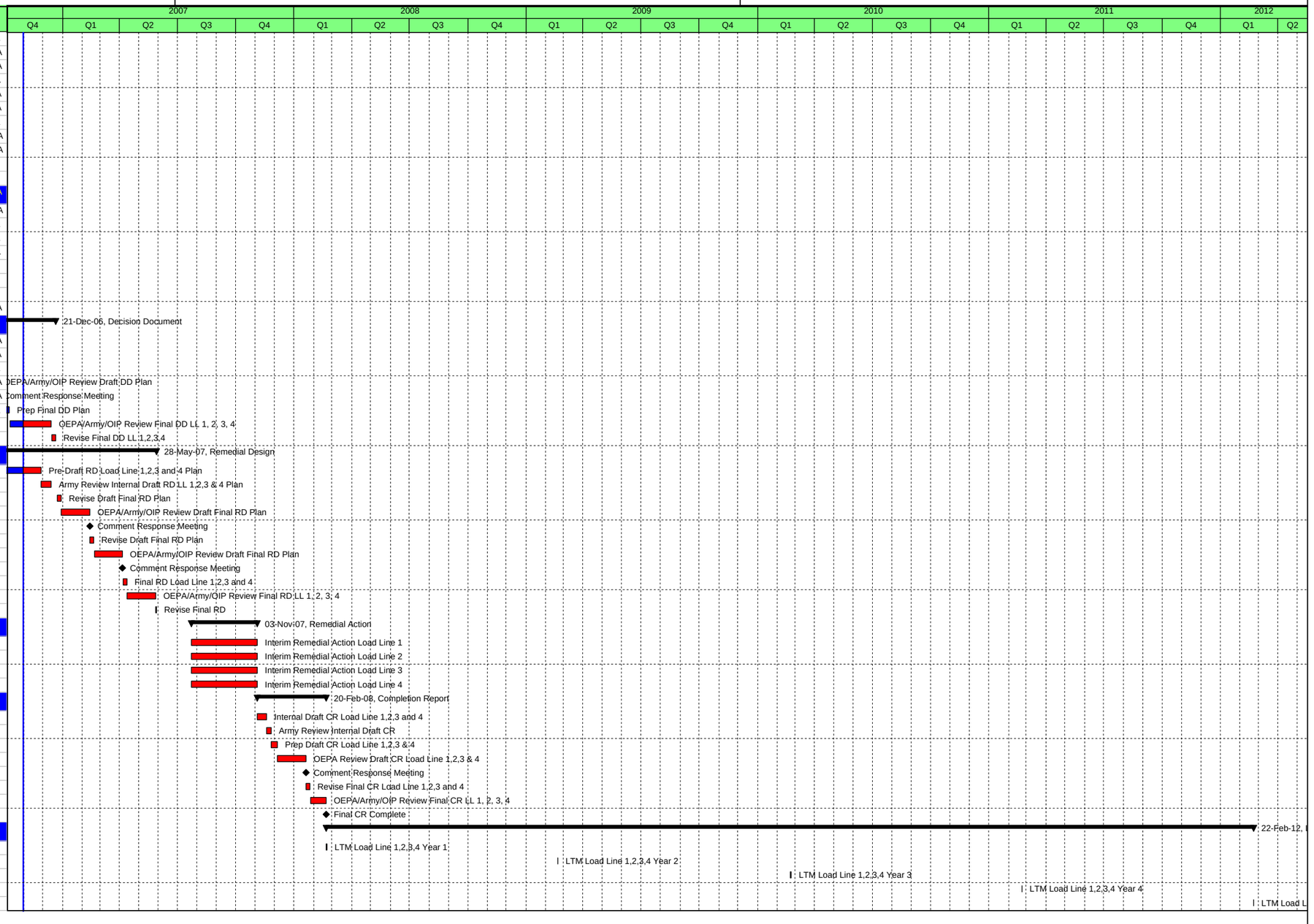
Activity ID	Activity Name	Original Duration	Start	Finish
380	Prep Pre-Draft FS Load Line 1,2,3,4	30	18-Feb-04 A	29-Oct-04 A
390	Army Review Pre-Draft FS Load Line 1...	16	01-Nov-04 A	12-Nov-04 A
400	Prep Preliminary FS Load Line 1,2,3 & 4	21	29-Oct-04 A	17-Nov-04 A
410	OEPA/Army/OIP Review Prelim FS LL ...	45	18-Nov-04 A	03-Jan-05 A
410A	Comment Response Meeting	0		18-Feb-05 A
420	Prep Draft FS Load Line 1,2,3 & 4	60	04-Jan-05 A	08-Mar-05 A
430	OEPA/Army/OIP Review Draft FS LL 1,...	45	10-Mar-05 A	25-Apr-05 A
430A	Comment Response Meeting	0		06-May-05 A
440	Final FS Load Line 1,2,3 and 4	7	26-Apr-05 A	09-May-05 A
440A	OPEA/Army/OIP Review Final FS LL 1,...	45	09-May-05 A	29-Jul-05 A
440B	Revise Final FS	7	21-Jul-05 A	29-Jul-05 A
Proposed Plan		447	15-Nov-04 A	10-Aug-05 A
500	Draft PP Load Line 1,2,3 and 4	104	15-Nov-04 A	16-May-05 A
510	Army Review Internal Draft PP	16	15-Apr-05 A	30-Apr-05 A
520	Revise Preliminary PP Load Line 1,2,3 ...	10	15-Apr-05 A	30-Apr-05 A
530	OEPA/Army/OIP Review Draft PP	45	16-May-05 A	30-Jun-05 A
530A	Comment Response Meeting	0		01-Jul-05 A
580	Revise Final PP Load Line 1,2,3 & 4	7	01-Jul-05 A	11-Jul-05 A
580A	OEPA/Army/OIP Review Final PP LL 1,...	45	12-Jul-05 A	29-Jul-05 A
580B	Revise Final PP	7	08-Aug-05 A	10-Aug-05 A
Decision Document		190	12-Jul-05 A	21-Dec-06
600	Draft DD Load Line 1,2,3 and 4	30	12-Jul-05 A	20-Sep-05 A
610	Army Review Internal Draft DD	45	21-Sep-05 A	21-Mar-06 A
620	Prep Draft DD Plan	10	20-Mar-06 A	24-Apr-06 A
630	OEPA/Army/OIP Review Draft DD Plan	45	25-Apr-06 A	18-Sep-06 A
630A	Comment Response Meeting	0		18-Sep-06 A
640	Prep Final DD Plan	7	19-Sep-06 A	09-Oct-06 A
640A	OEPA/Army/OIP Review Final DD LL 1...	45	10-Oct-06 A	14-Dec-06
640B	Revise Final DD LL 1,2,3,4	7	15-Dec-06	21-Dec-06
Remedial Design		292	27-Sep-05 A	28-May-07
660	Pre-Draft RD Load Line 1,2,3 and 4 Plan	30	27-Sep-05 A	27-Nov-06
670	Army Review Internal Draft RD LL 1,2,...	16	28-Nov-06	13-Dec-06
680	Revise Draft Final RD Plan	7	23-Dec-06	29-Dec-06
690	OEPA/Army/OIP Review Draft Final R...	45	30-Dec-06	12-Feb-07
690A	Comment Response Meeting	0		12-Feb-07
700	Revise Draft Final RD Plan	7	13-Feb-07	19-Feb-07
710	OEPA/Army/OIP Review Draft Final R...	45	20-Feb-07	05-Apr-07
710A	Comment Response Meeting	0		05-Apr-07
720	Final RD Load Line 1,2,3 and 4	7	06-Apr-07	12-Apr-07
720A	OEPA/Army/OIP Review Final RD LL 1...	45	13-Apr-07	27-May-07
720B	Revise Final RD	1	28-May-07	28-May-07
Remedial Action		75	23-Jul-07	03-Nov-07
840	Interim Remedial Action Load Line 1	90	23-Jul-07*	03-Nov-07
850	Interim Remedial Action Load Line 2	90	23-Jul-07*	03-Nov-07
860	Interim Remedial Action Load Line 3	90	23-Jul-07*	03-Nov-07
870	Interim Remedial Action Load Line 4	90	23-Jul-07*	03-Nov-07
Completion Report		78	04-Nov-07	20-Feb-08
880	Internal Draft CR Load Line 1,2,3 and 4	15	04-Nov-07	18-Nov-07
890	Army Review Internal Draft CR	7	19-Nov-07	25-Nov-07
900	Prep Draft CR Load Line 1,2,3 & 4	10	26-Nov-07	05-Dec-07
910	OEPA Review Draft CR Load Line 1,2,...	45	06-Dec-07	19-Jan-08
910A	Comment Response Meeting	0		19-Jan-08
940	Revise Final CR Load Line 1,2,3 and 4	7	20-Jan-08	26-Jan-08
940A	OEPA/Army/OIP Review Final CR LL 1...	25	27-Jan-08	20-Feb-08
940B	Final CR Complete	0		20-Feb-08
Long Term Monitoring		1045	21-Feb-08	22-Feb-12
940C	LTM Load Line 1,2,3,4 Year 1	1	21-Feb-08	21-Feb-08
950C	LTM Load Line 1,2,3,4 Year 2	1	20-Feb-09	20-Feb-09
960C	LTM Load Line 1,2,3,4 Year 3	1	22-Feb-10	22-Feb-10
970C	LTM Load Line 1,2,3,4 Year 4	1	22-Feb-11	22-Feb-11
980C	LTM Load Line 1,2,3,4 Year 5	1	22-Feb-12	22-Feb-12



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

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APPENDIX B

GUIDANCE FOR MULTI-INCREMENT SAMPLING

GUIDANCE FOR MULTI-INCREMENT SAMPLING

1. Multi-Increment Soil Sampling Procedures

a. Stake and survey the four corners of each Multi-Increment (MI) sampling area. The corners of each MI area will be surveyed using a Trimbal ProXRS (or equally approved) Global Positioning System (GPS) capable of providing an accuracy up to one meter.

b. Identify 30 random sampling points within the MI sample area using the "drunken sailor walk" or a random zigzag pattern.

c. Collect a sample from each of the 30 sampling points using a 7/8" stainless steel step probe or approved equal sample collection device.

d. Place the 30 samples from each MI sample area into a plastic-lined bucket and combine to make a single sample.

e. Immediately after combining the samples, secure the plastic bag, label and deliver it to Building 1036 for drying and processing.

f. Decontaminate all non-disposable sample tools after the combined sample collection at each MI sample area.

2. Overview of Processing Procedures of Multi-Increment Samples

a. The sample process procedures consist of the following steps:

1. Remove and log-out the sample from the drying room.
2. Pass the sample through a series of sieves.
3. Grind the sieve sample.
4. Log filled and completed sample jars into the refrigerator.
5. Clean and decontaminate the sample work station.
6. Prepare station for next sample.

b. All MI dry soil samples will be processed according to the sample process procedures.

c. All wet MI soil samples will be partially processed. Each saturated sample such as a wet clayey mixture will be laid out and 30 small spoon samples will be taken randomly across the mix to fill each of the analytical sample jars. For less saturated materials, the total sample of a sample area should initially be air dried overnight.

d. Groundwater and surface water samples are not MI and are not processed.

e. Due to volatilization, multi-incremental sampling cannot be utilized for collection of samples for volatile organic compound (VOC) analysis unless collected samples are stored in a solution of methanol.

f. The use of plastic bags for samples with constituents of concern (COCs) containing semi-volatile organic compounds (SVOCs) should be considered prior to sampling.

3. Process Station Equipment, Safety and Monitoring Requirements

a. Each process station will have the following equipment:

- Required PPE, engineering controls, monitoring and safety equipment
- Foil-wrapped Sieve set (#4, #10, collection pan)
- Foil-wrapped Baking pan
- 2 coffee grinder motor bases
- Foil-wrapped Spoons, etc.
- Power supply
- Sample collection jars (pre-labeled)
- Waste soil bucket
- Sharpie pen

b. Personal Protective Equipment (PPE) to be required at each process station shall include:

- Safety glasses – eye protection from fines and dust
- Dust mask – respiratory protection from fines and dust
- Nitrile gloves – skin protection during the sample handling/processing
- Ear plugs – protection from noise (optional)

c. Each work station shall have the following engineering controls, monitoring and safety equipment available:

- Dust collection system (hood) to be on the "high" setting at all times during the MI sampling processing.
- Personal air monitors for initial dust monitoring.
- Noise monitors for initial noise monitoring.
- Eye wash station located adjacent to processing stations.

4. Multi-Increment Processing Procedures

- **STEP 1 – Sample Logging-In**

  a. Retrieve dried sample from drying room and log-out sample on drying room log.

  b. Carefully transport the dried tray or trays (on baking racks) to the sample process area for processing.

  c. Log samples in using the sample processing log.

  d. Turn on negative air machine on high setting at the sample processing table.

  e. Gather the necessary sample jars for sample collection and double-check the labels/analytes are correct – sign, date and initial the collection jars.

- **STEP 2 – Preparing Samples for Processing**

  a. Place the sample tray on the side that the opening to the dust collection system is on.

  b. If necessary, break-up the dried soil on the tray to make the sieve process easier.

  c. Be careful to avoid potential cross-contamination at the stations as discussed in Section 5 of this guidance.

- **STEP 3 – Sieving the Sample**

  a. Align the sieves so that the #4 sieve is on top, the #10 sieve is in the middle and collection pan is on the bottom. *DO NOT PLACE SIEVE SET ON TRAY!!*

  b. Using a metal spoon or trowel, scoop the soil onto the #4 sieve and press it through the sieve with the spoon or trowel.*

  c. Any remaining soil/rock on the #4 sieve can be discarded into the waste soil bucket to be placed at the end of the station.

  d. Once the passable soils is through the #4 sieve, repeat the process with the #10 sieve.*

  e. Following the passing of soil through the #10 sieve, the entire sample should be in the collection pan.

  f. If there is too much sample to fit into the collection pan, then temporarily hold additional sample in stainless steel bowl, inside the dust collection work hood.

  **Note - Depending on the amount of soil processed, multiple sieving may be required to sieve the entire sample*.

- **STEP 4 – Grinding of Sieved Samples**

  a. Once the sample is completely processed through the sieve, retain the baking sheet and sieve collection pan in the hood. Remove the #4 and #10 sieves to outside the hood.

  b. Place the baking sheet in front of the duct opening in back of the hood, place collection pan in rear of the hood on the opposite side and place the coffee grinder in the center of the hood area.

  c. Using the scoop and spoon, spoon enough sieved sample to fill ½ of the coffee grinder.

  d. Grind for approximately 10-15 seconds and empty the powder-like ground contents back into a pile (do not spread out) on the baking sheeting.

  e. Repeat the process until the entire sample quantity is ground and re-piled onto the baking sheet.

- **STEP 5 – Incremental Filling of Sample Jars**

  a. Once the entire sample is completely ground and in a pile on the baking tray, place the coffee grinder into the sieve collection pan and place them out of the way under the hood.

  b. Next, quarter the pile into quadrants using the spoon.

  c. Bring sample jars into the hood and place onto the baking tray. *DO NOT PLACE SAMPLE JARS ON TABLE!!*

  d. Open the jars one at a time and fill the small jars first, working up to the larger jars. Using the spoon, fill the jars by taking a spoon or scoop from each quadrant of the pile, working in a clockwise or counter-clockwise motion. Repeat this filling method until all jars are filled.

  e. Cap all jars and ensure a tight seal.

f. Scoop any remaining sample into an adequate Ziploc bag and label bag with sample number.

- **STEP 6 – Sample Logging-Out**

  a. Once the sample is complete, wipe off any excess dust or soil with a damp paper towel.

  b. Log-out sample from the processing station and log-in sample at the refrigerator.

  c. Place samples, together, in appropriate/specified refrigerator.

  d. Once logged and placed in the refrigerator, return to process station to start cleanup and decontamination process.

- **STEP 7 – Cleanup and Decontamination of Process Station**

  a. Make sure that all equipment has little residual dust and/or soil on it as possible. Transfer any remaining dust/soil onto the baking tray.

  b. Disassemble the grinder cup (reverser threads on bottom) and empty out any residual dirt onto tray liner.

  c. Take dirty equipment over (in plastic container) to decon area and set on drop-off table. Leave the baking sheet and grinder base at process station.

  d. Return to the processing station and gently tap coffee grinder to release any remaining dust onto baking sheet.

  e. Using a damp paper towel, wipe down entire coffee grinder base until clean. *DO NOT SUBMERSE COFFEE GRINDER DURING DECON!!!*

  f. Once coffee grinder is visibly clean, place outside hood.

  g. Using scissors cut baking sheet liner along front and the side where the liner is folded under the tray. Carefully slide out tray and take tray over to decon drop-off table.

  h. Return to the process station and fold tray liner up to avoid spillage and throw away in trash bucket at the end of the station.

  i. Wipe down the processing station table with a damp paper towel until clean.

  j. Repeat until clean and free of visible dirt. Dispose of towels in the trash bucket at the end of the station.

  k. Wipe down the area outside of the hood and any noticeable accumulation of dust at intake vent or along sidewalls.

  l. Inspect the floor to ensure that there are no residual soils on the floor. If there is, use dust broom and pan and follow with a damp paper towel wipe.

- **STEP 8 – Prepare Sample Station for Next Sample**

  a. Once the process station is completely cleaned, ensure all the required items identified in Section 3 of this guidance are present for next processing:

     - Clean/foil-wrapped sieve set
     - New scoops/spoons
     - Foil-wrapped coffee grinder steel cup
     - Clean coffee grinder
     - All required supplies are refurbished (water, towels, pens, gloves, etc.)

  b. If proceeding with another sample, obtain correct bottles and check labeling.

  c. Return to drying room to obtain another tray to be processed.

5. Contamination Avoidance

a. Care should be taken to avoid and cross-contamination between samples and process work areas. The following steps will help minimize potential cross-contamination issues:

- Always change gloves between samples
- Never put the base of the coffee grinder on the sample tray. Note that the grinder bases cannot be submersed for cleaning and therefore cannot be 100% decontaminated.
- Avoid spilling sample and over-filling jars.
- Minimize sample falling onto the floors and other surfaces.
- Keep all "dirty" equipment with the dust collection work area.
- Perform a thorough decontamination between samples of both equipment and surfaces.
- Minimize dust generated outside of the hoods such as when emptying trash containing left over samples.

6. Chain-of-Custody Procedures

a. MI sample chain-of-custody and documentation procedures will be conducted in accordance with Section 5.0 of the SAIC Facility-Wide Sampling and Analysis Plan (FSAP) and the Shaw Sampling and Analysis Plan (SAP) Addendum

7. Quality Assurance/Quality Control

a. Field

- To measure repeatability of field collection techniques, additional MI samples (duplicate, matrix spike, matrix spike duplicates, QA, equipment blanks, etc) will be collected in accordance with requirements of the FSAP and U.S. Environmental Protection Agency protocols.
- Notification to parties of interest will be made in advance of sample collection activities in the event those parties require separate samples.

b. Laboratory

The Shaw QAPP Addendum to the FSAP references the protocols and procedures that will be followed to ensure that procedures for sampling, chain-of-custody, laboratory analysis, instrument calibration, data reduction and reporting, internal quality control, audits, preventive maintenance, and corrective action for MI sample analysis are met.

FINAL

Quality Assurance Project Plan Addendum No. 1
for the
Remediation of Soils at Load Lines 1, 2, 3 and 4
at the
Ravenna Army Ammunition Plant
Ravenna, Ohio

Contract Number DACA45-03-D-0026
Task Order 0001

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QUALITY ASSURANCE PROJECT PLAN ADDENDUM NO. 1
Remediation of Soils at Load Lines 1, 2, 3 and 4
Ravenna Army Ammunition Plant
Ravenna, Ohio

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APPENDICES

LIST OF ACRONYMS

%D	Percent Difference
%R	Spike Recovery
µg/L	Micrograms per liter
µL	Microliter
BFB	Bromofluorobenzene
CCC	Calibration Check Compound
CCV	Continuing Calibration Verification
COC	Constituents of Concern
DFTPP	Decafluorotriphenylphosphine
DQOs	Data Quality Objectives
FPRI	Fixed-Price Remediation Services with Cost Cap Insurance
FSAP	Facility-wide Sampling Plan
FSP	Field Sampling Plan
GC	Gas Chromatography
ICP	Inductively Coupled Plasma
ICS	Interference Check Sample
ICV	Initial Calibration Verification
IS	Internal Standardization
LCG	Louisville Chemistry Guideline
LCS	Laboratory Control Sample
MCAWW	Method for Chemical Analysis of Water and Waste
MEC	Munitions and Explosives of Concern
MDL	Method Detection Limit
MRL	Method Reporting Limit
MS	Mass Spectrometric
MS/MSD	Matrix Spike / Matrix Spike Duplicate
OhioEPA	Ohio Environmental Protection Agency
PAH	Polynuclear Aromatic Hydrocarbon
PCBs	Polychlorinated Biphenyls
QA	Quality Assurance
QC	Quality Control
QAMP	Quality Assurance Management Plan
QAPP	Quality Assurance Project Plan
RDX	Hexahydro-1,2,5-trinitro-1,3,5-triazine
RF	Response Factor
RGO	Remedial Goal Options
RPD	Relative Percent Difference
RRT	Relative Retention Time

LIST OF ACRONYMS

RSD	Relative Standard Deviation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SOPs	Standard Operating Procedures
SPCC	System Performance Check Compounds
SVOCs	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TIC	Tentatively Identified Compound
TNT	2,4,6-Trinitrotoluene
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WMMP	Waste Management and Minimization Plan

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) Addendum was prepared by Shaw Environmental, Inc. (Shaw) as part of the Sampling and Analysis Plan (SAP) Addendum to supplement the Field Sampling Plan (FSP) Addendum for the remediation of soils in Load Lines 1, 2, 3 and 4 (LLs 1-4) at the Ravenna Army Ammunitions Plant (RVAAP) in Ravenna, Ohio. The format of this QAPP addendum is presented to document adherence to the Facility-wide QAPP in the Facility-wide Sampling and Analysis Plan (FSAP; SAIC 2001a) and stipulate project-specific addendum requirements. The overall objective is to identify procedures for sampling, chain-of-custody, laboratory analysis, instrument calibration, data reduction and reporting, internal quality control, audits, preventive maintenance, and corrective action. This QAPP Addendum presents the field and laboratory quality assurance/quality control (QA/QC) policies and procedures that will be followed during the implementation of the project.

1.1 Site History/Background

Site history and background information are documented in numerous previous reports as indicated below:

- "Final Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (SAIC 2003);
- "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (Shaw 2004a);
- "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (Shaw 2004b); and
- "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio," (Shaw 2004c).

1.2 Past Data Collection

Previous data collection at LLs 1-4 is documented in detail in the aforementioned Remedial Investigation (RI) reports identified in Section 1.1 of this QAPP Addendum.

1.3 Project Objectives and Scope

Excavation and off-site disposal was selected by Shaw during the Proposed Plan (Shaw 2005) as the primary remedial option to address shallow soils and dry sediments found to be exceeding expected cleanup levels in LLs 1-4. The Scope of Work under this Task Order does not include designation and clearing of Munitions and Explosives of Concern (MEC), but will address soils and dry sediments found to be impacted by explosives contaminants identified as being used at the site.

Areas to be excavated in LLs 1-4 will be delineated based on available data (*e.g.*, RI data tables) and confirmation sampling activities. Based on the information provided in the RIs (SAIC 2003; Shaw 2004b, c, and d), Shaw estimates 14,567 cubic yards of dry sediment and soil will require excavation and off-site disposal. The actual disposal volumes will be dependent upon the size and depth of excavation areas as defined by subsequent confirmatory sampling for constituents of concern (COCs) by Shaw. Off-site disposal facilities will be selected based on waste

characterization data results. It is Shaw's intention to pre-characterize the soil for waste disposal to facilitate direct loading and disposal of the soil. However, if an area is encountered that requires excavation that was not pre-characterized; the material will be excavated and stockpiled on-site. Samples of the stockpile will be collected and analyzed for waste characterization profiling. Once the disposal option has been approved, the soil will be loaded and transported for disposal. The specific procedures for handling and disposing of wastes generated during the proposed remediation are further detailed in the Waste Management and Minimization Plan (WMMP; Shaw 2006a).

The project objective is to remediate accessible shallow soils and dry sediment containing COCs that exceed cleanup goals at LLs 1-4 at the RVAAP. As part of the remedial action, Shaw will conduct post-excavation sampling to confirm the extent of contamination above cleanup levels in soil and dry sediment at LLs 1-4 is removed, characterize soils for disposal and determine the potential impact of remediation on local groundwater. The sampling phases of this effort and the associated objectives are as follows:

- Pre-Excavation Waste Characterization Sampling: Collect samples prior to excavation to characterize soils as hazardous or non-hazardous for direct loading for disposal off-site.
- Post-Excavation Sampling: Confirm the effectiveness of the excavations with field and laboratory analysis to confirm that soil and dry sediment contaminated above cleanup levels have been removed.
- Waste Characterization Sampling for Stockpiled Material: Characterize stockpiled soils that have not already been characterized as part of pre-excavation waste sampling as hazardous or non-hazardous for disposal off-site.
- Long-Term Groundwater Monitoring: Evaluate the performance of the remedial action and impact on COC concentrations in local groundwater.

The data quality objectives (DQOs) for investigations at the RVAAP are established in Section 3.0 of the FSAP (SAIC 2001a). Project-specific DQOs are evaluated within the discussion of each task below, including the rationales related to sample location, discrete or composite soil sampling requirements, sample collection, field and laboratory analyses, QA/QC sample collection and frequency.

1.4 Sample Rationale

Shaw intends to conduct each of the soil and sediment sampling phases of the field work at one time across the four load lines to provide a more efficient remedial implementation. The groundwater monitoring will be conducted after remediation efforts are complete. The field activities described in the following sections will be conducted in accordance with the general guidelines identified in the FSAP (SAIC 2001a) in Section 4.3 for Groundwater, Section 4.4 for Subsurface Soil, and in Section 4.5 for Surface Soil and Sediment.

1.5 Field Testing and Post-Excavation Sampling

Shaw will start excavation from the area of the highest COC concentrations detected and move outward from the assumed source location. This will serve to remove the most potentially grossly impacted soils first to minimize the generation of hazardous wastes in accordance with Shaw's WMMP (Shaw 2006a). Once the "hot spot" areas are removed, Shaw will methodically

excavate in areas designated for excavation, using field test kits to guide further excavation. Once the field test kits indicate that the soil exceeding cleanup levels is removed, confirmatory samples will be collected using multi-increment sample as presented in the Guidance for Multi-Increment Sampling in Appendix B of the FSP Addendum and sent to an approved laboratory for analysis. Shaw will manage the field work such that the analytical results will be received prior to demobilization of the excavation equipment, allowing for further excavation based on the laboratory results, if necessary. Shaw will develop a correlation between the results of the field analyses and the laboratory analyses to improve the accuracy of the selection of the extent of excavation.

To ensure that remedial objectives are achieved by the planned excavation activities, post-excavation soil sampling will be conducted throughout excavation activities within each excavation area. This plan outlines the procedures to be followed to ensure that samples are collected and analyzed in a way that provides accurate and representative data for completion of the remedial action and fulfills the applicable regulatory requirements.

The following sections describe the sampling frequency, methodology, analyses and results interpretation.

1.5.1 SAMPLE LOCATION AND FREQUENCY

1.5.1.1 Field Screen Samples

Field screening soil samples will be collected within the excavation area from the floor and sidewalls and analyzed in the field. The planned sampling frequency will depend on the size of the excavation and may be manipulated based on field test results. The method of sample collection from the sidewall depends on the depth of the excavation. If the excavation reaches refusal (*i.e.*, foundations, rock) samples will be collected to the extent practical and areas and depths of refusal where no sample could be collected will be denoted in the field notes per the requirements of Section 5.0 in the FSP Addendum. If the field test indicates the edge of the excavation has been reached (*i.e.*, COCs < cleanup levels), excavation will cease in that direction or depth. If the field test results indicate otherwise (*i.e.*, COCs > cleanup levels) then the excavation will continue until the field test results indicate that cleanup levels are met or conditions prevent further excavation (i.e., building foundations, subsurface obstructions, etc.)

1.5.1.2 Post-Excavation Samples

Once field screen results have fully indicated contaminated soil to have been removed from an excavation area, a post-excavation sample shall be collected in accordance with Appendix B of the FSP Addendum. Post-excavation sampling will consist of the collection of a series of grab samples as part of multi-increment sampling within the excavated area. Locations and depths of the samples will be logged in a field book and flagged in the excavation area. These samples will be composited to create one representative sample and submitted to an environmental chemistry laboratory for analysis.

1.5.2 SAMPLE DESIGNATION

Section 5.3 of the FSAP (SAIC 2001a) identifies the required location/sample identification naming conventions to be used to the extent possible to identify samples collected at the RVAAP and submitted for laboratory analysis. A modified version of the USACE-Louisville District

location/sample identification naming conventions will be used for samples collected from within the excavation area and is shown in Table 1-1.

Table 1-1
Sample Naming System for Post-Excavation Sampling

Sample Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		SD	- Sediment Sample Location
		SS	- Surface Soil Location
NNN	= Discrete Excavation Number (three-digit number unique to excavation area across the four load lines)		
Random Sample Point Identification: XXXmm-NNN-LL			
LL	= Random multi-increment sample location (#01 – 30) within the post-excavation area		

Field personnel will identify the sample location identification in a field log book and the random multi-increment sample locations will be staked so that they can be surveyed using a Trimbal ProXRS (or approved equal) Global Positioning System (GPS) with an accuracy determination capable of within one meter. At a minimum, random sample locations will be surveyed on a bi-weekly basis. The sample locations will be downloaded and identified on plans to be prepared by Shaw.

1.5.3 SAMPLING EQUIPMENT AND PROCEDURES

Post-excavation samples shall be collected from the excavated area to delineate compliance with closure criteria. Post-excavation samples will be collected using the equipment and procedures presented in the Guidance for Multi-Increment Sampling in Appendix B of the FSP Addendum. Sampling devices will be inspected prior to use to ensure that there is no corrosion or wear that would increase the likelihood of COC sorption to the sampling equipment. Reusable sampling equipment will be thoroughly decontaminated between uses as described in Section 4.4.2.8 of the FSAP (SAIC 2001a) to prevent cross contamination.

1.5.4 SAMPLE HANDLING AND ANALYSIS

Sample preservation methods for each analytical approach are described in this QAPP Addendum, along with a description of sample handling, chain-of-custody and other quality assurance procedures.

The field test kits will be used to analyze for explosives and metals, as well as polychlorinated biphenyls (PCBs), where previous investigation identified the presence of PCBs. The field test kits will be used to guide the excavation only. Laboratory analysis will be used for confirmatory samples. The specific methods are described in the QAPP Addendum. The parameters for laboratory analysis of post-excavation samples will be selected based upon Remedial

Investigation (RI) and pre-excavation characterization results. Parameters may include PCBs, metals, explosives, pesticides and semi-volatile organic compounds (SVOCs).

1.5.5 Sample Analysis and Interpretation

If the field analysis results indicate that concentrations of COCs exceed cleanup levels, excavation will continue in the direction from where the sample was collected until exceedances are not detected. When the four sidewall samples and the floor sample(s) do not exceed the cleanup levels, the excavation will be considered temporarily complete pending the results of the laboratory confirmation results.

Should the laboratory analysis indicate that the concentrations of COCs in a sample are less than the established cleanup levels, then the excavation from which that sample was collected will be backfilled with certified clean fill from an approved off-site source. Should the sample indicate a concentration greater than or equal to cleanup levels, then excavation in the area will recommence and the sampling program for that area will proceed from there.

1.6 Waste Characterization Sampling

Prior to excavation activities, Shaw may collect pre-excavation samples for waste characterization purposes. Pre-excavation samples will be collected in accordance with the Guidance for Multi-Increment Sampling presented in Appendix B of the FSP Addendum included as part of this SAP Addendum. The proposed excavation areas will be measured for horizontal location prior to the initiation of the sampling activities and delineated with wooden stakes to ensure that the pre-excavation samples are collected from within the limits of contamination.

Soils that require excavation that were not characterized during the pre-excavation sampling will be consolidated at a temporary central stockpile area within each load line. The soils at the central stockpile locations will be segregated based on existing sample data provided in the RIs. Samples shall be collected from each stockpile and submitted for waste characterization analyses prior to off-site disposal as discussed further in this section.

1.6.1 Sample Location and Frequency

1.6.1.1 Pre-Excavation Locations

Samples to be collected from pre-excavation locations will be analyzed in accordance with disposal requirements identified in the WMMP (Shaw 2006a). In general, stockpile sampling will consist of the collection of a series of grab random samples as part of multi-increment sampling within the pre-excavation area. Locations and depths of the samples will be logged in a field book and flagged in the pre-excavation area. These samples will be composited to create one representative waste characteristic sample to submit to an environmental chemistry laboratory for analysis. Multi-increment sampling procedures are presented in Appendix B of the FSP Addendum. The number of samples required for waste characterization will be determined in consultation with the Ohio Environmental Protection Agency (OhioEPA) and in accordance with disposal facility acceptance criteria and state and federal requirements

1.6.1.2 Soil Stockpiles

Soil samples to be collected from the stockpiles will be analyzed in accordance with disposal requirements identified in the WMMP (Shaw 2006a). In general, stockpile sampling will consist of the collection of a series of grab random samples as part of multi-increment sampling within the stockpile. Locations and depths of the samples will be logged in a field book and flagged in the stockpile to the extent possible. These samples will be composited to create one representative waste characteristic sample to submit to an environmental chemistry laboratory for analysis in accordance with Appendix B of this FSP Addendum. The number of samples required for waste characterization will be determined in consultation with the OhioEPA and in accordance with disposal facility acceptance criteria and state and federal requirements.

1.6.2 SAMPLE DESIGNATION

The USACE-Louisville District location/sample identification naming conventions presented in Section 5.3 of the FSAP (SAIC 2001a) will be used to identify samples collected at the RVAAP and submitted for laboratory analysis. A modified version of the USACE-Louisville District location/sample identification naming conventions will be used for samples collected from pre-excavation areas and stockpiles of excavated soil and sediment. The modified naming systems for waste characterization samples collected from the pre-excavation areas and stockpile locates are shown in Table 1-2.

Table 1-2
Sample Naming System for Waste Characterization Sampling

Sampling Location Identification: XXX-NNN-###		
XXX	= Area Designator	Examples LL1 - Load Line 1 LL4 - Load Line 4
NNN	= Discrete Excavation or Stockpile Number (three-digit number unique to excavation area or stockpile across the four load lines)	
###	= Sequential Sample Number (only if more than one sample required from discrete excavation or stockpile location)	
Random Sample Point Identification: XXX-NNN-####-LL		
LL	= Random multi-increment sample location (#1 – 30) within the discrete excavation or stockpile area.	

Field personnel will identify the waste sample location identification in a field log book and the random multi-increment sample locations will be staked within the pre-excavation area of stockpile location so that they can be surveyed using a Trimbal ProXRS (or approved equal) GPS with an accuracy determination capable of within one meter. At a minimum, random sample locations will be surveyed on a bi-weekly basis. The sample locations will be downloaded and identified on plans to be prepared by Shaw.

1.6.3 Sampling Equipment and Procedures

Waste characterization samples shall be collected from both the pre-excavation and stockpile areas using multi-increment sampling to adequately provide a representative analysis of the contaminated areas using the procedures presented in Appendix B of the FSP Addendum. Sampling devices will be inspected prior to use to ensure that there is no corrosion or wear that would increase the likelihood of COC sorption to the sampling equipment. Reusable sampling equipment will be thoroughly decontaminated between uses as described in Section 4.4.2.8 of the FSAP (SAIC 2001a) to prevent cross contamination.

1.6.4 Sample Handling and Analysis

Sample preservation methods for each analytical approach are described in this QAPP Addendum. A description of sample handling, chain-of-custody and other quality assurance procedures are included in this and subsequent sections of this document as well. The waste samples will be submitted to the laboratory for analysis of COCs and other parameters required by the disposal facilities in a short turnaround. The laboratory will likely analyze the samples for SVOCs, PCBs, explosives, pesticides, metals, corrosivity, pH, reactivity and flash; however, the accepting disposal facilities will ultimately dictate the required waste characterization sample requirements.

1.6.5 Sample Analysis and Interpretation

If the results indicate the metals concentration exceeds Toxicity Characteristic Leaching Procedure (TCLP) characteristics, the soil in the associated excavation area or stockpile will be disposed of as hazardous waste. If TCLP characteristics are not exceeded, and the soil is not a characteristic waste, then the soil will be disposed of off-site as non-hazardous, but contaminated. All generated soil/sediment will also be evaluated to determine if it should be handled as a waste under the Toxic Substances Control Act (TSCA).

1.7 Long-Term Groundwater Monitoring

Groundwater monitoring will be conducted to evaluate the impact of the proposed source removal action. Prior to the removal, a baseline set of groundwater data will be obtained. Groundwater monitoring will also be conducted after remediation activities have been completed.

1.7.1 Sample Location and Frequency

The proposed sampling locations, frequency and term of groundwater monitoring will be determined through discussions with the OhioEPA.

1.7.2 Sample Designation

The USACE-Louisville District location/sample identification naming conventions presented in Section 5.3 of the FSAP (SAIC 2001a) will be used to the extent possible to identify samples collected at the RVAAP and submitted for laboratory analysis. Shaw will utilize a modified version of the USACE-Louisville District location/sample identification naming conventions for groundwater samples collected as part of groundwater monitoring activities. A summary of these modified naming conventions is presented in Table 1-3.

Table 1-3
Sample Naming System for Groundwater Sampling

Sampling Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		MW	- Groundwater Monitoring Well
NNN	= Sequential Location Number (three-digit number unique to designator)		
Sample Identification: XXXmm-NNN-####-tt			
####	= Sequential Sample Number (four-digit number unique to site)		
tt	= Sample Type	Examples	
		GW	- Groundwater Sample (unfiltered)
		GF	- Groundwater Sample (filtered)
		FB	- Field Blank
		ER	- Equipment Rinsate

The sample numbers noted with a '####' in Table 1-3 will begin at the value one greater than that assigned to the last sample collected in each of the load lines. The location and sample will be assigned matching numbers.

1.7.3 SAMPLING EQUIPMENT AND PROCEDURES

The sampling methods identified in the FSAP (SAIC 2001a) will be used to collect the groundwater monitoring samples. Field measurement procedures and criteria are described in Section 4.3.3 of the FSAP (SAIC 2001a). Monitoring well purging and groundwater sampling will be conducted with a Teflon® bailer or bladder pump as described in Section 4.3.4 (and 4.3.5 for filtered samples) of the FSAP (SAIC 2001a).

Sampling devices will be inspected prior to use to ensure that there is no corrosion or wear that would increase the likelihood of COC sorption to the sampling equipment. Reusable sampling equipment will be thoroughly decontaminated between uses as described in Section 4.3.8 of the FSAP (SAIC 2001a).

1.7.4 SAMPLE HANDLING AND ANALYSIS

Parameters for field and laboratory analysis will be discussed with OhioEPA.

1.7.5 SAMPLE ANALYSIS AND INTERPRETATION

The criteria for evaluating the performance of the proposed remediation approach through groundwater monitoring will be established in discussions with the OhioEPA. Potential criteria include reduced concentrations of COCs in groundwater in the vicinity of excavations.

1.8 Parameters to be Tested and Frequency

Sample matrix types, analytical parameters, and analytical methods are discussed in Section 4.0 of the FSP Addendum. These are summarized in Table 1-4 of this QAPP Addendum, in conjunction with QA sample and field QC sample frequencies.

1.9 Project Schedule

The project schedule is discussed in Section 11.0 of the FSP Addendum.

Table 1-4
Sampling and Analytical Requirements

Parameter	Methods	Post-Excavation	Disposal Characterization[1]
Field 2,4,6-Trinitrotoluene (TNT)/ Hexahydro-1,2,5-trinitro-1,3,5-triazine (RDX) Screening	RVAAP Standard Operating Procedure (SOP) 2000	X	
Field Metals Screening	Test Methods for Evaluating Solid Waste (SW-846), 6200	X	
Semi-Volatile Organic Compounds (SVOCs), Target Compound List (TCL)	SW-846, 3540/8270C/Louisville Chemical Guidelines (LCG)	X	X
Pesticides, TCL	SW-846, 3540/8081A/LCG	X	X
Polychlorinated Biphenyls (PCBs)	SW-846, 3540/8082/LCG	X	X
Explosives	SW-846, 8330/LCG	X	X
Propellants/ Nitroglycerine	SW-846, 8330/LCG	X	X
Propellants /Nitroguanidine	SW-846, 8330 modified /LCG	X	X
Propellants /Nitrocellulose	Method for Chemical Analysis of Water and Waste (MCAWW) 353.2 Modified	X	X
Metals, Target Analyte List (TAL)	SW-846, 6010B/7471/LCG	X	X
Volatile Organic Compounds (VOCs), TCL	SW-846, 5030/8260B/LCG		X
pH	SW-846 9040/9045		X
Reactivity	REACT-C=SW-846 7.3.3.2 REACT-C=SW-846 7.3.3.2		X
Flash Point	SW-846 1010		X

[1] The parameters for disposal characterization sampling will ultimately be determined by the requirements of the disposal facility.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The functional project organization and responsibilities are described in Section 2.0 of the FSP Addendum.

Analytical support for this work will be assigned to an USACE Louisville approved laboratory. The address and telephone number for the laboratory facility will be provided when a facility is selected.

3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

Quality assurance objectives for measurement data are identified in the Facility-wide QAPP in the FSAP (SAIC 2001a). Project-specific objectives are identified in the following sections.

3.1 Data Quality Objectives

DQO summaries for this scope of work will follow Tables 3-1 and 3-2 in the Facility-wide QAPP in the FSAP (SAIC 2001a). QC parameters stated in the Louisville Chemical Guidelines (LCG; USACE 2002) will be adhered to for each chemical listed. The U.S. Environmental Protection Agency (USEPA) Publication SW-846, Test Methods for Evaluation Solid Waste (USEPA, 2004) references found in the Facility-wide QAPP have been revised to the Update III Methods (i.e., 8270B is now 8270C, etc.). Laboratories are required to comply with all SW-846/LCG method requirements.

3.2 Level of Quality Control Effort

QC efforts will follow Section 3.2 of the Facility-wide QAPP in the FSAP (SAIC 2001a). Field QC measurements will include trip blanks, field duplicates and equipment rinsate blanks. Laboratory QC measurements will include method blanks; laboratory control samples (LCSs), laboratory duplicates, and matrix spike/matrix spike duplicate (MS/MSD or MS/MD) samples.

3.3 Accuracy, Precision, and Sensitivity of Analysis

Accuracy, precision, and sensitivity goals identified in Section 3.3 and Tables 3-3 through 3-9 of the Facility-wide QAPP in the FSAP (SAIC 2001a) will be imposed for this project.

3.4 Completeness, Representativeness, and Comparability

Completeness, representativeness, and comparability goals identified in Section 3.4 of the Facility-wide QAPP in the FSAP (SAIC 2001a) will be imposed for this project.

4.0 SAMPLING PROCEDURES

Sampling procedures for each sampling activity are discussed in Section 4.0 of the FSAP (SAIC 2001a) and the media- and areas of concern (AOC)-specific addenda (SAIC 1999, 2000, 2001b), and Shaw's FSP Addendum for this project. Table 4-1 summarizes sample container, preservation, and holding time requirements for the soil and dry sediment matrices for this investigation for known parameters. Shaw will follow laboratory requirements for sample container, preservation, and holding time for parameters yet to be determined for disposal characterization and groundwater sampling.

Table 4-1
Container Requirements for Soil and Sediment

Analyte Group	Method	Container	Preservative	Holding Time
VOCs	SW-846 5030/8260B/LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	14 days
SVOCs	SW-846 3540/8260B/LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	14 days (extraction) 40 days (analysis)
Pesticides	SW-846 3540/8081A/LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	14 days (extraction) 40 days (analysis)
PCBs	SW-846 3540/8082/LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	14 days (extraction) 40 days (analysis)
Explosives	SW-846 3540/8330/LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	14 days (extraction) 40 days (analysis)
Propellant /Nitro-glycerine	SW-846 3540/8330/LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	14 days (extraction) 40 days (analysis)
Propellant /Nitro-guanidine	SW-846 8330 Modified/ LCG	4-oz jar	Ice, 4°C	14 days (extraction) 40 days (analysis)
Propellant /Nitro-cellulose	MCAWW 353.2 Modified	4-oz jar	Ice, 4°C	28 days from collection
Metals	SW-846 6010B/6010A/7471LCG	One 4-oz glass jar with Teflon-lined cap	Ice, 4°C	6 months
pH	SW-846 9040/9045	1 2-oz glass jar with Teflon-lined cap	Ice, 4°C	No Hold times defined
Reactivity	REACT-C=SW-846 7.3.3.2 REACT-C=SW-846 7.3.4.1	1 2-oz glass jar with Teflon-lined cap	Ice, 4°C	No Hold times defined
Flash Point	SW-846 1010	1 4-oz glass jar with Teflon-lined cap	Ice, 4°C	No Hold times defined

5.0 SAMPLE CUSTODY

5.1 Field Chain-of-Custody Procedures

Sampling handling, packaging, and shipment procedures will follow those identified in Section 5.1 of the Facility-wide QAPP in the FSAP (SAIC 2001a). The Laboratory Sample Receipt form to be filled out by the laboratory once they receive the samples is included in Appendix A of this QAPP.

5.2 Laboratory Chain-of-Custody Procedures

Laboratory chain-of-custody processing will follow handling and custody procedures identified in the laboratory's Quality Assurance Management Plan (QAMP). These procedures will be forwarded to the USACE for review after a designated laboratory is selected.

5.3 Final Evidence Files Custody Procedures

Custody of evidence will follow those criteria defined in Section 5.3 of the Facility-wide QAPP in the FSAP (SAIC 2001a).

6.0 CALIBRATION PROCEDURES AND FREQUENCY

6.1 Field Instruments/Equipment

Field instrument and equipment calibrations will follow those identified in Section 6.1 of the Facility-wide QAPP in the FSAP (SAIC 2001a) or the manufacturer's instructions if specific calibration procedures are not identified in the SAP.

6.2 Laboratory Instruments

Calibration of laboratory equipment will follow procedures identified in the laboratory's QAMP as well as the LCG (USACE, 2002). The procedures will be forwarded to USACE for review and a copy retained in Shaw's project file.

7.0 ANALYTICAL PROCEDURES

7.1 Laboratory Analysis

Samples will be analyzed using USEPA-approved methods or other recognized standard methods. All samples will be analyzed following the QC requirements stipulated in the LCG Tables 1-10 (USACE 2002). The principal source for analytical methods is SW-846, Test Methods for Evaluating Solid Wastes (USEPA, 2004). In addition to the practiced QC requirements in SW-846, there are four additional QC requirements that must be implemented in all analytical analyses for Louisville District as indicated below.

Method Reporting Limit (MRL): MRLs are threshold values above which results are reported as positive quantities, and below which results are reported as non-detects or as estimated. The MRL is set based on the Method Detection Limit (MDL), action level, and risk assessment levels. It should be set at $\geq$ 3MDL and below one half of the project action level. Furthermore, MRL must be set below risk assessment levels. USACE guidance on establishing reporting limits is provided in Appendix C of the LCG on pages 237-246 (USACE 2002).

QC/MRL Check: A QC sample at the MRL concentration must be analyzed at a low level of the calibration curve. This standard is run before and after analyzing USACE samples. The QC/MRL is a low-level standard that is not exposed to either digestion or extraction.

QC/MDL Check: A QC sample of known concentration must be analyzed to verify instrument sensitivity at the MDL on a quarterly basis for every instrument used to run USACE samples. The QC/MDL concentration is at $\cong$ 2 MDL. The QC/MDL is a low-level standard that is not exposed to either digestion or extraction.

Initial Calibration Verification (ICV)/Second Source Verification: A mid level standard from a second vendor must be analyzed after initial calibration. The acceptable recoveries are provided in the Tables 1-9 of LCG (USACE 2002).

Tables 1-9 also list the required laboratory QC samples for each method. The MRLs for each analyte must be no more than one-half (1/2) of the project specific action levels.

7.1.1 VOLATILE ORGANIC COMPOUNDS BY METHOD 8260B

Volatile (or purgeable) organic compounds (VOCs) in water and soil samples are analyzed using method SW-8260B. This method uses a capillary column Gas Chromatography (GC)/Mass Spectrometric (MS) technique. Volatile compounds are introduced into the by purge and trap (SW-5030B/SW-5035). An inert gas is bubbled through the water sample (or soil-water slurry for soil samples) to transfer the purgeable organic compounds from the liquid to the gaseous phase. Soil samples with higher contamination levels are extracted using methanol before purging. The vapor is then swept through a sorbent trap where the purgeable organics are trapped. The trap is then back flushed with the inert gas and heated to desorb the organic compounds onto a capillary GC column where they are separated and then detected with a mass spectrometer.

The mass spectrometer is tuned daily to give an acceptable spectrum for bromofluorobenzene (BFB). The tuning acceptance criteria are given in the following list as ion abundance for each specified mass.

- Mass 50 15% to 40% of mass
- Mass 75 30% to 60% of mass 95
- Mass 95 Base Peak, 100% relative abundance
- Mass 96 5% to 9% of mass 95
- Mass 173 Less than 2% of mass 174
- Mass 174 Greater than 50% of mass 95
- Mass 175 5% to 9% of mass 174
- Mass 176 Greater than 95%, but less than 101% of mass 174
- Mass 177 5% to 9% of mass 176

Project samples may not be analyzed until the instrument achieves the tuning criteria. The Internal Standardization (IS) method is used for quantitation of analyte of interest. For quantitation, ISs are added to all calibration standards, blanks, samples and QC and response factors (RFs) are calculated from the base ion peak of a specific IS.

Initial and Continuing Calibration

Initial calibration is designed to measure instrument performance and demonstrate that the instrument is capable of generating acceptable values. This is performed at the beginning of the analytical run and is used in producing a linear calibration curve. Continuing calibration provides a means to measure or check performance on a daily basis. It also provides information on satisfactory maintenance and adjustment of the instrument during sample analysis.

Initial Calibration

The initial calibration is established by analyzing standards containing both volatile target compounds and surrogate compounds (system monitoring compounds) at concentrations of MRL, 20, 50, 100, 200 micrograms per liter (µg/L) (USACE 2002). It is to be noted that these concentrations are not mandatory. The relative standard deviation (RSD) for each target analyte must be ≤ 15 percent; however, the RSD for the calibration check compound (CCC) must be ≤ 30 percent (USACE 2002).

The mean RF for the, system performance check compounds (SPCC), must be ≥ the following criteria: chloromethane = 0.10; 1,1-dichloroethane = 0.10; bromoform = 0.10; chlorobenzene = 0.30; and 1,1,2,2-tetrachloroethane = 0.30 (USACE 2002).

The system is checked for leaks and/or reactive sites on the column by evaluating the CCCs. The RSD must be ≤ 30 percent for each of the CCC compounds, 1,1-dichloroethene; chloroform; 1,2-dichloropropane; toluene; ethylbenzene, and vinyl chloride (USACE 2002).

Initial Calibration Verification (ICV)

The ICV must be prepared from a second source, and the recovery must be within 80-120 percent (USACE 2002). ICV must be completed prior to the start of sample analysis.

Continuing Calibration Verification (CCV)
In order to ensure that the initial calibration curve is still usable for determining the concentration of the target compounds during analysis, the analyst must conduct a CCV every 12 hours. If the CCV did not meet the RF criteria for the SPCC, and/or the "D" for the CCC, then results of all samples analyzed during that 12-hour period are suspect.

Blanks
Blank samples must be free of any contaminants. Method blanks should not be considered contaminated when levels of compounds appear at or below 1/2 MRL levels. If levels of contaminant are > 1/2 MRL, then a comment will be made in the laboratory report that these blanks are contaminated. The acceptance criteria for the method blank have been described in the LCG (USACE 2002).

Laboratory Control Sample (LCS)
Since the LCS is prepared by spiking target compounds of interest in a pure matrix that is interference free (reagent water), meeting the QC limits is vitally important in assuring that the instrument and the method are within the acceptance criteria. Analysis should not be conducted when the LCS results are out of the QC limits. QC limits are provided in Appendix C of the LCG (USACE 2002).

Surrogate Recovery
Samples are spiked with surrogate compounds prior to preparation. The surrogate recoveries for volatile organic compounds must be within the acceptable limits specified in the LCG (USACE 2002).

Matrix Spike/Matrix Spike Duplicate
The MS/MSD results are designed to determine the precision of the analytical method on various matrices. Given that every matrix is unique, the use of MS/MSD for precision may be specific to individual samples.

Internal Standards
IS area counts should be within the range –50 percent to +100 percent from the associated calibration standard. The retention time of the internal standard must not vary more than 30 seconds from the associated calibration standard. ISs are added to all calibration standards, blanks, and samples. QC and RFs are calculated from the ion peak of a specific IS.

Sample Analysis
Positive hits must possess ion abundance > 10 percent of the base ion in the standard. Furthermore, identified compounds must have Relative Retention Time (RRT) within ± 0.06 RRT of the standard component. The internal standard areas QC limits are -50 to +100 percent.

Table 1 of the LCG (USACE 2002) presents a summary of quality objectives for this method and Section VI (Appendix C) of the LCG presents reporting limits.

Table 7-1
Laboratory Quality Control Sample Summary

Analytical Instrumentation Method	Parameter	QC Check	Frequency
SW-846 8260B	Volatile Organic Compounds	Method blank Surrogate Internal Standard LCS MS/MSD	1/prep. batch 3/sample + QC 3/sample + QC 1/prep. batch 1 pair/prep. batch
SW-846 8270C	Semivolatile Organic Compounds	Method blank Surrogate Internal Standard LCS MS/MSD	1/prep. batch 6/sample + QC 6/sample +QC 1/prep. batch 1 pair/prep. batch
SW-846 8081A	Pesticides	Method blank Surrogate LCS MS/MSD	1/prep. batch 6/sample + QC 1/prep. batch 1 pair/prep. batch
SW-846 8082	PCBs	Method blank Surrogate LCS MS/MSD	1/prep. batch 6/sample + QC 1/prep. batch 1 pair/prep. batch
SW-846 8330	Explosives	Method blank Surrogate LCS MS/MSD	1/prep. batch 6/sample + QC 1/prep. batch 1 pair/prep. batch
SW-846 6010B/6020A/7471	Metals	Method blank LCS MS/MD	1/prep. batch 1/prep. batch 1 pair/prep. batch
SW-846 9040/9045	pH	LCS	1/prep batch
REACT-C=SW-846 7.3.3.2 REACT-C=SW-846 7.3.4.1	Reactivity	Duplicate	1/prep batch
SW-846 1010	Flash Point	Method blank LCS/LCS Duplicate	1/prep batch

7.1.2 SEMIVOLATILE ORGANIC COMPOUNDS BY METHOD 8270C

SVOCs also known as base-neutral and acid extractables, in water and soil samples are analyzed using method SW-8270C. This technique quantitatively determines the concentration of a number of SVOCs. Samples are solvent extracted and concentrated through evaporation of the solvent. Compounds of interest are separated and quantified using a capillary column GC/MS.

The mass spectrometer is tuned every 12 hours to give an acceptable spectrum for decafluorotriphenylphosphine (DFTPP). The tuning acceptance criteria are given in the following list as ion abundance for each specified mass.

- Mass 51 30% to 60% of mass 198
- Mass 68 Less than 2% of mass 69
- Mass 70 Less than 2% of mass 69
- Mass 127 40% to 60% of mass 198

- Mass 197 less than 1% of mass 198
- Mass 198 Base Peak, 100% relative percent abundance
- Mass 199 5% to 9% of mass 198
- Mass 275 10% to 30% of mass 198
- Mass 365 greater than 1% of mass 198
- Mass 441 present, but less than mass 443
- Mass 442 greater than 40% of mass 198
- Mass 443 17% to 23% of mass 442

Project samples may not be analyzed until the instrument achieves the tuning criteria.

Initial Calibration
The initial calibration is established by analyzing standards containing both semivolatile target compounds at the concentrations of MRL, 20, 50, 100, 200 µg/L as stated in LCG Version 5, page 124. However, these concentrations are not mandatory. The RSD for each target analyte must be ≤ 15 percent, however, the RSD for the CCC must be ≤ 30 percent. The RFs for the SPCC the RF must meet the minimum requirements. Both CCCs and SPCCs have been identified in the LCG (USACE 2002).

The system is checked for leaks and/or reactive sites on the column are by evaluating the CCCs. The RSD must be ≤ 30 percent for each of the CCC compounds.

ICV
The ICV must be prepared from a second source, and the recovery must be within 70-130 percent as stated in the LCG (USACE 2002).

CCV
In order to ensure that the initial calibration curve is still usable for determining the concentration of the target compounds during analysis, the analyst must conduct a CCV every 12 hours. If the CCV did not meet the RF criteria for the SPCC, and/or the "D" for the CCC, then results of all analyzed samples become suspect during that 12 hours period.

Sample Analysis
Positive hits must possess an ion abundance > 10 percent of the base ion in the standard spectra, and be within 30 percent of the major ions.

Blanks
Blank samples must be free of any contaminants. Method blanks should not be considered contaminated when levels of compounds appear at or below 1/2 MRL levels. If levels of contaminant are > 1/2 MRL, then a comment will be made in the laboratory report that these blanks are contaminated. The acceptance criteria for the method blank have been described in the LCG (USACE 2002).

LCS
LCSs are prepared by spiking target compounds of interest in a pure matrix that is interference free (reagent water). Meeting the QC limits is vitally important in assuring that the instrument and the method are within acceptance criteria. Analysis should not be conducted when the LCS

are out of the QC limits. The QC limits for the LCS are provided in Appendix C of the LCG (USACE 2002).

Surrogate Recovery
Samples are spiked with surrogate compounds prior to the addition of extracting solvents to the samples. The surrogate recoveries for semivolatile organic compounds must be must be within the acceptable limits specified as follows:

- 2-fluorophenol 35 -100%
- Phenol-d5 35 -100%
- Nitrobenzene-d5 50 -150%
- 2-fluorobiphenyl 50 -150%
- 2,4,6-tribromophenol 35 -100%
- terphenyl-d14 50 -150%

MS/MSD
Analytical data are generated for MS/MSDs to determine precision and accuracy of the analytical methods and extraction methods on various matrices. MS/MSDs are prepared by adding a known amount of target analytes to the sample prior to the extraction process. If MS/MSD results are outside the QC limits, professional judgment is used to interpret the data. The MS/MSD results are designed to determine the precision of the analytical method on various matrices. Given that every matrix is unique, the use of MS/MSD for precision may be specific to individual samples.

IS
IS area counts should not vary by more than a factor of two (-50% to +100%) from the associated calibration standard. The retention time of the must not vary more than ±0.06 from associated calibration standard. ISs are added to all calibration standards, blanks, samples and QC and RFs are calculated from the base ion peak of a specific IS. Table 2 of the LCG (USACE 2002) presents a summary of quality objectives for this method and Section VI (Appendix C) presents the reporting limits.

7.1.3 Polynuclear Aromatics Hydrocarbons by Method 8270C Low Level

The SW8270C analysis for low level polynuclear aromatic hydrocarbons (PAHs) follows standard SW8270 methodology with the following differences:

(a) The injection volume is increased from 0.5 microliters (μL) to 2 μL
(b) The multiplier is raised to about 100.

7.1.4 Polychlorinated Biphenyl by Method 8082

Initial Calibration
The initial calibration is established by analyzing standards containing Aroclors 1016 and 1260 at MRL and four other levels. The RSD for each Aroclor must be ≤ 20 percent.

ICV
The must be prepared from a second source, and the recovery must be within 85-115 percent.

CCV
In order to ensure that the initial calibration curve is still usable for determining the concentration of the target compounds during analysis, the analyst must conduct a CCV every 12 hours. The accepted criteria for percent difference (%D) for each Aroclor is <20 percent.

Sample Analysis
Results from both the columns of the samples analyses must be reported.

Blanks
Blank samples must be free of any contaminants. Method blanks should not be considered contaminated when levels of compounds appear at or below 1/2 MRL levels. If levels of contaminant are > 1/2 MRL, then a comment will be made in the laboratory report that these blanks are contaminated.

LCS
LCSs are prepared by spiking target compounds of interest in a pure matrix that is interference free (reagent water). Meeting the QC limits is of vitally important in assuring that the instrument and the method are within the optimum and acceptance criteria. Analysis should not be conducted when the LCS are out of the QC limits.

Surrogate Recovery
Samples are spiked with surrogate compounds prior to the addition of extracting solvents to the samples. The surrogate recoveries for PCBs must be must be within the acceptable limits specified as follows:

- 2,4,5,6-tetrachloro-m-xylene 50-150%
- decachloro-m-xylene 50-150%

MS/MSD
Analytical data are generated for MS/MSDs to determine precision and accuracy of the analytical methods and extraction methods on various matrices. MS/MSD is prepared by adding a known amount of target analytes to the sample prior to extraction process. If MS/MSDs results are outside the QC limits, professional judgment is used to interpret the data. The MS/MSD results are designed to determine the precision of the analytical method on various matrices. Given that every matrix is unique, the use of MS/MSD for precision may be specific to individual samples.

7.1.5 METALS ANALYSIS BY METHOD 6010B

Initial calibration must be performed daily and each time the instrument is set up. This is established by analyzing a blank and three standards. A correlation coefficient of >0.995 is required.

ICV
The initial calibration verification must be prepared from a second source, and the recovery must be within 90-110 percent.

CCV
In order to ensure that the initial calibration curve is still valid for determining the concentration of the target compounds during analysis, the analyst must conduct a CCV after every ten samples and at the end of analytical sequence.

Blanks
There should be no contamination in the blank(s) at >1/2 MRL.

ICP Interference Check Sample
The inductively coupled plasma (ICP) interference check sample (ICS) verifies laboratory interelement and background corrective factors. Interference Check Sample A (ICSA) elements should be less than 1/2MRL. Results of the Interference Check Sample B (ICSB) solution must fall within the control limits of +/-20 percent of the true value.

LCS
The LCS serves as a monitor of the overall performance of all steps in the analysis, including sample preparation. All aqueous LCS results must fall within the control limits as provided in Appendix C of the LCG (USACE 2002).

Duplicate Sample Analysis
Duplicate analyses are indicators of laboratory precision based on each sample matrix.
A control limit of 20% relative percent difference (RPD) shall be used for sample values >MRL.

Check the raw data and recalculate one or more RPD using the following equations to verify that results have been correctly reported.

$$RPD = \left| \frac{S - D}{(S+D)/2} \right| \times 100$$

S = First Sample Value (original)
D = Second Sample Value (duplicate)

Matrix Spike Analysis
Spike recovery (%R) must be within the limits of 75-125 percent. However, spike recovery limits do not apply when sample concentration exceeds the spike concentration by a factor of 4 or more. In this case, the sample duplicate and serial dilution results will apply.

Check raw data and recalculate one or more %R using the following equation to verify that results were correctly reported.

$$\%R = \frac{(SSR-SR)}{SA \times 100}$$

where SSR= Spiked Sample Result
SR = Sample Result
SA = Spike Added

7.2 Field Screening Analytical Protocols

Procedures for analysis using field equipment are identified in Section 6.0 of the FSAP (SAIC 2001a).

8.0 INTERNAL QUALITY CONTROL CHECKS

8.1 Field Sample Collection

Field sample locations are identified in Section 4.0 of the FSP Addendum. In general, field duplicates and splits will be collected at a frequency of 10 percent. For soil samples, one field rinsate blank will be collected each day. MS/MSD (MS/MD in case of metals) samples will be collected at a frequency of 5 percent.

8.2 Field Measurement

Refer to Section 4.2 of the FSP Addendum for details regarding these measurements.

8.3 Laboratory Analysis

Analyses will also be consistent in accordance with the LCG (USACE 2002).

9.0 DATA REDUCTION, VALIDATION, AND REPORTING

9.1 Data Reduction

Sample collection and field measurements will follow the established protocols defined in the Facility-wide FSP and QAPP in the FSAP (SAIC 2001a) and Shaw's FSP Addendum. Laboratory data reduction will follow the LCG (USACE 2002).

9.2 Data Validation

Shaw will initially validate 10% of the data following the direction provided in the LCG (USACE 2002). The frequency of data validation may be increased based on the extent of deficiencies noted in the initial data and the importance of the data to the overall context of the project in accordance with Section 9.2 of the FSAP (SAIC 2001a).

9.3 Data Reporting

Analytical data reports will follow the directions provided in the Facility-wide QAPP in the FSAP (SAIC 2001a) and the Facility-wide Electronic Deliverable Document (SAIC 2001c) with subsequent addendums prepared by SAIC in 2004.

10.0 PERFORMANCE SYSTEM AUDITS

10.1 Field Audits

A minimum of one field surveillance for the investigation will be performed by the Shaw QA Officer and/or the Shaw Field Team Leader. This audit will encompass the sampling of soil and sediment from the AOCs, excavations and stockpiles and groundwater sampling. Surveillances will follow procedures outlined in Shaw's QAMP (Shaw 2006b).

10.2 Laboratory Audits

USEPA Region 5 or OhioEPA audits may be conducted at the discretion of the respective agency. Internal performance audits will be conducted by laboratory's QA staff as defined in the laboratory QAMP. Routine laboratory audits, on and off-site, will be conducted at the discretion of the auditing agency (i.e., USACE, OhioEPA, USEPA, etc.). Shaw will perform audits of laboratories selected for use under this contract in accordance with company standard SOPs. A list of subcontracted laboratories will be provided to USACE and OhioEPA prior to the commencement of field sampling activities.

11.0 PREVENTIVE MAINTENANCE PROCEDURES

11.1 Field Instruments and Equipment

Maintenance of field equipment and sampling equipment will follow direction provided in Section 11.1 of the Facility-wide QAPP in the FSAP (SAIC 2001a).

11.2 Laboratory Instruments

Routine and preventive maintenance for laboratory instruments and equipment will follow the direction of the laboratory's QAMP. The procedures will be forwarded to USACE for review and a copy retained in Shaw's project file.

12.0 SPECIFIC ROUTINE PROCEDURES TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

12.1 Field Measurements Data

Field data will be assessed as outlined in Section 12.1 of the Facility-wide QAPP in the FSAP (SAIC 2001a).

12.2 Laboratory Data

Laboratory data will be assessed as outlined in Section 12.2 of the Facility-wide QAPP in the FSAP (SAIC 2001a).

13.0 CORRECTIVE ACTIONS

13.1 Sample Collection/Field Measurements

Field activity corrective action protocol will follow directions provided in Section 13.1 of the Facility-wide QAPP in the FSAP (SAIC 2001a).

13.2 Laboratory Analyses

Laboratory activity corrective action protocol will follow directions provided in Section 13.2 of the Facility-wide QAPP in the FSAP (SAIC 2001a) and the laboratory's QAMP.

14.0 QA REPORTS TO MANAGEMENT

Procedures and reports will follow the protocol identified in Section 10.0 of the Facility-wide QAPP in the FSAP (SAIC 2001a) and those directed by the Shaw selected laboratory's QAMP.

15.0 REFERENCES

1. Science Applications International Corporation (SAIC) 1996. "Final Phase I Remedial Investigation Sampling and Analysis Plan Addendum for High Priority Areas of Concern for the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 1996.
2. SAIC 1999. "Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". August 1999.
3. SAIC 2000. "Final Sampling and Analysis Plan Addendum No. 2 for the Phase II Remedial Investigation of Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". September 2000.
4. SAIC 2001a. "Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunitions Plant, Ravenna, Ohio". March 2001.
5. SAIC 2001b. "Final Sampling and Analysis Plan Addendum No. 1 for the Phase II Remedial Investigation of Load Lines 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2001.
6. SAIC 2001c. "Electronic Data Deliverable." [Addendum in 2004].
7. SAIC 2003. "Final Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". June 2003.
8. Shaw Environmental, Inc. (Shaw) 2004a. "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
9. Shaw 2004b. "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
10. Shaw 2004c. "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". September 2004.
11. Shaw 2005. "Final Proposed Plan for Load Lines 1-4 for the Remediation of Soils at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2005.
12. Shaw 2006a. "Final Waste Management and Minimization Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
13. Shaw 2006b. "Final Quality Assurance and Management Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
14. United States Army Corps of Engineers (USACE)-Louisville District 2002. "USACE, Louisville Chemical Guideline, Version 5". June 2002.
15. United States Environmental Protection Agency (USEPA) 2004. "Test Methods for Evaluating Solid Waste, EPA Publication SW-846, Version 6". November 2004.

APPENDIX A

LABORATORY SAMPLE RECEIPT FORM

SAMPLE RECEIPT FORM

156 STARLITE DRIVE
MARIETTA, OH
45750
(740) 373-4071

Date:_____ Client:_____

Shipped By: ( ) Fed-Ex ( ) UPS ( )DHL ( ) KEMRON ( ) Client ( ) Other

Opened By:_____

Logged By:_____ Login # L06_____

IR Temp Gun: ( ) D ( ) F

COOLER INFORMATION

Number	Cooler ID	Temp °C	Airbill#	COC#	Other
1					
2					
3					
4					
5					
6					

Were all coolers sealed?	Y	N	N/A
Were custody seals used on all coolers?	Y	N	N/A
Were custody seals intact?	Y	N	N/A
Was visible ice present?	Y	N	N/A
Were all coolers in the temperature range of 2-6C? (>6C*)	Y	N	N/A
Were the samples frozen?*	Y	N	N/A
Were COC papers provided?	Y	N	N/A
Were all sample containers intact?*	Y	N	N/A
Were all sample labels intact?	Y	N	N/A
Were all sample labels legible?*	Y	N	N/A
Did all sample labels match the COC?*	Y	N	N/A
Was the label information complete?*	Y	N	N/A
Were the correct containers used?*	Y	N	N/A
Were the correct preservatives added to water samples?*	Y	N	N/A
Was the pH tested on preserved water samples?	Y	N	N/A
Were pH ranges acceptable?*	Y	N	N/A
Was sufficient amount of sample provided?*	Y	N	N/A
Were bubbles present in VOA samples?*	Y	N	N/A
Were COC's signed and dated?	Y	N	N/A
Did samples arrive before hold time expired?*	Y	N	N/A
Are discrepancy forms attached?	Y	N	N/A

**Requires a discrepancy form*

Comments:_____

FINAL

Quality Assurance and Management Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant Ravenna, Ohio

Contract Number DACA45-03-D-0026
Task Order 0001

Prepared for:

United States Army Corps of Engineers
Louisville District

Prepared by:

Shaw Environmental, Inc.
100 Technology Center Drive
Stoughton, MA 02072

November 2006

QUALITY ASSURANCE AND MANAGEMENT PLAN
Remediation of Soil at Load Lines 1, 2, 3 and 4
Ravenna Army Ammunition Plant
Ravenna, Ohio

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APPENDICES

LIST OF ACRONYMS

CADD	Computer Aided Design and Drafting
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CIH	Certified Industrial Hygienist
DDMP	Data and Document Management Plan
EIMS	Environmental Information Management System
FPRI	Fixed-Price Remediation with Insurance
FSAP	Facility-wide Sampling and Analysis Plan
FSP	Field Sampling Plan
LLs 1-4	Load Lines 1, 2 , 3 and 4
MEC	Munitions and Explosives of Concern
O&M	Operation and Maintenance
OhioEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Act
PMP	Project Management Plan
QA	Quality Assurance
QC	Quality Control
QAMP	Quality Assurance Management Plan
QAPP	Quality Assurance Project Plan
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RVAAP	Ravenna Army Ammunition Plant
SAP	Sampling and Analysis Plan
SERCP	Security, Emergency Response, and Contingency Plan
SHERP	Safety, Health, and Emergency Response Plan
SOW	Scope of Work
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WMMP	Waste Management and Minimization Plan

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) was contracted by the United States Army Corps of Engineers (USACE) Omaha District to perform remediation activities associated with impacted soils and dry sediments in Load Lines 1, 2, 3 and 4 (LLs 1-4) at the Ravenna Army Ammunition Plant (RVAAP) under the Fixed Price Remediation Insured (FPRI) Indefinite Delivery/Indefinite Quantity Contract No. DACA45-03-D-0026. Work by Shaw at the Ravenna facility in LLs 1-4 will be performed under Task Order 0001 of the above referenced contract. As part of the remediation activities, Shaw has been tasked with preparing a Quality Assurance and Management Plan (QAMP) to document procedures for assuring quality and management in all aspects of project execution during the completion of work under this Task Order. This QAMP will reference and adhere to existing facility wide and FPRI project specific work plans, but it is not an element of the Remedial Action Work Plan that is forthcoming under the FPRI. The following document will serve as the basis for Shaw's quality assurance and management procedures for work at RVAAP.

This QAMP was developed in accordance with Shaw's Project Management Plan (PMP) submitted in April 2004 (Shaw 2004a). The QAMP provides for inspections, tests, and controls necessary to achieve specified quality assurance (QA). It identifies personnel, procedures, control, instructions, tests, records, and forms to be used.

2.0 SHAW'S QUALITY POLICY

It is the policy of Shaw to consistently provide services and products that satisfy the requirements and meet or exceed the expectations of our clients worldwide. Our goal is to be the industry benchmark for excellence. The successful implementation of the Quality Policy and the continual improvement of our processes is the responsibility of all personnel, led by management. Shaw's Project Manager is responsible for ensuring compliance with Shaw's corporate Quality Management System Plan.

3.0 DOCUMENT ORGANIZATION

This document has been organized into the following sections with appendices:

Section	Title
Section 4.0	Project Personnel and Organization
Section 5.0	Procedures for Controlling Project Activities
Section 6.0	Procedures for Controlling Design Activities
Section 7.0	Appropriate Design Tools
Section 8.0	Procedures for Submittals
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Appendix	Title
Appendix A	Preparatory Phase Checklist
Appendix B	Initial Phase Checklist
Appendix C	Log for Tracking Inspection Forms
Appendix D	Deficiency Report Form
Appendix E	Deficiency and Corrective Action Log
Appendix F	Contractors Quality Control Report, Daily Log of Construction

4.0 PROJECT QUALITY MANAGEMENT PERSONNEL

This project will be executed by the Shaw Federal Contracts Group under the direction of the Project Manager, Mr. David Cobb. Shaw maintains numerous technical resource groups from which the Project Manager draws technical resources for project execution. Project personnel and organization for the RVAAP project are detailed in Section 4.4 of the PMP (Shaw 2004a) that includes information related to project personnel, roles, responsibilities, project participants and other interested parties. The roles and responsibilities of primary project personnel involved with the documentation procedures for assuring quality management in all aspects of project execution during the completion of work under this Task Order are described below. Shaw and its subcontractors performing project activities are required to follow the guidelines set forth in this QAMP and all associated quality management procedures referenced in this document.

4.1 Shaw Project Manager

The Shaw Project Manager is Mr. David Cobb. Mr. Cobb will serve as the point of contact (POC) for the USACE on all project issues, as well as Task Order-specific issues as they may arise. As Project Manager, Mr. Cobb will ensure that contractual obligations are observed. He will be responsible for interactions with USACE Louisville District and will be ultimately responsible for all quality management activities under this project. The Project Manager will be responsible for coordinating the satisfactory quality assurance and management of testing, inspection and review of all aspects of the project and will oversee the performance of these activities by assigned project personnel. The Project Manager will track the progress of these activities through monthly project review meetings and reports.

4.2 Shaw Technical/Regulatory Lead

The Shaw Technical/Regulatory Lead for the RVAAP has direct responsibility for implementing of the Facility-wide Sampling and Analysis Plans (SAP; SAIC 2001) remedial designs, field activities, data acquisition and management, and report preparation. The Technical/Regulatory Lead will also provide the overall quality management of all project tasks and will serve as technical lead and point of contact with the USACE, Louisville District Project Manager and USACE designated point of contact. The Technical/Regulatory Lead will have direct contact with the Shaw Contractor Quality Control Manager (CQCM) and will perform follow-up inspections, as required, and will review all quality management documentation. The Shaw Technical/Regulatory Lead will coordinate with the Shaw CQCM to designate qualified project personnel to prepare, review, and distribute quality management documentation, and respond to comments as described in Section 6.1 of this QAMP.

4.3 Shaw Contractor Quality Control Manager

The Shaw Contractor Quality Control Manager (CQCM) is responsible for implementation of project quality management in accordance with the requirements of the FSAP (SAIC 2001, Shaw 2006a) and other project planning documents. The CQCM, in coordination with the Project Chemist, will assure that data acquisition is in compliance with the aforementioned SAPs. The Shaw CQCM will coordinate with the Shaw Technical/Regulatory Lead to designate qualified project personnel to prepare, review, and distribute quality management documentation, and respond to comments as described in Section 6.1 of this QAMP. A more detailed discussion regarding the responsibilities of quality control (QC) personnel is discussed in Section 5.2 of this QAMP.

4.4 Shaw Project Chemist

The Project Chemist is responsible for implementation and documentation of all project quality management protocols during field activities, which are presented in the FSAP (SAIC 2001) and the site-specific SAP Addendum (Shaw 2006a). In this capacity, the Project Chemist will direct and implement the various components of the SAPs, as identified in the USACE Engineer Manual 200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans* (USACE 2001). This will include, but not be limited to the following: ensuring chemical analysis and reporting performed by the analytical laboratories are in accordance with requirements defined in the SAP Addendum (Shaw 2006a); oversight of field sampling and analytical activities; documentation of field QC activities; resolving questions the laboratory may have regarding sampling requirements and deliverables, and coordination of data reduction, validation, and documentation activities related to sample data package deliverables received from the laboratories. All analytical data used for project decision-making should be reviewed and approved by the Project Chemist prior to their release or publication.

4.5 Shaw Field Superintendent

The Field Superintendent is responsible for implementing all field activities in accordance with the FSAP (SAIC 2001) and site-specific documentation (i.e., SAPs, quality control plans and/or work plans). The Field Superintendent will be responsible for ensuring that all Shaw field personnel perform field activities in accordance with field plans and project documents. The Field Superintendent will have direct responsibility over all subcontractor activities and will ensure that the subcontractors comply with project requirements.

5.0 PROCEDURES FOR CONTROLLING PROJECT ACTIVITIES

This section outlines the procedures for controlling project activities to ensure efficiency, cost effectiveness, coordination with design objectives, reliability of data collected, maintenance of worker safety, and proper recording and reporting formats. The procedures include identification of government and contractor staff, by name and discipline, which will be responsible for preparation, independent review, and QA review of technical reports produced in support of the project. The specific QC for activities is summarized in Table 5-1.

Table 5-1
Quality Control Verification Summary

Activity	QC Verification
Field Work	
Mobilization	▪ Daily Contractor QC Report ▪ Daily Health & Safety Report
Site Preparation	▪ Daily Contractor QC Report ▪ Daily Health & Safety Report
Excavation	▪ Daily Contractor QC Report ▪ Daily Health & Safety Report
Post-Excavation Analytical Testing	▪ Daily Contractor QC Report ▪ QA/QC Samples ▪ Chain-of-Custody ▪ Audit
Pre-Excavation and Stockpile Analytical Testing	▪ Daily Contractor QC Report ▪ QA/QC Samples ▪ Chain-of-Custody ▪ Audit
Backfilling, compaction and site restoration	▪ Daily Contractor QC Report ▪ Daily Health & Safety Report
Transportation / Disposal of Excavated Soil	▪ Daily Contractor QC Report ▪ Waste profiles, disposal manifests
Demobilization	▪ Daily Contractor QC Report ▪ Daily Health & Safety Report ▪ Final Closeout Report Submittals

5.1 Corporate and Contract-Specific Control Procedures

Cost control and reporting for this Task Order is detailed in Section 6.0 of the PMP (Shaw 2004a). The discussion includes procedures to ensure QC in Procurement (Section 6.1), Invoicing (Section 6.2), Purchasing (Section 6.3), Subcontracting (Section 6.4) and Roles and Responsibilities (Section 6.5).

In general, the data quality objectives, sample collection procedures, analytical procedures, and quality monitoring and corrective action procedures surrounding the collection of data in this project are covered in the SAP Addendum (Shaw 2006a). The Shaw SAP Addendum is composed of the Field Sampling Plan (FSP) Addendum, which identifies field procedures, and the Quality Assurance Project Plan (QAPP) Addendum, which identifies laboratory procedures.

5.2 Shaw Project Quality Control Personnel

A discussion of Shaw's project-specific quality control personnel is discussed in Section 4.0 of this QAMP. These designated personnel will be responsible for the overall management of the QC program onsite and offsite.

5.3 Project-Specific Training

In addition to providing QC personnel with specific minimum training and qualifications to assume control functions over the project, Shaw will provide training as needed to other project personnel, to ensure efficiency, cost-effectiveness, coordination with design objectives, reliability of data collected, maintenance of worker safety, and proper recording and reporting formats. The training would potentially include, but not be limited to:

- Project Orientation Training – Overview of project purpose, objectives, policies, and procedures.
- Department of Transportation training on the shipment of hazardous materials.
- Health and Safety Refresher Training
- Training on Resource Conservation and Recovery Act (RCRA) as it pertains to land disposal, off-site transportation and disposal, and on-site storage of hazardous wastes and materials, as needed.
- Quality Control Training, including proper testing procedures, data collection, evaluation, storage, and reporting procedures.
- Sampling Protocol Training to ensure consistent sample procedures and methodologies are performed in accordance with the SAP.
- Munitions and Explosives of Concern (MEC) and Unexploded Ordnance (UXO) Avoidance and Recognition Training

6.0 PROCEDURES FOR CONTROLLING DESIGN ACTIVITIES

Defining quality management activities for engineering design tasks associated with the remediation of soils at LLs 1-4 will assist Shaw in providing quality deliverables aligned with the client needs and project requirements which will, in turn, help ensure effective execution of the construction phases. QC activities will focus on assignment of appropriately qualified and experienced personnel, adequate project planning and monitoring, review and checking of work, and use of appropriate technical tools.

6.1 Assignment of Personnel

Shaw requires that appropriately qualified and experienced personnel be utilized to perform both the technical tasks and the associated QC activities. While quality is a focus for all project personnel, the primary positions responsible for ensuring quality are the Project Manager, Technical/Regulatory Lead, Project Chemist, QC Supervisor, Registered Professional Engineer and the Field Superintendent. These individuals will work in concert to identify appropriate individuals for engineering and review tasks on a per-deliverable basis. In general, individuals and/or subcontractors will be assigned based on their technical competency in the relevant discipline(s), with the most experienced assigned as discipline leads responsible for the planning and review activities. In addition, individuals (including subcontractors) with appropriate Ohio professional licenses will be designated at the outset to personally supervise the design activities in order to sign/seal final deliverable documents.

6.2 Project Planning and Monitoring

For each deliverable, the technical team may develop a checklist based on guidance in this QAMP which will indicate the QC activities to be performed during preparation of the deliverable, the personnel assigned to each activity, and target dates. Development of the checklist helps ensure that each of the QC activities is performed and sufficient time is scheduled to allow the activity to take place. It also documents when each activity is completed and by whom. Planning and monitoring activities that may be included in the individual checklists include the following:

- Task initiation meeting – participants attend to establish an understanding of the task, the technical approach, budget and schedule, QC activities, individual assignments, and other task information.
- Technical approach meeting – project and discipline leads review the planned technical approach and conduct a brief “Devil’s Advocate Review” relative to other possible courses of action. This review will occur at the outset and may be repeated as warranted through the course of the project as determined by the technical team leader.
- Task status meetings – the Project Manager and team members will meet intermittently to review project execution issues, difficulties encountered, project coordination, forthcoming work, and progress versus the schedule.

6.3 Review and Checking of Work

In addition to the planning and monitoring activities, the checklist may present the designation of a number of review activities that are to be performed at a particular stage of the design through construction process or on an as-needed basis. Many of these activities can be combined;

however, it is critical that personnel can not solely review their own work. Documentation of the activities will be made on the checklist with detailed comments or meeting minutes attached.

- Preliminary Technical Review – Even if a formal preliminary submittal is not required for a project, an internal review will be conducted at the completion of the preliminary phase (approximately 35% completion). This review will be conducted by the Project Manger and the licensed professional to ensure that the project is being conducted in a manner that will meet the required quality level and contractual requirements.
- Documented Checking – Must be provided for all calculations, drawings, specifications, operations and maintenance (O&M) manuals, and other documents. The checking will address both "method" and "calculations." This checking will be conducted by a qualified individual and will be assigned by and be under the direction of the Project Manager.
- Technical Reviews – Will be conducted as scheduled in the checklist and/or as needed throughout the design phase of the project. These reviews will be initiated by the Project Manager to ensure that the quality of the design project is being met in accordance with the scope of work and project requirements. If necessary, corrective actions will be defined and documented.
- Safety Reviews – May be conducted as appropriate. The review could address general safety and Occupational Safety and Health Act (OSHA) compliance, process safety or a formal hazardous materials review, or other specific safety activity. The Safety, Health and Emergency Response Plan (SHERP; Shaw 2004b) will be reviewed as appropriate and/or required prior to any field activity. The safety reviews will be scheduled by the Project Manager, or his designee, as part of the development of the checklist.
- Constructability Review – May be conducted to ensure that remediation can be conducted with minimum practical difficulty and with the potential for errors and omissions controlled to a reasonable level. This review will be performed by an experienced construction engineer, or related field professional, if determined necessary by the Project Manager.
- Coordination/Interference Review – Review of documents conducted to ensure compliance with project requirements and the proper integration and lack of any interferences or conflicts between the various technical disciplines. This review is normally performed by the Technical/Regulatory Lead after all documents for each submittal have been collected.
- Independent Review – An independent review of all documents will be conducted prior to each submittal to the client and throughout the development of the documents, if necessary. Reviews are to be performed by an experience Shaw engineer, or other qualified professional, who has not been closely, involved in the design project activities. A statement of independent technical review will be included with each submittal when deemed appropriate by the Project Manager.
- Lessons Learned Review – May be conducted at deliverable or completion by the project team. The intent of the meeting would be to review circumstances that developed during an implementation in order to improve and reduce the cost of quality on future remedial actions.

7.0 APPROPRIATE TECHNICAL TOOLS

In addition to relying on the technical competence of the technical staff and reviewers, use of appropriate technical tools helps ensure quality in the final deliverable. Technical tools of potential use on the remedial design include:

- Computer Aided Design and Drafting (CADD) Systems – The application of CADD and related technology can affect every phase of the project positively. Use of this technology allows improved productivity, clearer drawings, integration of automated design feature, and reduced cost and schedules. CADD also allows the project team and subcontractors to integrate their drawings seamlessly.
- Standard Specifications – Use of standard guide specification, in particular the USACE Guide Specifications, will provide the project staff with a current and accepted basis that may be tailored into a complete and thorough set of project specifications, rather than trying to develop project-specific requirements "from scratch."
- Computer Software – Use of automated computer software such as groundwater modeling, cut and fill and database management programs helps speed certain calculation-rich tasks while reducing the chance of calculation errors. By reducing the effort of calculation, multiple scenarios can be analyzed to help optimize the project results. Care must be exercised, however, to ensure that the methods and assumptions used by the software are appropriate for the specific project and that data input and output are entered and used properly.
- Technical Standards – As a normal course of practice, Shaw staff utilize established Technical Standards. The objectives of these are to provide a mechanism that permits the project and field staff to produce project submittals (documents, plans, drawings, etc.) in the most productive manner, enhance the quality and clarity of project drawings, provide for uniformity of project submittals produced at various locations throughout the Shaw organization, permit interoffice coordination and rapid transfer of documents, and facilitate QC and QA reviews. It is expected that the standards will be used by experienced technical staff members to incorporate their experience in generating project submittals in the most productive manner.

8.0 PROCEDURES FOR SUBMITTALS

Shaw is responsible for total management and implementation of remediation work identified in this Task Order. This responsibility includes scheduling, reviewing, certifying and managing submittals. Shaw is also responsible for ensuring that certifications provided by others (e.g., subcontractors) are accurate and in compliance with the contract requirements. The submittals identified for this project are discussed in Section 4.2 of the PMP (Shaw 2004a). The procedures for submittals are discussed in the following subsections.

8.1 Schedule of Submittals

The submittal schedule for various Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and periodic status reports is discussed in Section 4.3 of the PMP (Shaw 2004a).

8.2 Submittal Review

As described in Section 7.2.1 of the PMP (Shaw 2004a), a technical person associated with the project who did not prepare the document and the Project Manager will review documents prior to submittal. Shaw will review each submittal for contract compliance. Submittals will be reviewed internally by the Project Manager or the designated alternate. Submittals that are deemed to comply with the contract will be forwarded to RVAAP and, if necessary, Ohio Environmental Protection Agency (OhioEPA). Documents destined for submittal to OhioEPA will also be reviewed by the Technical/Regulatory Lead for regulatory compliance. USACE, RVAAP and OhioEPA will ensure that the submittal is reviewed by the proper personnel in their organizations and will approve it, or, if appropriate, will provide technical comments on the submittal for incorporation by Shaw. Submittals that do no comply with the contract will be returned to Shaw to be revised. Unless other arrangements are made, the number (i.e., preliminary draft, draft, final, etc.) and length (in days) of submittal review periods will be as specified in Section 4.1 of the PMP (Shaw 2004a).

8.3 Submittal Procedures

The appropriate number of copies of submittals will be distributed directly to USACE, RVAAP, OhioEPA and other interested parties in accordance with project requirements or as directed by USACE. Submittals for RVAAP, USACE and OhioEPA approval are identified in the Project Task and Submittal Approval Matrix in Table 3 of the PMP (Shaw 2004a). Submittal recipients for each submittal and mailing addresses are identified in Tables 3 and 4, respectively, of Section 4.4.3 of the PMP (Shaw 2004a).

8.4 Submittals of Subcontractors

Shaw's Project Manager is ultimately responsible for identifying technical and schedule requirements for subcontractors and overseeing subcontractor performance. Direct management of subcontractors may be delegated to Task Managers or to the Technical/Regulatory Lead. As such, these individuals are responsible for reviewing subcontractor or vendor work plans, drawings, and specifications. In cases where transportation and disposal or regulatory issues are discussed in submittals, the Transportation and Disposal Coordinator will also review the pertinent submittals. If, at any point during this review cycle, discrepancies, inconsistencies, or incorrect entries are noted, the submittal will be returned for correction and then resubmitted for review. Shaw will manage subcontractors as detailed in Section 6.4 of the PMP (Shaw 2004a).

8.5 Document Control System

Document control under this Task Order is identified in the Data and Document Management Plan (DDMP) (Shaw 2006b).

9.0 SAMPLE DOCUMENTATION

As part of field sampling activities, Shaw will be responsible for the required documentation and proper custody transfer of samples for analysis per the standards outline in the SAP Addendum (Shaw 2006a). The procedures for performing the necessary documentation for the sampling activities and proper handling of the samples are presented in the following subsections.

9.1 Field Logbook

All information related to sampling and analytical procedures, including sample locations and field instrument calibration data, will be recorded in field logbooks in accordance with Section 5.1 of the FSP in the SAP Addendum (Shaw 2006a). Information to be recorded shall include, but is not limited to, a description of the testing activities, individuals involved in the sampling activities, date and time of sampling, sample numbering identification, sampling locations, weather conditions, problems encountered and all field measurements. Sufficient information will be recorded in the logbooks to permit reconstruction of the sampling activities conducted.

9.2 Sample Documentation

All applicable information will be recorded on each sample container label at the time of sample collection in accordance with Section 5.4 of the FSP in the SAP Addendum (Shaw 2006a). However, if pre-printed labels are used, only field-specific information not already on the labels will be recorded at the time of sample collection. Sample numbering shall be performed in accordance with Section 5.3 of the FSP in the SAP Addendum (Shaw 2006a).

9.3 Chain-of-Custody Records

Custody of all samples to be submitted for off-site analysis will be documented through the Chain-of-Custody (COC) procedures identified in Section 5.0 of the FSP of the SAP Addendum (Shaw 2006a). All personnel with sample custody responsibilities will be required to sign, date, and note the time on the COC form when relinquishing samples from their immediate custody (except in the cases where samples are placed into designated secured areas for temporary storage before shipment). The COC documentation process will include the proper transfer from the Sampler to the Shaw Sample Coordinator. Bills of lading or air bills will be used for custody documentation during times when samples are being shipped from the site to the laboratory, and they will be retained as part of the permanent sample custody documentation. COC forms will be used to document the integrity of the samples collected (SAIC 2001).

9.4 Documentation Procedures

Documentation and tracking of samples will be conducted in accordance with Section 5.5 of the FSP of the SAP Addendum (Shaw 2006a).

9.5 Corrections to the Documentation

Any necessary corrections to the documentation will be performed in accordance with Section 5.6 of the FSP in the SAP Addendum (Shaw 2006a) and Section 12.0 of this QAMP.

9.6 Reporting

Shaw shall provide the USACE timely reports of all sampling activities in accordance with Section 5.7 of the FSP in the SAP Addendum (Shaw 2006a).

10.0 ANALYTICAL PROCEDURES

Shaw will be responsible for ensuring that all analytical procedures are followed per Section 7.0 of the QAPP in the SAP Addendum (Shaw 2006a). This section contains information regarding the chemical analyses to be performed, and the quality standards to be met to achieve contract requirements. The principal source for analytical methods is the Unites States Environmental Protection Agency (USEPA) Publication SW-846, Test Methods for Evaluating Solid Wastes (USEPA 2004). The QC requirements for the laboratory analyses to be performed are stipulated per the USACE-Louisville District Chemistry Guideline (USACE 2002), and relevant updates as identified in the QAPP portion of the SAP Addendum (Shaw 2006a).

11.0 CONTROL PHASES AND INSPECTION PROCEDURES

The QC procedures for work under this Task Order based on a four-phased protocol consisting of the following control phases:

- Preparatory,
- Initial,
- Follow-up, and
- Final

Each QC phase is discussed separately in the following subsections. Section 11.5 outlines inspection documentation for the various control phases. Inspections will be conducted for each phase and each activity. Shaw's Field Superintendent will have ultimate responsibility for the performance of the inspections at the site. The Field Superintendent may assign inspection duties for individual activities to the work leader responsible for the activity, or to appropriate QC personnel, depending on their area of expertise. Inspection results will ultimately be reviewed by Shaw's Technical/Regulatory Lead, and he will report findings to RVAAP.

11.1 Preparatory Phase

A preparatory inspection will be performed prior to beginning any work on a task activity using the form in Appendix A. The preparatory inspection may include the following:

- A review of the contract/Task Order plans and scope of work, if applicable;
- A review of applicable work plans or specifications identified by RVAAP or Shaw;
- A check to ensure that materials and/or equipment are available, and if required, have been tested;
- A check to ensure that provisions have been made to provide required QC inspection and testing;
- Examination of the work area to ensure that required preliminary work has been completed and is in compliance with the contract;
- A physical examination of required materials, equipment, and sample work to ensure that they are on-hand, conform to approved specifications, and are properly stored;
- A review of appropriate activity hazard analysis to ensure that safety requirements are met and provided for; and
- Discussion of procedures for conducting the work and workmanship standards.

The RVAAP Facility Manager and USACE will be notified at least 48 hours in advance of beginning the required actions of the preparatory phase. A meeting will be conducted by the Technical/Regulatory Lead and attended by appropriate QC personnel and the Field Superintendent. The results of the preparatory phase inspection (i.e., discussion of acceptable procedures, actions required, etc.) will be documented by separate minutes prepared by the Technical/Regulatory Lead and attached to the Daily Contractor QC Report.

Additional preparatory phases may be conducted on the same task activity as determined by RVAAP if the quality of ongoing work is unacceptable; or if there are changes in the applicable

QC personnel or in the on-site supervision or work crew; or if work on an activity is resumed after a substantial period of inactivity; or if other concerns develop.

11.2 Initial Phase

An initial inspection will be performed at the beginning of a task activity using the form in Appendix B. This inspection may include the following:

- A check of preliminary work to ensure that it is in compliance with contract/Task Order requirements;
- Verification of required control inspection and testing and compliance with the contract/Task Order;
- Verification of acceptable workmanship levels that meet standards;
- Resolution of differences or conflicts in work scope or with contract specifications; and
- A check of safety to include compliance with Shaw's SHERP (Shaw 2004b) and activity hazard analysis.

The RVAAP Facility Manager and USACE will be notified at least 24 hours in advance of beginning the initial phase. A meeting will be conducted by the Technical/Regulatory Lead and attended by appropriate QC personnel and the Field Superintendent. The results of the initial phase inspection (i.e., discussion of acceptable procedures, actions required, etc.) will be documented by separate minutes prepared by the Technical/Regulatory Lead and attached to the Daily Contractor QC Report. The initial phase will be repeated for each new crew to work onsite or any time acceptable specified quality standards are not being met.

11.3 Follow-up Phase

Daily checks will be performed to ensure continuing compliance with contract requirements, including cost-effectiveness, efficiency of operations, safety, control testing, and corrective actions until completion of the particular features of work. Checks will be made a matter of record in the QC documentation.

11.4 Final Phase

At the completion of work or any increment thereof, the Technical/Regulatory Lead or alternate will conduct an inspection of the work. The work will be inspected for conformance to plans, specifications, quality, workmanship, and completeness and will be documented in the Daily Contractor QC Report as discussed in Section 13.1 of this QAMP. If necessary, an itemized punch list will be compiled that includes a summary of work not properly completed, inferior workmanship, and work not conforming to plans and specifications. The punch list will be included with the QC documentation with an estimated date for correction of each deficiency.

Following inspection of work, a second inspection will be conducted by the Technical/Regulatory Lead or alternate to ensure that deficiencies have been corrected. When deficiencies have been corrected and verified by the Technical/Regulatory Lead, RVAAP and USACE will be given at least 14 days notice and a final acceptance inspection of the work will be conducted, documented in a logbook or other appropriate form, and the documentation retained in the project file. The inspections and corrective actions will be completed within the schedule stated for completion of the entire project, or any particular increment thereof if the project is divided into increments by separate completion dates.

11.5 Inspection Documentation

The Field Superintendent or Technical/Regulatory Lead where applicable, will be responsible for ensuring completion of all inspection paperwork, including inspection forms, checklists for tests, deficiency report forms and corrective action logs, Daily Contractor QC Report forms and QA audit checklists. Preparatory, Initial and Follow-up inspections will be recorded on the standard forms included in Appendices A and B. The completed forms generated by inspections will be used to document and track specification compliance, deficiencies, and corrective actions, where necessary. Regardless of which person conducts the inspections, the completed forms will be reviewed by the Technical/Regulatory Lead. Complete forms will be maintained on-site by the Field Superintendent and will be available for inspection. Inspection forms will be tracked using the Log for Tracking Inspection Forms presented in Appendix C.

12.0 TRACKING DEFICIENCIES AND CORRECTIVE ACTIONS

There are several mechanisms to identify services or activities that do not comply with the contract requirements. These mechanisms include the following:

- Inspections;
- Tests;
- QA audits; and
- Notification of the FPRI Project Manager and RVAAP Authorized Representatives.

In each case, noncompliance issues will be specifically identified in documents generated as a result of implementing the QAMP. It will be the responsibility of the Technical/Regulatory Lead or designated alternate to notify the relevant parties of the noncompliance and to ensure that corrective action is taken as soon as possible.

The Technical/Regulatory Lead and Field Superintendent, or designated alternates, have the authority and responsibility to stop work, if necessary, related to or affected by the noncompliance condition until action can be taken to correct the noncompliance condition or prevent it from affecting related or subsequent work. The Technical/Regulatory Lead and Field Superintendent, or designated alternates, may, at their discretion, require that the work be retested and/or reinspected, if necessary, to confirm or disprove the noncompliance condition.

The Field Superintendent or designated alternate may not permit any subsequent work to continue if that work is, or may be affected by the noncompliance condition until:

- The work is retested and/or reinspected and found to be in compliance;
- The work is redone and subsequently retested and/or reinspected and found to be in compliance;
- The Project Manager has notified the USACE and OhioEPA followed by the Army of the issue and the planned course of action for concurrence.

12.1 Documenting Deficiencies and Corrective Actions

As deficiencies are noted, they will be documented on the QC Inspection Forms in Appendices A and B. In addition, the following documentation may be maintained by the Field Superintendent or designated alternate to track deficiencies and corrective actions:

- A Deficiency Report Form, provided in Appendix D, will be completed. In preparing this report, the Field Superintendent or designated alternate will review the QC procedures and other relevant documents and procedures to determine if the systems being used need to be amended. This report will also include corrective action, including specific changes in procedures, work practices, or other actions taken to prevent reoccurrence of the noncompliance condition.
- A Deficiency and Corrective Action Log will be maintained to ensure the deficiencies have been corrected. A Deficiency and Corrective Action Log form is provided in Appendix E.
- Deficiencies will also be noted in the Daily Contractor QC Report in Appendix F.

13.0 REPORTING PROCEDURES

Current records of QC operations, activities, and tests performed, including the work of subcontractors and suppliers, will be maintained. Documents generated as a result of the implementation of this QAMP will undergo review and signoff. Table 13-1 summarizes the review and distribution requirements for QC documents. A master file of QC Documents will be maintained at the project site and the master document file as indicated in the Data and Document Management Plan (DDMP; Shaw 2006b).

Table 13-1
Document Review and Distribution of QC Documents

Document	Prepared By	Review and Distribution
QAMP and Supplements	Project Personnel	▪ Program Manager, ▪ Project Manager, ▪ Technical/Regulatory Lead, ▪ Field Superintendent, ▪ Supplemental QC Personnel, and ▪ Contracting Officer Representative.
Daily Contractor QC Report	Field Superintendent	▪ Project Manager, ▪ Technical/Regulatory Lead, ▪ Field Superintendent, and ▪ Contracting Officer Representative.
Inspection Reports	Field Superintendent, Technical/Regulatory Lead or Designated Inspector	▪ Project Manager, ▪ Technical/Regulatory Lead, ▪ Field Superintendent, and ▪ Contracting Officer Representative.
QA Audit Reports	Technical/Regulatory Lead	▪ Program Manager, ▪ Project Manager, ▪ Technical/Regulatory Lead, ▪ Field Superintendent, ▪ Supplemental QC Personnel, and ▪ Contracting Officer Representative.
Reports of Noncompliance	Various	▪ Project Manager, ▪ Regulatory Lead, ▪ Field Superintendent, and ▪ Contracting Officer Representative.
Change Order Form	Project Manager	▪ Program Manager, and ▪ Contracting Officer Representative.

13.1 Daily Contractor QC Report

The Field Superintendent will issue a daily report using the standard form provided in Appendix E. The following information is included:

- Site work activities.
- Transportation and disposal tracking.
- Weather conditions encountered and any delays.
- Test and/or control activities performed with results. The control phase will be identified (preparatory, initial, or follow-up). Deficiencies will be noted along with corrective action.

- Materials, supplies, and equipment received with a statement as to its acceptability and storage.
- Submittals reviewed, with contract reference, by whom, and action taken.
- Sampling information, including description of samples being taken, calibration procedures performed on field monitoring equipment, problems identified for sampling and/or analysis, and corrective actions taken.
- Inspections conducted by non-Shaw personnel.

The originals and one copy of the Daily Contractor QC Reports will be furnished to the FPRI Project Manager on a weekly basis. Reports will not be submitted for days on which no work is performed. At a minimum, one report will be prepared and submitted for every 7 calendar days of no work and on the last day of a no work period that is less than 7 days.

Daily Contractor QC Reports will be signed and dated by the Field Superintendent and will include copies of test reports and reports prepared by subordinate QC personnel.

13.2 CERCLA Reporting

Shaw will be responsible for presenting and finalizing the selected remedy for LLs 1-4 with the OhioEPA, with input from the USACE, RVAAP, and other interested parties. The required CERCLA reports, reviewers, review periods and distribution is detailed in Section 4.0 of the PMP and in Shaw's project specific scope of work (SOW) (Shaw 2004a)

13.3 Meetings, Briefings and Updates

As discussed in Section 5.1 of the PMP, monthly program management meetings will be held with the Participant Organizations through the duration of the Contract as deemed necessary by USACE. As discussed in Section 5.2 of the PMP, briefings, in the form of conference calls, coordinated by the Shaw Project Manager, or designee, will be held periodically to discuss the project status with Participant Organizations. As discussed in Section 5.4 of the PMP, Shaw will conduct a milestone presentation at the completion of each major component activity as required by USACE (Shaw 2004a).

13.4 Quarterly Status Reports

As discussed in Section 5.5 of the PMP, quarterly status reports will contain updates on field activities performed during the quarter and those planned in the near future, the overall project schedule, and a summary of analytical data received during the quarter (Shaw 2004a).

14.0 DEFINABLE FEATURES OF WORK

The work breakdown structure under this Task Order is summarized in Table 1 of Shaw's PMP (Shaw 2004a).

15.0 NOTIFICATION OF CHANGES TO PROCEDURES IN QAMP

Where possible, after acceptance of the QAMP or QAMP supplement, the USACE Project Manager will be notified in writing a minimum of seven (7) calendar days prior to any proposed change. Proposed changes are subject to acceptance by the USACE Project Manager. There may be occasions when a 7-day notification is not possible (e.g., unexpected absence of personnel due to injury or illness). On these occasions, the USACE Project Manager's Representative will be notified within 72 hours of the change.

16.0 RELATED PROJECT PLANS

Additional field plans were developed to document procedures for specific components of soil remediation at LLs 1-4. Where applicable, the field plans were created as addendums to the corresponding Facility-wide plan.

16.1 Safety, Health, and Emergency Response Plan

The SHERP (Shaw 2004b) was completed for remedial activities specifically for work to be completed in contaminated or potentially contaminated areas. The SHERP documents potential hazards, inform personnel of safety procedures, and provide information in the event of an emergency. The SHERP was developed as an addendum to the Facility-wide Safety and Health Plan (SAIC, 2001b). An outline of the SHERP is provided below for convenience:

1.0 Introduction
2.0 Organization, Qualifications, and Responsibilities
3.0 Accident Prevention Plan
4.0 Project Hazards and Hazard Control Measures
5.0 Personal Protective Equipment
6.0 Site Control and Work Zones
7.0 Decontamination
8.0 Environmental and Personnel Monitoring Program
9.0 Training Requirements
10.0 Medical Surveillance
11.0 Emergency Response Plan and Contingency Procedures
12.0 Blood-Borne Pathogen Exposure Control Plan
13.0 Logs, Reports, and Record Keeping
14.0 References

Field activities will not begin until the RVAAP has accepted the SHERP. The Health and Safety Officer, in association with the Field Superintendent, will oversee the safety and health program for the LLs 1-4 soil remediation project. Oversight will include the implementation and approval of SHERP or changes to the SHERP. The Health and Safety Officer will be assigned to the site on a full-time basis during field activities and will be the main contact for any on-site emergency situation.

16.2 Security, Emergency Response, and Contingency Plan

A Security, Emergency Response, and Contingency Plan (SERCP; Shaw 2004c)) were completed for soil remedial activities in LLs 1-4. The SERCP documents security measures, required emergency procedures beyond what is provided in the SHERP (Shaw 2004b), and required procedures in the event that planned work cannot be conducted. The SERCP was developed as a supplement to emergency procedures identified in the SHERP. An outline of the SERCP is provided below for convenience:

1.0 Introduction
2.0 Project Management Organizations
3.0 Health and Safety
4.0 Security
5.0 Emergency Response
6.0 Additional Contingency Planning
7.0 References

16.3 Sampling and Analysis Plan Addendum

Chemical QC is required for remedial and investigative activities to ensure that the analytical data obtained are of sufficient quality to meet the intended usages. Chemical QC refers to the analytical activities performed by Shaw or its subcontractors to verify and ensure compliance to the contract and the quality of work performed.

A SAP Addendum (Shaw 2006a) was completed for soil remediation activities in LLs 1-4 to document procedures for chemical QC. The SAP was developed as an addendum to the FSAP (SAIC, 2001). The SAP consists of a FSP and a QAPP.

An outline of the FSP is provided below for convenience:

1.0 Introduction
2.0 Project Organization and Responsibilities
3.0 Project Scope and Objectives
4.0 Field Activities
5.0 Sample Chain of Custody/Documentation
6.0 Sample Packaging and Shipping Requirements
7.0 Investigation-Derived Waste
8.0 Contractor Chemical Quality Control
9.0 Daily Chemical Quality Control Reports
10.0 Corrective Actions
11.0 Field Work Schedule
12.0 References

An outline of the QAPP is provided below for convenience:

1.0 Introduction
2.0 Project Organization and Responsibilities
3.0 Quality Assurance Objectives for Measurement Data
4.0 Sampling Procedures
5.0 Sample Custody
6.0 Calibration Procedures and Frequency
7.0 Analytical Procedures
8.0 Internal Quality Control Checks
9.0 Data Reduction, Validation, and Reporting
10.0 Performance System Audits
11.0 Preventative Maintenance Procedures
12.0 Specific Routine Procedures to Assess Data Precision, Accuracy, and Completeness
13.0 Corrective Actions
14.0 QA Reports to Management
15.0 References

16.4 Data and Document Management Plan

A DDMP (Shaw 2006b) was completed for soil remedial activities in LLs 1-4. The DDMP documents methods for managing electronic and hard copy data generated as part of remedial activities and procedures for production, review, finalization, distribution, and storage of contract-related documentation. An outline of the DDMP is provided below for convenience:

1.0 Introduction
2.0 Project Organization and Responsibilities
3.0 Data Management Plan
4.0 Document Management Plan
5.0 References

Shaw will update the Ravenna Environmental Information Management System (EIMS) for data related to this contract. New laboratory data and field screening results, along with sample location will be added to the EIMS once the data are verified. The EIMS will also include a tracking system for CERCLA document submittal and review that will be used to update the schedule.

16.5 Waste Management and Minimization Plan

A Waste Management and Minimization Plan (WMMP; Shaw 2006c) were completed for soil remedial activities in LLs 1-4. The WMMP documents procedures for managing various types of wastes (including investigation-derived waste, drilling spoils, unused sample bottles, etc.) and minimizing generation of wastes. An outline of the WMMP is provided below for convenience:

1.0 Introduction
2.0 Project Management Organization
3.0 Health and Safety
4.0 Compounds of Concern
5.0 Waste Generating Activities
6.0 Container Types
7.0 Labeling Requirements
8.0 Waste Storage Locations
9.0 Inspection Requirements
10.0 Disposal Requirements
11.0 Waste Minimization Plan
12.0 Reporting
13.0 References

16.6 Operations and Maintenance Plan

An Operations and Maintenance Plan (O&M Plan) will be completed during remedial activities. The O&M Plan will document required activities to monitor the remedy's effectiveness.

16.7 Public Relations Plan

Currently, Restoration Advisory Board (RAB) meetings are held at a minimum of four times per year. Meeting minutes are maintained by MKM Engineers. A Public Relations Plan (PRP; Shaw 2006d)) was completed to address soil remedial activities in LLs 1-4 with the community in the area of RVAAP. The PRP documents public relations efforts required for remedial activities. An outline of the PRP is provided below for convenience:

1.0 Introduction
2.0 Overview of Public Relations Plan
3.0 Highlights of Community Relations Program
4.0 Capsule Site Description
5.0 Community Background
6.0 Communication Techniques and Actions
7.0 References

As indicated in the PRP, Shaw will initiate, coordinate, schedule and prepare for RAB meetings and public activities regarding this contract under the direction and oversight of the RVAAP Facility Manager. Shaw will prepare and present briefings, presentations, fact sheets, newsletters, annual tours, and articles to news media, if necessary. Shaw will conduct necessary public involvement activities necessary under CERCLA.

17.0 AUDITS

Audits will be conducted on a routine basis to ensure compliance with the Task Order and Contract. At a minimum, at least one internal audit for the Task Order and at least one audit every 6 months will be conducted. Audits will verify that the procedures outlined in the Project and Task Order documents are being conducted as stated. Site Health and Safety audits will follow the procedures outlined in Shaw's SHERP (Shaw 2004c).

The following personnel, or their designated alternates, will be responsible to conduct audits in the area stated (if additional plans are required, the personnel responsible to audit the plans will be identified in the QAMP Supplement):

Personnel Responsible to Conduct Audit	Project Plan Outlining Requirements
Technical/Regulatory Lead	QAMP, SAP (FSP and QAPP), Specifications, Work Plan, DDMP, Public Relations Plan
Health and Safety Officer	SHERP, SERCP
Transportation and Disposal Coordinator	WMMP

In some cases, the auditor may designate an alternate to conduct the audit. For example, the Project Chemist may be identified to conduct an audit to ensure compliance with the QAPP because this person is more familiar with chemical quality requirements.

The following information will be included in the Audit Summary Report:

- Area of concern,
- Corrective action,
- Responsible person,
- Technical/Regulatory Lead approval of corrective action (i.e., within scope of work, etc.),
- Documentation;
- Schedule of corrective action; and
- Impact on overall schedule.

Ongoing audits will target problem areas identified in previous audits to ensure continued compliance.

18.0 REFERENCES

1. Science Applications International Corporation (SAIC), 2001a. "Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio". March 2001.
2. SAIC 2001b. "Final Facility-Wide Safety and Health Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio". March 2001
3. Shaw Environmental, Inc. (Shaw) 2004a. "Final Project Management Plan, Remediation of Soils at Load Lines 1-4, Ravenna Army Ammunition Plant, Ravenna, Ohio". April 2004.
4. Shaw 2004b. "Final Safety, Health and Emergency Response Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". October 2004.
5. Shaw 2004c. "Final Security, Emergency Response and Contingency Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". October 2004.
6. Shaw 2006a. "Final Sampling and Analysis Plan Addendum No.1 for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
7. Shaw 2006b. "Final Data and Document Management Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
8. Shaw 2006c. "Final Waste Management and Minimization Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
9. Shaw 2006d. "Final Public Relations Plan Addendum No. 1 for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
10. United States Army Corps of Engineers (USACE), Louisville District 2002. "USACE, Louisville Chemical Guideline, Version 5". June 2002.
11. United States Environmental Protection Agency (USEPA) 2004. "Test Methods for Evaluating Solid Waste, EPA Publication SW-846, Version 6". November 2004.

APPENDIX A

PREPARATORY PHASE CHECKLIST

PREPARATORY PHASE CHECKLIST

(CONTINUED ON SECOND PAGE)

SPEC SECTION	DATE

CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED? _____

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING? _____

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES.)

COMMENTS: _____

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN? _____

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS. _____

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK. _____

CLARIFY ANY DIFFERENCES. _____

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NOT, WHAT ACTION IS TAKEN? _____

PREPARATORY PHASE CHECKLIST

(CONTINUED FROM FIRST PAGE)

CONTRACT NO	DEFINABLE FEATURE OF WORK	SPEC SECTION	DATE
		SCHEDULE ACT NO.	INDEX #

TESTING

IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.

WHEN REQUIRED?

WHERE REQUIRED?

REVIEW TESTING PLAN.

HAS TEST FACILITIES BEEN APPROVED?

SAFETY

ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐

REVIEW APPLICABLE PORTION OF EM 385-1-1.

MEETING COMMENTS

NAVY/ROICC COMMENTS DURING MEETING.

OTHER ITEMS OR REMARKS

OTHER ITEMS OR REMARKS:

QC MANAGER DATE

APPENDIX B

INITIAL PHASE CHECKLIST

INITIAL PHASE CHECKLIST

		SPEC SECTION	DATE
CONTRACT NO	DEFINABLE FEATURE OF WORK	SCHEDULE ACT NO.	INDEX #

PERSONNEL PRESENT

GOVERNMENT REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/GOVERNMENT

PROCEDURE COMPLIANCE

IDENTIFIY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.

COMMENTS:

PRELIMINARY WORK

ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?

WORKMANSHIP

ESTABLISH LEVEL OF WORKMANSHIP.

WHERE IS WORK LOCATED?

IS SAMPLE PANEL REQUIRED? YES ☐ NO ☐

WILL THE INIITAL WORK BE CONSIDERED AS A SAMPLE? YES ☐ NO ☐

(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE)

RESOLUTION

RESOLVE ANY DIFFERENCES.

COMMENTS:

CHECK SAFETY

REVIEW JOB CONDITIONS USING EM 385-1-1 AND JOB HAZARD ANALYSIS

COMMENTS:

OTHER

OTHER ITEMS OR REMARKS

QC MANAGER DATE

APPENDIX C

LOG FOR TRACKING INSPECTION FORMS

Log for Tracking Inspection Forms

Contract Number/Task Order _____
Site _____
Work Order Number _____

Feature of Work	Inspection Type	Date of Inspection	Comments

APPENDIX D

DEFICIENCY REPORT FORM

Deficiency Report Form

Contractor: _____

Date: _____Contractor No.: _____

Location: _____

Reference Specifications Paragraph: _____

Reference Contract Drawing Sheet No.: _____

Deficiency: _____

_____

_____

Responsible Personnel to Identify Corrective Action: _____

_____

Corrective Action: _____

_____

_____

Responsible Personnel to Implement Corrective Action: _____

Approval of Corrective Action by Task Order Manager: _____

Schedule for Corrective Action: _____

Acknowledged: _____

Area Representative and Date _____

USACE Field Representative _____

APPENDIX E

DEFICIENCY AND CORRECTIVE ACTION LOG

Contract No.: _____
Project Title and location: _____

Deficiency and Corrective Action Log

Deficiency	Deficiency Report No.	Date Deficiency Noted	Corrective Action	Date Corrective Action Taken	Comments

APPENDIX F

CONTRACTORS QUALITY CONTROL REPORT, DAILY LOG OF CONSTRUCTION

CONTRACTORS QUALITY CONTROL Report (QCR) DAILY LOG OF CONSTRUCTION		Report Number ___ Page 1 of ___ Date
PROJECT		Contract DACW17-02-C-00__
Contractor	Weather	
QC NARRATIVES **Did anything develop that may lead to a Change Order/Claim?** -		
Activities In Progress: -		
Were there any Delays in Work Progress today? -		
General Comments: -		
Verbal Instructions given by Government: -		
Safety Inspection / Safety Meetings: -		
Safety: (Inspections Made, Deficiencies noted): -		
PREP/INITIAL DATES (Preparatory and initial meetings held or advance notice) -		
ACTIVITY STAR/FINISH -		
QC REQUIREMENTS -		
QA/QC PUNCH LIST -		
CONTRACTORS ON SITE (Report subcontractor's first and last day on site)		
LABOR HOURS		
EQUIPMENT HOURS		
ACCIDENT REPORTING		
Contractor Certification : On behalf of the contractor, I certify that this Report is complete and correct and all equipment and material 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.		
QC Representative's Signature and Date	Superintendent's Initials and Date	

DEFICIENCY MANAGEMENT RECORD

CONTRACT NO._____ PROJECT _____ CONTRACTOR _____

Date	Deficiency No.	Category	Discipline	Deficiency Description	Corrected Date	CQC Init.	QA Init

01451-B2

Category:
1- Urgent; 2, Significant, 3 Requires Written Letter of Non-compliance

Receipt Acknowledged:

_____
Signature QC Staff, Date

US Army Corps of Engineers

Punch List Items by QC

28 Feb 2002

Sample Project

Project Location

DACW17-02-C-00XX

Item Number	Description	Location	Status	Date Issued	Age (days)
#12	See QC Report 25 2 pallets of brick rejected	Removed from site	Not Corrected	Day 25	53

SAMPLE FORM – Actually generated by QCS Database

Status: All **Range: All Locations** **Sort: Item No**

ACTIVITY _____ ANALYZED BY/DATE _____ REVIEWED BY/DATE _____

PRINCIPAL STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS

EQUIPMENT TO BE USED	INSPECTION REQUIREMENTS	TRAINING REQUIREMENTS

FINAL

Data and Document Management Plan
for the
Remediation of Soils at Load Lines 1, 2, 3 and 4
at the
Ravenna Army Ammunition Plant
Ravenna, Ohio

Contract Number DACA45-03-D-0026
Task Order 0001

Prepared for:

United States Army Corps of Engineers
Louisville District

Prepared by:

Shaw Environmental Inc.
100 Technology Center Drive
Stoughton, MA 02072

November 2006

DISCLAIMER: This document is prepared for the United States Army Corps of Engineers, Louisville District (USACE) by Shaw Environmental (Shaw). Some of the information in this document has not been given final approval by the Ohio Environmental Protection Agency (OhioEPA). The opinions, findings and conclusions expressed are those of Shaw and not necessarily those of OhioEPA and USACE.

DATA AND DOCUMENT MANAGEMENT PLAN
Remediation of Soils at Load Lines 1, 2, 3 and 4
Ravenna Army Ammunition Plant
Ravenna, Ohio

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APPENDICES

LIST OF ACRONYMS

AEC	US Army Environmental Center
AR	Analysis Request
AR/COC	Analysis Request/Chain of Custody
BRAC	Base Realignment and Closure
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Chain of Custody
CQCM	Contractor Quality Control Manager
DcMP	Document Management Plan
DDMP	Data and Document Management Plan
DMP	Data Management Plan
DOD	Department of Defense
EDD	Electronic Data Deliverable
EIMP	Environmental Information Management Plan
EIMS	Environmental Information Management System
EPA	United States Environmental Protection Agency
ER	Equipment Rinsate
ERIS	AEC Environmental Restoration Information System
FB	Field Blank
FSP	Field Sampling Plan
FSAP	Facility-wide Sampling and Analysis Plan
FSP	Field Sampling Plan
GIS	Graphical Information Systems
LL1-4	Load Lines 1 through 4
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
NCP	National Contingency Plan
NGB	National Guard Bureau
OHARNG	Ohio Army National Guard
OhioEPA	Ohio Environmental Protection Agency
OIP	Other Interested Parties
PBC	Performance Based Contracts
PMP	Project Management Plan
PO	Participant Organization
POC	Point of Contact
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QCP	Quality Control Plan

LIST OF ACRONYMS

RAB	Restoration Advisory Board
RGO	Remedial Goal Option
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SAP	Sampling and Analysis Plan
USACE	United States Army Corps of Engineers
USCHPPM	US Army Center for Health Promotion and Preventive Medicine

1.0 INTRODUCTION

Shaw Environmental (Shaw) was contracted by the United States Army Corps of Engineers (USACE) Omaha District to perform remediation activities associated with impacted soils and dry sediments in Load Lines 1, 2, 3 and 4 (LLs 1-4) at the Ravenna Army Ammunition Plant (RVAAP) under the Fixed Price Remediation Insured (FPRI) Indefinite Delivery/Indefinite Quantity Contract No. DACA45-03-D-0026. Work by Shaw at the Ravenna facility in LLs 1-4 will be performed under Task Order 0001 of the above referenced contract. As part of the remediation activities, Shaw has been tasked with preparing a Data Management Plan (DMP) to document methods for managing electronic and hard copy data generated during the completion of work under this Task Order and a Document Management Plan (DcMP) to establish procedures for production, review, finalization distribution and storage of contract-related documentation during the completion of work under this Task Order. This Data and Document Management Plan (DDMP) will reference and adhere to existing facility wide and FPRI project specific work plans, but it is not an element of the Remedial Action Work Plan that is forthcoming under the FPRI. The following document will serve as the basis for Shaw's data and document management procedures for work at RVAAP.

This DDMP was developed in accordance with the Project Management Plan (PMP) (Shaw, 2004a). Where applicable, references are made to the Environmental Information Management Plan (EIMP) (SAIC 2001) and the Electronic Data Deliverables Specification contained in Appendix D.

The DMP provides the framework for the systems used to acquire, document, track, maintain, manage, archive, retrieve, and report project data. The purpose of the plan is to provide guidance to support and coordinate site activities, support the collection of data, and facilitate project reporting and communication. The DcMP provides a means to track, maintain, manage, distribute and control preliminary draft, draft and final submittal documents as well as other document submittals, comments, and comment responses generated as part of the soil remediation work conducted at LLs 1-4.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The roles and responsibilities of the individuals participating in the acquisition and management of data and preparation and distribution of documentation are described below. The roles listed below are for personnel mainly involved with the database. Further details regarding Shaw personnel and their respective project roles are included in the Project Management Plan (PMP; Shaw 2004a). Other contractors and subcontractors performing data collection and document preparation activities at RVAAP are required to follow the guidelines set forth in this DDMP and the Environmental Information Management System (EIMS; SAIC 2001b).

2.1 RVAAP Information Team

The RVAAP Information Team is a committee representative of the RVAAP stakeholders that provides technical guidance on decisions regarding the EIMS at the request of the RVAAP Information Manager. It is made up of representatives of the various user groups of the system that include the RVAAP, Ohio Army National Guard (OHARNG), USACE, Army Environmental Center (AEC), Ohio Environmental Protection Agency (OhioEPA), EIMS contractor, other contractors, the Restoration Advisory Board (RAB) and the general public.

Responsibilities of the RVAAP information team include the following:

- Review information management issues at the request of the RVAAP information Manager,
- Make recommendations for changes and additions to the EIMS, and;
- Prioritize system and information needs.

2.2 RVAAP Information Manager

The RVAAP Information Manager is the Army representative at the site with the direct responsibility for oversight of the RVAAP EIMS. Currently this role is filled by the RVAAP Remedial Project Manager, Mr. Irv Venger. The RVAAP information manager has the following responsibilities:

- Verify that the EIMS contractor has produced an EIMS that works as specified in the EIMP;
- Approve changes to the structure and function of the EIMS with input from the RVAAP Information Team.
- Approve information such as documents and data for public access, and;
- Identify and approve information for addition to EIMS.

2.3 Shaw Program Manager

The Shaw Program Manager is Mr. Robert Culbertson. Mr. Culbertson will serve as Executive Oversight to ensure the project is completed in accordance with USACE and all regulatory standards.

2.4 Shaw Project Manager

The Shaw Project Manager is Mr. David Cobb. Mr. Cobb will serve as the point of contact (POC) for the USACE on all project issues, as well as Task Order-specific issues as they may arise. As Project Manager, Mr. Cobb will ensure that contractual obligations are observed. He

will be responsible for interactions with USACE Louisville District and will be ultimately responsible for all data and document management activities under this project. The Project Manager will be responsible for coordinating the satisfactory completion of data and document collection, preparation, and presentation and will oversee the performance of these activities by assigned project personnel. The Project Manager will track the progress of data and document management through monthly project review meetings and reports.

2.5 Shaw Technical/Regulatory Lead

The Technical/Regulatory Lead for the RVAAP has direct responsibility for implementing all sampling and analysis plans (SAPs), work plans, field activities, data acquisition and management, and report preparation. The Technical/Regulatory Lead will also provide the overall management of all project tasks and serve as technical lead and point of contact with the USACE, Louisville District Project Manager and USACE designated point of contact. The Technical/Regulatory Lead will review all documentation and designate qualified project personnel to prepare, review, and distribute documentation, and respond to comments.

2.6 Shaw Contractor Quality Control Manager

The Contractor Quality Control Manager (CQCM) is responsible for implementation of project Quality Assurance/ Quality Control (QA/QC) in accordance with the requirements of the global and site-specific SAPs, the Quality Control Plan (QCP) and site-specific QCPs, and other project planning documents. The CQCM, in coordination with the Project Chemist, will assure that data acquisition is in compliance with the QCP.

2.7 Shaw Project Chemist

The Project Chemist is responsible for implementation and documentation of all project QA/QC protocols during field activities, which are presented in the SAP and subsequent site-specific SAPs. In this capacity, the Project Chemist will direct and implement the various components of the Quality Assurance Project Plan (QAPP), as identified in the USACE Engineer Manual 200-1-3, *Requirements for the Preparation of Sampling and Analysis Plans* (USACE 2001). This will include, but not be limited to the following: ensuring chemical analysis and reporting performed by the analytical laboratories are in accordance with requirements defined in the QAPP; oversight of field sampling and analytical activities; documentation of field QC activities; resolving questions the laboratory may have regarding QAPP requirements and deliverables, and coordination of data reduction, validation, and documentation activities related to sample data package deliverables received from the laboratories. All analytical data used for project decision-making should be reviewed and approved by the Project Chemist prior to their release or publication.

2.8 Shaw Field Superintendent

The Field Superintendent is responsible for implementing all field activities in accordance with the global SAP and site-specific documentation (i.e., SAPs, QCPs, and/or work plans). The Field Superintendent will be responsible for ensuring that all subcontractor activities comply with project requirements and verifying that all necessary project data are collected and documented completely and accurately to facilitate data transfer or entry into the database. In the event a Sample Coordinator is not used or is absent for a specific scope of work, the Field Superintendent assumes the responsibilities of the Sample Coordinator (see Section 2.11).

2.9 Shaw Field Personnel

The field personnel participating in field activities are anticipated to be sampling technicians. These individuals will be responsible for performing all field activities in accordance with field plans and project documentation (i.e., SAPs, QCPs, and/or work plans) and will report directly to the Field Superintendent. Field personnel will support the Sample Coordinator to verify that all necessary project data are collected and documented completely and accurately to facilitate data transfer or entry into the database.

2.10 Subcontractor Field Personnel

Subcontractor field personnel, under the supervision of the Shaw Field Superintendent, will be responsible for performing their specific scopes of work. These individuals will be required to review applicable sections of the global SAP and site-specific documentation (i.e., SAPs and QCPs), and the Safety, Health, and Emergency Response Plan (SHERP, Shaw 2004e) prior to field mobilization.

2.11 Shaw Sample Coordinator

The Sample Coordinator works closely with the Project Chemist, Field Superintendent, and field personnel to ensure successful collection, documentation, and shipment of all environmental samples and related QA/QC samples. The Sample Coordinator is responsible for initiating all data gathering activities and capturing information for inclusion in the database. The Sample Coordinator is also responsible for coordination of the shipment of samples to the USACE-selected QA laboratory, which has been designated as the government QA laboratory for the project. This individual, with support from the Project Chemist, will be responsible for obtaining the required sample containers from the laboratories. In the absence of a Sample Coordinator, the Field Superintendent will be responsible for the field tasks associated with the data acquisition and management process.

2.12 Shaw Network Administrator

The Network Administrator manages the hardware and software required by the network server. The Network Administrator conducts the following:

- Installs, configures and maintains server hardware and software,
- Creates back ups of data at specified intervals,
- Assigns server user names and initial passwords, and;
- Monitors server for unauthorized access.

2.13 EIMS Database Manager

The EIMS Database Manager is employed by the EIMS contractor to load data into the EIMS database. The Database Manager conducts the following:

- Identifies and Resolves problems with data before loading,
- Loads data into the EIMS, and
- Issues change notices to inform users when data have been changed.

The EIMS Database Manager works closely with the Project Chemist. Changes to data in the database must be coordinated with the Project Chemist and/or Database Manager. Changes to

the database are not allowed without prior approval of one of these two individuals. If field data (e.g., survey data, water levels, geologic, well construction) are to be input into the database, the Database Manager works with the Field Superintendent to ensure all data are entered accurately.

2.14 Data Entry Personnel

Data entry personnel work with the Project Chemist and the Database Manager to input data into the database or review and check data.

2.15 Geographic Information System Manager

The Geographic Information System (GIS) Manager has primary responsibility for management of spatial data for the project. The GIS Manager provides the following:

- Works closely with the Project Chemist to prepare figures requiring use of analytical data
- Directs GIS support in preparation of figures (report quality and other)
- Notifies the Project Chemist of any data problems encountered while using visualization tools to depict or analyze data (which serves as an additional step in the QA process)
- Aids Project Chemist/Database Manager in QA of spatial data
- Provides training to spatial data end users
- Serves as a resource to support GIS and other data analysis and visualization applications
- Maintains base map consistency between GIS and computer-aided design and drafting.

Other roles are defined in the EIMP (SAIC 2001b).

3.0 DATA MANAGEMENT PLAN

This chapter presents a description of the overall data acquisition and management process. The data reduction, review, validation, reporting, and record keeping procedures described in subsequent sections will ensure that complete documentation is maintained, transcription and data reduction errors are minimized, the quality of the data is reviewed and documented, and the reported results are properly qualified. The process followed will be in accordance with the existing plans (SAP, QAPP, EIMP, etc.). The various types of data generated on the project will be addressed in this section, including analytical data, earth science and geoscience data, and spatial data.

3.1 Data Acquisition and Management Objectives

The RVAAP DMP portion of the DDMP was developed to provide a means to maintain and produce output for data collected at the facility consist with the existing data, under Shaw's execution of work. This DMP provides the framework for the systems used to acquire, document, track, maintain, manage, archive, retrieve, and report project data. The purpose of the plan is to provide guidance to support and coordinate site activities, support the collection of data, and facilitate project reporting and communication. Project data expected under this contract include field records and measurements, survey data, boring and lithologic logs, well construction diagrams, analytical data, and results of data validation. The overall goals of the DMP are to establish the following:

- Standards for documenting data collection
- Standards for data storage
- Protocols for data entry
- Protocols for data quality review
- Protocols for electronic data deliverables (EDD)
- Standard data structures
- Project valid values
- Standard sample nomenclature
- Protocols for efficiently querying and reporting data, and;
- Define the project roles and responsibilities for personnel involved in the data management process.

The DMP complements the process for acquiring and managing data for field investigations and remediation performed at RVAAP. These data are used to characterize the nature and extent of contamination and to monitor the progress of remediation activities.

The DMP provides additional requirements to the addendums to the existing Facility-wide SAP (FSAP; SAIC 2001a). This plan consists of two parts, the Field Sampling Plan (FSP) and the QAPP. The FSP describes procedures and protocols to be followed during field activities conducted at the RVAAP. The QAPP describes the QA/QC procedures to be followed for laboratory analyses of samples collected during field activities. A site-specific SAP Addendum (Shaw 2006) provides details of specific field activities (e.g., field analysis procedures), as well as applicable procedures and protocols presented in this document.

The RVAAP project will follow a systematic process for acquiring and managing data. The data flow from the laboratory and the field to the project team and data users shall be sufficiently documented to ensure the data are properly tracked, reviewed, and validated for use. Shaw will use the existing EIMS managed by the EIMS contractor. The project valid values and naming conventions defined for the project are presented in the SAP Addendum (Shaw 2006) and area consistent with the EIMP (SAIC 2001b).

The primary elements of the data acquisition and management process include the following:

- Project planning
- Field sampling
- Laboratory analysis and reporting
- Data loading and data entry
- Data review and validation
- Data reporting

Multiple field investigations and confirmatory sampling events will occur at RVAAP under this contract. The data collected during these events will be loaded into the database and used to document interim closure of the sites and identify areas requiring remedial action implementation. The data acquisition and management process for all data collection activities is shown in Figure 3-1 of the EIMP, "Information Flow for the RVAAP EIMS".

Data collection is conducted in accordance with the scope of work outlined in the site-specific FSP (Shaw 2006), the Scope of Work, existing RVAAP Facility-wide plans, and applicable USACE guidance documents. Laboratory analysis of collected samples is discussed in the QAPP (Shaw 2006). Additional requirements for the transfer of laboratory data to Shaw and other contractors are discussed further in this DMP and the EIMP (SAIC 2001b).

3.2 Field Task Planning

The purpose of this chapter is to describe the activities that occur when planning a field sampling event. Section 3.2.3 describes the sample nomenclature for RVAAP.

3.2.1 Project Setup

Specific events must occur at the initiation of a project to facilitate the timely and accurate flow of data. This information is entered into the database at the outset of the project and remains constant throughout the course of the project unless there are changes that necessitate modifying or updating this information. The project setup serves as the foundation of the project with respect to QA/QC, analytical requirements, and the analytical program as described in the FSP and QAPP of the SAP Addendum (Shaw 2006). This information includes the following:

- Project summary (i.e., project name, type, number, manager, etc.) that will appear on analysis request/chain of custody (AR/COC) forms
- Tasks (i.e., name, description, start and end dates, etc.) for subdivision of projects
- Parameters, groupings, and default units
- Other valid values (i.e., qualifiers, containers, preservatives, laboratories, etc.).

The project setup task is critical to the success of the project.

3.2.2 Sample Planning

Sample planning occurs as early in the project as practicable and involves the Shaw Project Manager, Technical /Regulatory Lead, Sample Coordinator, Project Chemist, and laboratory(ies). The Technical/Regulatory Lead or Project Chemist will prepare a Sampling Summary of the anticipated sampling event for submittal to USACE and Ohio EPA for approval. The Sampling Summary will include QC requirements, reporting criteria and a schedule. The specific information about the individual samples to be collected include medium to be sampled; sample depth; sampling method; number of containers, type and volume; preservatives; analytical method requirements; and special handling, such as high hazard or expedited turnaround. This Sample Summary will serve as the source of information (as an AR) to notify the laboratory of an upcoming sampling event and to initiate bottle and sample container orders from the laboratory. The Project Chemist utilizes these data to place this order and conducts a final review of the laboratory requirements for the project during this phase. The Sampling Summary serves as a sample plan for the project to be used in the field by the Sample Coordinator. To maintain flexibility, the Sampling Summary will allow for additional samples that are not preplanned.

3.2.3 Sample Nomenclature

Sample nomenclature is a process for naming samples that begins in the work planning stage when all planned field and QA/QC samples are assigned a location code, unique sample number, and sample description. This process is facilitated by the data acquisition and management procedures set forth in this DMP and the RVAAP database application. The following sections describe the sample nomenclature approach that will be used at RVAAP and is also contained in the SAP Addendum (Shaw 2006).

The sample nomenclature scheme from previous investigations on the Site, consistent with the Louisville District naming convention, will be maintained for this project. Nomenclature has been modified for sampling areas unique to this project such as stockpile sampling and confirmatory sampling. Each of these conventions is described in further detail in the sections that follow.

- Area Designator: Each Load Line is identified as Load Line 1, 2, 3 or 4 and will be designated in the sample identification as LL1, LL2, LL3, or LL4, respectively.
- Sample Location type: The sample will be designated as either SD for sediment, or SS for surface soil (samples to be collected at the bottom of excavation for confirmatory analysis).
- Sequential Sample Location number: The sample will be designated with a three-digit number unique to the designator.

Table 3-1
USACE-Louisville District Location/Sample Identification Naming Conventions

Sampling Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		SD	- Sediment Sample Location
		SS	- Surface Soil Location
NNN	= Sequential Location Number (three-digit number unique to designator)		
Sample Identification: XXXmm-NNN-####-tt			
####	= Sequential Sample Number (four-digit number unique to site)		
tt	= Sample Type	Examples	
		SO	- Soil Sample
		SD	- Sediment Sample
		FB	- Field Blank
		ER	- Equipment Rinsate

A modified version of the USACE-Louisville District location/sample identification naming conventions described above will be used for samples collected from within the excavation areas for confirmatory analysis. The modified naming system is shown in Table 3-2.

Table 3-2
Modified Sample Naming System for Post-Excavation Sampling

Sample Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		SD	- Sediment Sample Location
		SS	- Surface Soil Location
NNN	= Discrete Excavation Number (three-digit number unique to excavation area across the four load lines)		
Random Sample Point Identification: XXXmm-NNN-LL			
LL	= Random multi-increment sample location (#01 – 30) within the post-excavation area		

A modified version of the USACE-Louisville District location/sample identification naming conventions described above will be used for pre-excavation samples or samples collected from stockpiles of excavated soil and sediment. The modified naming system is shown in Table 3-3.

Table 3-3
Modified Sample Naming System for Waste Characterization Sampling

Sampling Location Identification: XXX-NNN-###			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
NNN	= Discrete Excavation or Stockpile Number (three-digit number unique to excavation area or stockpile across the four load lines)		
###	= Sequential Sample Number (only if more than one sample required from discrete excavation or stockpile location)		
Random Sample Point Identification: XXX-NNN-####-LL			
LL	= Random multi-increment sample location (#1 – 30) within the discrete excavation or stockpile area.		

Shaw will utilize a modified version of the USACE-Louisville District location/sample identification naming conventions for groundwater samples collected as part of long-term groundwater monitoring activities. A summary of these modified naming conventions is presented in Table 3-4.

Table 3-4
Modified Sample Naming System for Groundwater Sampling

Sampling Location Identification: XXXmm-NNN			
XXX	= Area Designator	Examples	
		LL1	- Load Line 1
		LL4	- Load Line 4
mm	= Sample Location Type	Examples	
		MW	- Groundwater Monitoring Well
NNN	= Sequential Location Number (three-digit number unique to designator)		
Sample Identification: XXXmm-NNN-####-tt			
####	= Sequential Sample Number (four-digit number unique to site)		
tt	= Sample Type	Examples	
		GW	- Groundwater Sample (unfiltered)
		GF	- Groundwater Sample (filtered)
		FB	- Field Blank
		ER	- Equipment Rinsate

3.2.4 QC Sample Identification

Field QC samples will be identified in accordance with the procedures outlined in the SAP Addendum (Shaw 2006). They will be identified as QC samples by the sample type field. The sample type for QC field blank is “FB” and for equipment rinsate is “ER”.

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) samples maintain the sample number of the original regular sample collected and have either "MS" or "MSD" appended to the end of the original regular sample number to denote the matrix spike or matrix spike duplicate samples.

3.2.5 Historical Sample Identification and Numbering

To maintain consistency, the nomenclature used here is consistent with the nomenclature used during the Remedial Investigation activities previously completed by others (SAIC 2003; Shaw 2004b, c, and d).

3.3 Field Data Collection Activities

The Sample Coordinator plans each day's sampling activities, including preparing field test and confirmatory sampling kits with the appropriate number and type of containers. Container labels are preprinted to the extent possible as part of the field test or confirmatory sampling kits. The Sample Coordinator produces a daily work list to direct the sampling effort for the day. Along with the work list, Sampling Coordinator also prints sample collection logs summarizing the planned sample information. This information includes the analytical program, container types and quantities, chemical preservation, and associated QA/QC requirements.

Field parameters, if applicable, along with any changes to the plan, are recorded on the sample collection logs. Completed sample collection logs are returned to the Sample Coordinator at the end of each day's sampling activity. The Sample Coordinator reviews and approves each completed form and uses the required information to produce the COC. The Sample Coordinator produces the COC that accompanies the samples to the laboratory. Copies of the COC are faxed each day to the Technical/Regulatory Lead, Project Chemist and Database Manager for review and tracking. The Technical/Regulatory Lead will also provide copies to USACE, OhioEPA and RVAAP. Field measurement data are sent along with other field documentation to the Database Manager for data entry. Both the transferred data and manually entered data residing in the database constitute the complete record of field sampling information for each sample.

During field sampling activities, custody of the samples must be maintained from the time that the samples are collected until laboratory data are issued and samples are appropriately disposed. Documentation of sample custody transfer is required for all aspect of the COC process to include documentation of the samples from the Field Sampler to the on-site Sample Coordinator. Initial information concerning collection of the samples will be recorded in a field logbook and on a sample collection log as shown on Figures 1 and 2. Entries into the field logbook shall follow the Standard Operating Procedure (SOP) provided in Attachment 1 - Field Logbook SOP. Information regarding the transfer, handling, and shipping of all samples will be recorded on a COC. If a Sample Coordinator has not been designated, the Field Superintendent assumes the responsibilities of the Sample Coordinator.

3.3.1 Waste Characterization Sample Collection Activities

Samples will be collected and analyzed for waste characterization purposes as detailed in the SAP Addendum (Shaw 2006). Samples may be collected from designated excavation areas prior to excavation or from soil stockpiles generated from the excavation activities. The SAP Addendum (Shaw 2006) contains or references the following information:

- Sample nomenclature
- Parameters to be tested

- Methods of analysis to be used
- QA/QC samples to be collected at each designated location
- Data requirement for deliverables format, validation requirements, etc.

Samples to be collected prior to excavation activities will have preprinted bottle labels and sample collection logs available for each sample. The Sample Coordinator should review and verify all preplanned information for accuracy and compliance to the SAP Addendum (Shaw 2006) and should notify the Project Chemist of any problems. Paper copies of all generated COCs and completed sample collection logs should be placed in site-specific files created expressly for the purpose of managing documentation as samples are collected and faxed daily to the Database Manager and Project Chemist.

The Sample Coordinator provides all necessary sample bottles, preservatives, bottle labels, sample collection logs, etc. to each sampling team to accomplish the sample collection work list assigned by the site manager. The Sample Coordinator is responsible for enforcing the frequency established in the FSP (Shaw 2006) for field QA/QC samples such as equipment rinsates, trip blanks, and field blanks by initiating and submitting to the lab as required.

3.3.2 Sample Collection Activities

Once the designated areas of contamination are removed, Shaw personnel will utilize field test kits to guide further excavation. Once the field test kits indicate that the soils exceeding the cleanup criteria are removed, post-excavation confirmatory samples will be collected using multi-increment sampling per the guidance in Appendix B of the FSP Addendum (Shaw 2006) and submitted to an approved laboratory for analysis. If the field test indicates that excavation should continue, no sample will be submitted to the laboratory from that area pending further investigation.

Each post-excavation sample collected for chemical analysis or archived for possible future analysis will be placed in the appropriate container(s) and labeled at the time of sample collection with the following information:

- Project number and name
- Sample number
- Date and time of collection
- Required analyses and methods
- Type of preservative, if applicable
- Volume of sample and container type.

The above scenario assumes that all samples to be collected are predetermined. In the event that the field scope of work does not explicitly define the number of samples, the Field Personnel will need to follow the sample nomenclature for labeling samples. All appropriate documents including field logbooks, field activity daily logs, and sample collection logs are completed. The collected samples should be returned to the Sample Coordinator upon completion.

3.3.3 Post-Sample Collection Activities

The Sample Coordinator is responsible for verifying that the appropriate paperwork is submitted for each post-sample, the correct sample container(s) was used, the samples were correctly

preserved or maintained at the appropriate temperature, and the assigned QA/QC samples were collected. Special attention should be given to the preplanned information such as sampling method, sample depth, etc. that is recorded on the logbook form. The Sample Coordinator should track the field QC sample to regular sample association. The accuracy of the information should be verified at the time of sample log in given actual field conditions and activities. The following forms should be assembled into a file folder for each sampling location and sent to the Project Chemist for entry into the database.

- Sample Collection Logs/Field Forms
- Water Level Measurements, if applicable
- Survey Data
- Well Construction Diagrams, if applicable
- Boring Logs, if applicable
- COC Records
- Field Data, if applicable.

The Database Manager or designee will ensure that these data are entered or imported into the database. If a Sample Coordinator was not designated, the Field Superintendent will collect and forward all field forms to the Technical/Regulatory Lead, Project Chemist and Database Manager.

The Sample Coordinator will generate the COC for each sample shipment. The Sample Coordinator is responsible for verifying the accuracy and completeness of the COCs for the sample shipment being made. A full QC check will be performed and documented on the COC for each shipment. The Sample Coordinator is responsible for the contents of each cooler shipped and the accompanying documentation. At the close of each sampling day, the generated COCs should be faxed to the Project Chemist and the associated laboratories for notification of sample shipment. The Sample Coordinator will record each shipment on the Sample Shipping record contained in Appendix B.

The Sample Coordinator is responsible for documenting any variance or nonconformance to the SAP Addendum (Shaw 2006) with respect to sample collection, preservation, packaging, documentation, and shipment through the use of the variance log, nonconformance form and/or any other means of documentation initiated by the project. The Project Chemist should be notified and consulted prior to the initiation of the documentation. A summary checklist for Data Acquisition and Management Tasks is provided in Table 3-5.

Table 3-5
Summary Checklist for Data Acquisition and Management Tasks

No.	Task	Responsible Person[a]	Comments
1	Write SAP	Project Chemist	With input from the project team.
2	Database initial setup	Database Manager	Creates table space for new project in the database
3	Project setup in the database	Project Chemist and Database Manager	Setup analytical methods, reporting units, analytes, CAS numbers, etc. Relay all above information to the laboratory.
4	Preplan samples in the database (optional)	Project Chemist	Applies to long-term monitoring or scheduled sampling events
5	Transmit Sampling Summary to Database Manager and Analysis Request to Laboratory	Sample Coordinator	Notified Database Manager and Laboratory of upcoming sampling events.
6	Field sample collection and coordination	Sample Coordinator/ Field Superintendent	Coordinate the collection of planned and ad hoc samples, generate sample documentation, and provide uploads of field data to the database.
7	COC data entry	Sample Coordinator	Complete the entry of the field data portion of the sample record.
8	COC entry review	Project Chemist	Check COC information against what is expected in the database, especially sample location codes and sample numbers.
9	Geoscience field data review	Project Geologist	Review boring logs, well construction diagrams and other geoscience data for completeness, accuracy and consistency
10	Geoscience field data entry and QC review	Database Manager	Enter geoscience data into database and perform QC review of data entry process
11	EDD upload	Database Manager	Should not occur until COC data entry is done. Database Manager informs the Project Chemist of mistakes in the EDD.
12	Generate EDD report	Database Manager	Provide to Project Chemist for review of upload.
13	QC of data and review of EDD report	Project Chemist	Check for completeness, compliance with project requirements (results, compound lists, MDL, etc.)
14	Check data usability	Project Chemist	Evaluates which data provided by the laboratory are to be reported (e.g., dilutions, reanalysis).
15	Update usability in database and make corrections in the database	Database Manager	Makes corrections in the database per Project Chemist review and sends an electronic file to the Project Chemist.
16	Data validation	Project Chemist	
17	Data validation qualifier entry into the database	Database Manager	Update the database to reflect changes and qualification resulting from data validation.
18	Generate tables for reports or calculations	Database Manager	At the request and to the specifications of project data users.
19	Review of report tables	Project Chemist	Verify data sets are complete and free of anomalies, errors or omissions.
20	Location survey data	Sample Coordinator or Field Superintendent	Project Chemist is responsible for collecting survey data, although a data entry clerk may either manually enter the data or upload the data from a file.
21	Perform audit check	Database Manager	

No.	Task	Responsible Person[a]	Comments
22	Initiate client data transmittal process	Project Chemist	At the request of the project team, the Project Chemist initiates closeout of the project database in preparation for the client submittal. (Specific submittal procedures vary by project)
23	Client data transmittal	Database Manager	Transmits data to client as required

a This is the person responsible for the task, but not necessarily the person who performs the task.

CAS Chemical Abstract Services.
COC Chain of custody.
EDD Electronic data deliverable.
QC Quality control.
MDL Method detection limit.
RDL Reportable lower detection limit.
SCL Sample collection log.

3.4 Laboratory Analysis and Data Deliverables

The laboratory verifies receipt of the samples with the Project Chemist. Any sample integrity problems or discrepancies with the AR/COC are addressed at this time. If the issue requires that a location be resampled, the Project Chemist notifies the Sample Coordinator and the Technical/Regulatory Lead of the problem so it can be resolved. The Project Chemist also initiates the sample-tracking feature in the database at this time using the sample receipt/acknowledgement received from the laboratory. This document contains information on laboratory sample number, lot or work order number, date due and other relevant data. Any problems encountered by the laboratory during the sample analysis program are immediately brought to the attention of the Project Chemist.

The laboratory data packages are sent to the Project Chemist for review and inventory and to the project office for archival. As packages are received, they are noted in the tracking module. At the same time, the Database Manager receives the EDD from the laboratory, acknowledges receipt of the EDD, and reviews and processes the file. Upon successful upload of the EDD by the Database Manager, the Project Chemist is notified the electronic portion of the deliverable is ready for review and validation. The EDD is also received by the project office and stored for archival purposes.

All data generated for the RVAAP investigation and remediation will be provided in both hardcopy and electronic format that complies with the database EDD specifications which appears in Appendix D, “Electronic Data Deliverable Specification” as well as the format suitable for submission into the Army Environmental Center (AEC) Environmental Restoration Information Systems (ERIS). The laboratory will be required to confirm sample receipt and login information. The laboratory will return a copy of the completed COC and confirmation of the laboratory’s analytical login to the Sample Coordinator within 24 hours of sample receipt.

3.4.1 Receipt for Sample Forms

When the analytical laboratory receives the sample coolers, a receipt of sample form will be initiated. This form will document the sample condition upon receipt. All receipt nonconformance situations will be documented through the use of this form and sent to the Project Chemist.

3.4.2 Delivery of Hard Copy Data

The analytical laboratory will prepare and deliver a full hard copy of an analytical data package to the Project Chemist in a format acceptable to USACE. The laboratory is required to retain a full copy of the analytical and QC documentation. Such retained documentation will include all hard copies and other storage media (e.g., CD-ROM). As needed, the analytical laboratory will make available all retained analytical data information.

3.4.3 Delivery of Electronic Data

The laboratory will also provide an EDD to the Database Manager in the format specified in Appendix D.

3.5 Data Entry and Data Loading

This subsection presents a summary of the tasks associated with loading electronic data received from the laboratory, data entry of non-electronic data, and GIS data.

3.5.1 Analytical Data

The Shaw Database Manager will load the EDD received from the laboratory into the RVAAP database. The database will perform a series of checks for data format and valid values. These checks include, but are not limited to the following:

- Samples reported match samples input from the COC.
- Test methods, leachate methods, preparation methods, and analyte lists match those established in SAP
- Samples are reported with appropriate units
- No duplicate data are loaded
- Method blank associations are properly denoted
- Only valid values established at the outset of the project for selected fields are reported
- Filtered and re-extracted or reanalyzed records are marked.

Any problems encountered during the data loading process regarding the data presented by the laboratory are resolved with the laboratory prior to the data being loaded. The Shaw Project Chemist and the Database Manager also create associations between laboratory QC samples and the corresponding field samples.

3.5.2 Field and Geoscience Data

Field data not available electronically will be entered manually into the database from the field documents. Geologic data and well construction data will be entered into the database by data entry technicians after the forms have been reviewed by the Project Geologist. This review will minimize the data entry effort and assure that the end users of the data receive a technically sound product that is consistent and reliable. The QC that will be required after data entry will consist of verifying that the data were input correctly, as additional technical review will not be necessary.

3.5.3 Spatial Data

The spatial data will be loaded and managed in accordance with the EIMP. Data shall be provided in a standardized ERSI ArcView compatible format with metadata.

3.6 Data Review and Data Validation

The Project Chemist will review the data for accuracy and completeness once loaded into the database. For RVAAP tasks where formal data validation is required, the Project Chemist coordinates the entry of data validation qualifiers into the RVAAP database. All manual data entry is subjected to a QC review to verify the completeness and accuracy of the data entry. Data validation will be performed in accordance with the USACE, Louisville Chemistry Guideline (LCG;USACE 2002). Flags signifying the usability of data will be noted and entered into the database. Deficiencies in data deliverables will be corrected through direct communication with the field or laboratory.

All changes to the database will be recorded on a Database Change Notice. An electronic file of database change notices will be maintained and accessible as part of the system in accordance with the EIMP. Decisions to repeat sample collection and analyses may be made by the Project Manager and the Project Chemist based on the extent of the deficiencies and their importance in the overall context of the project.

Upon completion of the data validation process, the data validation team will update the database with the appropriate data validation and usability qualifiers. The revised data and qualifiers will be reprinted and reviewed by the Project Chemist or designee for accuracy until all qualifiers have been successfully entered into the database.

4.0 DOCUMENT MANAGEMENT PLAN

4.1 Document Management Plan Objectives

The RVAAP Document Management Plan (DcMP) of the DDMP was developed to provide a means to track, maintain, manage, distribute and control preliminary draft, draft and final submittal documents as well as other document submittals, comments, and comment responses generated as part of the soil remediation work conducted at Load Lines 1 through 4 (LL1-4). The goals of the DcMP are to establish the following:

- Electronic and hard copy document distribution methods
- Electronic document version tracking methods
- Comment submittal and tracking methods
- Comment response and implementation procedures, and
- Electronic and hard copy document filing and archiving methods

4.2 Responsibilities

The Shaw Project Manager, Mr. David Cobb, is ultimately responsible for all document preparation, distribution, comment response, filing and archival. As Project Manager, Mr. Cobb will designate a Task Manager who is most familiar with the site and document objectives to prepare the report, with the assistance of other project staff such as the Project Chemist and Database Manager. The Task Manager may also serve as another role on the project.

4.3 Document Preparation

The Task Manager, with review by the Technical/Regulatory Lead will compile all information and prepare and distribute the Preliminary Draft (or draft version depending on iterations required by the contract) documents to the Participant Organizations (POs) designated personnel, described below, for review. The Technical/Regulatory Lead and Task Manager will discuss the document with the POs and address comments. The Task Manager will then coordinate changes to the text and distribute the Draft document to the POs and Other Interested Parties (OIPs) as listed below. The Technical/Regulatory Lead and Task Manager and other project staff as needed will discuss and address comments from the POs and OIPS. For each review, the Technical/Regulatory Lead and Task Manager will prepare a written response to comments to be included in the following revision of the document. The Task Manager will distribute the reports as indicated on Table 4-1 – Document Distribution. Documents for review will be submitted via electronic and hardcopy format, or as requested by the reviewing party.

Participant Organizations

- USACE – Louisville District
- RVAAP
- Ohio Army National Guard (OHARNG)/Ravenna Training and Logistics Site (RTLS)
- Shaw Environmental, Inc.
- Ohio Environmental Protection Agency (OhioEPA)
- US Army Environmental Center (AEC)

OIPs

- National Guard Bureau (NGB)
- Base Realignment and Closure (BRAC) Office
- US Army Joint Munitions Command (JMC)
- US Army Center for Health Promotion and Preventive Medicine (USCHPPM)
- Toltest, Inc.
- RVAAP Restoration Advisory Board (RAB)

Table 4-1
Document Distribution

Project Deliverables	Participant Organizations (POs)	Other Interested Parties (OIPs)	Project Repository	RVAAP Repository (electronic version)	Administrative Record
Preliminary Draft	Army				
Draft	X	X	X	X	
Final	X	X	X	X	X

Shaw will maintain a log of document submittals including comments, dates, recipients, and any other information to record document distribution.

Project Deliverables include the following:

- Project Schedule and Updates
- Project Management Plan and revisions
- Coordination Plan
- Field Project Plans
- Final Supplemental Baseline Human Health Risk Assessment for the Load Line 1 Alternative Receptors Report
- Draft and Final Remedial Investigation Reports for Load Lines 2 through 4
- Preliminary, Draft and Final Feasibility Study Reports for Load Lines 1 through 4
- Preliminary, Draft and Final Proposed Plan for Load Lines 1 through 4
- Draft and Final Decision Document for Load Lines 1 through 4
- Preliminary, Draft and Final Remedial Design Reports for Load Lines 1 through 4
- Preliminary, Draft and Final Completion Reports for Load Lines 1 through 4
- Quarterly Project Status reports
- Meeting/conference call minutes

4.4 Document and Records Management

Shaw will use a standardized electronic file naming convention using revision numbers to manage multiple versions of files. Printed documents will indicate the file name a path on the last page of text for future reference. Electronic files will be maintained on Shaw's computer system until they can be archived onto alternate media. Electronic text documents shall be in Microsoft Word format, and all engineering drawings shall adhere to the Department of Defense (DOD) Tri-Service Criteria for computer-assisted design. Analytical and associated data will be prepared in electronic format suitable for submission into the AEC ERIS.

Shaw will maintain a multimedia (i.e., both hard and electronic formats to the extent that they exist) repository of all FPRI Project-related information to ensure that pertinent documentation is available for Project reviews or justification and to provide a clear record of the FPRI/PBC approach. This includes, but is not limited to, field data, analytical reports, correspondence and deliverables. This repository is the property of the Army. For security purposes, Shaw shall be required to obtain permission from the Joint Munitions Command (JMC) prior to providing any maps to the public. Shaw will integrate CERCLA/National Contingency Plan (NCP)-required information developed from the conduct of the Contract into existing repositories in the Administrative Record (RVAAP Building 1037), the Ravenna, OH Library and the Newton Falls, OH Library. The Shaw Project Manager is responsible for ensuring that Project personnel use the appropriate formats.

Shaw will provide electronic versions of documents and drawings to the EIMS contractor in PDF format in accordance with the EIMP and EDD Specification contained in Appendix D.

5.0 REFERENCES

1. Science Applications International Corporation (SAIC) 2001a. "Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunitions Plant, Ravenna, Ohio". March 2001.
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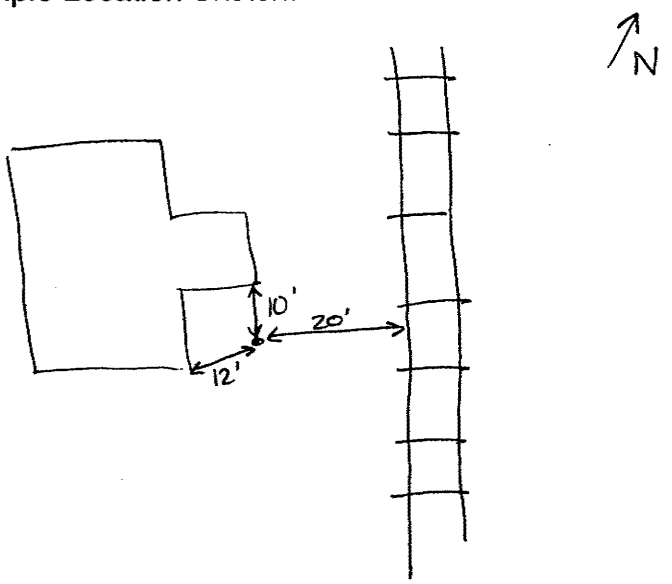
3. SAIC 2003. "Final Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". June 2003
4. Shaw Environmental, Inc. (Shaw) 2004a. "Project Management Plan, Remediation of Soils at Load Lines 1-4, Ravenna Army Ammunition Plant, Ravenna, Ohio". April 2004.
5. Shaw 2004b. "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
6. Shaw 2004c. "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
7. Shaw 2004d. "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". September 2004.
8. Shaw 2004e. "Final Safety, Health, and Emergency Response Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". October 2004.
9. Shaw 2006. "Final Sampling and Analysis Plan Addendum No. 1 for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
10. USACE 2001. "Requirements for the Preparation of Sampling and Analysis Plans" EM 200-1-3. February 2001.
11. USACE 2002. "USACE, Louisville Chemical Guideline, Version 5". June 2002.

FIGURES

Soil / Sediment Field Logsheet

Shaw™ Shaw E&I

Site Name: Sample AAP Project #: 12345

Sample ID: LLSS-123-SO	Sample Location Sketch: 
Sample Type*: SUR/COMP	
*: SED=Sediment; SUR=Surface soil; SUB=Subsurface Soil; OTH=Other. grab=Grab, comp=Composite	
Date Sampled: ~~6/29/04~~ IMS 6/28/04 6/28/04	
Time Sampled: 15:20	
Depth (ft bgs): 0.75	
Physical description: clayey silt w/ trace fine sand and gravel	Northing: 555273.63 Easting: 2365915.43
Analyses requested: explosives, PCBs, RCRA 8 metals	Photograph Log #: N/A
PID: ND	Calibration Date: 6/28/04 7:00
O2/LEL: IMS 6/28/04 XRF: Mn=1,585 mg/kg As: 15 mg/kg	Calibration Date: 6/28/04 7:15
Weather: partly sunny, low humidity, NE wind 5-10 mph	
Temperature: 80 °F	
Sampling Equipment: SS scoop/ ss bowl	
Equipment Decontamination Technique: tap, Alconox/tap, tap, HNO_3, tap, DI	
QC Samples: NONE	
Analytical Laboratory: Sample Technical Labs, Canton OH	
Comments: mostly cobbles, little fine soil to sample	
Field Technician: (Print) Ima Mary Sampler	Date: 6/28/04

Sample Shipping Log

Shaw® Shaw E & I

Site Sample AAP					Project Number: 1234S		
			Shipping Information				
Date	COC number (attach copy)	cooler number	date	time	carrier	waybill number	Special Handling
6/28/04	681265123	1	6/28/04	16:04	FedEx	536523467112	

APPENDIX A

FIELD LOGBOOK AND FIELD LOG SHEET STANDARD OPERATING PROCEDURE

STANDARD OPERATING PROCEDURE

Subject: Field Logbook

1. PURPOSE

The objective of this Standard Operating Procedure (SOP) is to set criteria for content entry and form of field logbooks.

2. SCOPE

This procedure is applicable during all Shaw E & I site operations.

3. REFERENCES

- Nielsen Environmental Field School, 1997, *Field Notebook Guidelines*.

4. DEFINITIONS

4.1 **Site Logbook—**Logbook that is an index of all activities performed at the site. Specific entries are summaries of each day's activities. It is part of the project file.

4.2 **Field Logbook**—Logbooks used at field sites that contain detailed information regarding site activities including dates, times, personnel names, activities conducted, equipment used, weather conditions, etc. Field logbooks are used by a variety of different field personnel and are part of the project file.

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments, or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

6.1 General

Each site or operation, as applicable, will have one current Site Logbook, which will serve as an index of all activities performed at the site. It is initiated at the start of the first on-site activity. Summary entries are made for every day that on-site activities take place. The details of all field activities shall be recorded in separate field logbooks. Multiple field logbooks may be used depending upon the number of different types of field personnel conducting activities at the site. These field logbooks and the site logbook shall be made part of the project files.

Information recorded in field logbooks includes observations, data, calculations, time, weather, and descriptions of the data collection activity, methods, instruments, and results. Additionally, the field logbook may contain descriptions of wastes, biota, geologic material, and site features including sketches, maps, or drawings as appropriate.

6.2 Equipment and Materials

- Site logbook
- Site-specific plans
- Hard-covered, waterproof field logbook(s)
- Indelible black ink pen
- Ruler or similar scale

6.3 Preparation

Site personnel responsible for maintaining field logbooks must be familiar with the SOPs for all tasks to be performed.

The field logbook will be assigned to an individual responsible for its care and maintenance.

Field logbooks are project files and should remain with project documentation when not in use.

Field logbooks shall be bound with lined, consecutively numbered pages. All pages must be numbered prior to initial use of the field logbook.

The following information shall be recorded inside the front cover of the field logbook:

- Person and organization to whom the book is assigned
- Phone number(s)
- Start date
- Project Name
- Shaw E & I Job Number
- Project Superintendent's Name
- Sequential Book Number (if applicable)

The first five pages of the field logbook shall be reserved for a table of contents. Mark the first page with the heading and enter the following:

TABLE OF CONTENTS

Date/Description	Page
(Start Date/Reserved for TOC)	1-5

The remaining pages of the Table of Contents will be designated as such with "TOC" written on the top center of each page.

6.4 Operation

The following requirements must be met when using a field logbook:

- Record work, observations, quantities of materials, calculations, drawings, and related information directly in the field logbook. If data-collection forms are specified by an activity-specific work plan, the information on the form need not be duplicated in the field logbook. However, any forms used to record site information must be referenced in the field logbook.
- Information should be factual and unbiased.
- Do not start a new page until the previous one is full or has been marked with a single diagonal line so that additional entries cannot be made. Use both sides of each page.
- Write in black, indelible ink. Do not write in pencil unless working in wet conditions.
- Do not erase or blot out any entry. Before an entry has been signed and dated, changes may be made; however, care must be taken not to obliterate what was written originally. Indicate any deletion by a single line through the material to be deleted. A change should be initiated and coded using one of the common data error codes shown in Attachment 1. All error codes should be circled.
- Do not remove any pages from the book.
- Do not use loose paper and copy into the field logbook later.
- Record sufficient information to completely document field activities.
- All entries should be neat and legible.

Specific requirements for field logbook entries include the following:

- Initial and date each page.
- Sign and date the final page of entries for each day.
- Initial and date all changes.
- Multiple authors must sign out the field logbook by inserting the following:

  Above notes authored by:

  _____ (Sign name)

  _____ (Print name)

  _____ (Date)

- A new author must sign and print his/her name before additional entries are made.

- Draw a diagonal line through the remainder of the final page at the end of the day.
- Record the following information on a daily basis:

  a) Date and time

  b) Name of individual making entry

  c) Description of activity being conducted including well, boring, sampling, location number as appropriate

  d) Unusual site conditions

  e) Weather conditions (i.e., temperature, cloud cover, precipitation, wind direction, and speed) and other pertinent data

  f) People on site

  g) Level of personal protection to be used

  h) Arrival/departure of site visitors

  i) Arrival/departure of equipment

  j) Sample pickup (chain-of-custody form numbers, carrier, time)

  k) Sampling activities/sample log sheet numbers

  l) Start and completion of borehole/trench/monitoring well installation or sampling activity

  m) Health and Safety issues

  n) Instrumentation calibration details

Entries into the field logbook shall be preceded with the time of the observation. The time should be recorded frequently and at the point of events or measurements that are critical to the activity being logged. All measurements made and samples collected must be recorded unless they are documented by automatic methods (e.g., data logger) or on a separate form required by an operating procedure. In such cases, the field logbook must reference the automatic data record or form.

While sampling, record observations such as color and odor. Indicate the locations from which samples are being taken, sample identification numbers, the order of filling bottles, sample volumes, and parameters to be analyzed. If field duplicate samples are being collected, note the duplicate pair sample identification numbers. If samples are collected that will be used for matrix spike and/or matrix spike/matrix spike duplicate analysis, record that information in the field logbook.

A sketch of the station location may be warranted. All maps or sketches made in the field logbook should have descriptions of the features shown and a direction indicator. Maps and sketches should be oriented so that north is towards the top of the page.

Other events and observations that should be recorded include (but are not limited to) the following:

- Changes in weather that impact field activities
- Subcontractor activities
- Deviations from procedures outlined in any governing documents, including the reason for the deviation
- Problems, downtime, or delays
- Upgrade or downgrade of personal protective equipment

6.5 Post-Operation

To guard against loss of data due to damage or disappearance of field logbooks, copies of completed logbooks shall be securely stored by the project.

At the conclusion of each activity or phase of site work, the individual responsible for the field logbook will ensure that all entries have been appropriately signed and dated, and that corrections were made properly (single lines drawn through incorrect information, then initialed, coded, and dated). The completed field logbook shall be submitted to the project records file.

6.6 Restrictions/Limitations

Field logbooks constitute the official record of on-site technical work, investigations, and data collection activities. Their use, control, and ownership are restricted to activities pertaining to specific field operations carried out by Shaw personnel and their subcontractors. They are documents that may be used in court to indicate and defend dates, personnel, procedures, and techniques employed during site activities. Entries made in these notebooks should be factual, clear, precise, and as non-subjective as possible. Field logbooks, and entries within, are not to be utilized for personal use.

7. ATTACHMENTS

- Attachment 1—Common Data Error Codes.

8. FORMS

None.

ATTACHMENT 1
COMMON DATA ERROR CODES

COMMON DATA ERROR CODES

- RE Recording Error
- CE Calculation Error
- TE Transcription Error
- SE Spelling Error
- CL Changed for Clarity
- DC Original Sample Description Changed After Further Evaluation
- WO Write Over
- NI Not Initialed and Dated at Time of Entry
- OB Not Recorded at the Time of Initial Observation

All Error Codes should be circled

STANDARD OPERATING PROCEDURE

Subject: Field Logsheet

1. PURPOSE

The purpose of this procedure is to identify the minimum information that should be collected during sampling activities. Samples can be collected at a project site for various reasons, including nature & extent determination, risk assessment, permit compliance, and confirmation of site cleanup. Information regarding sampling locations and techniques is just as important as sample collection, since it allows future data users to determine whether the sample data is appropriate for its intended use.

2. SCOPE

This procedure applies to project-deliverable electronic files generated for Shaw Environmental & Infrastructure, Inc. contracts and projects, unless superseded by contract-specified requirements.

3. REFERENCES

U.S. Environmental Protection Agency, 1998, *EPA Guidance for Quality Assurance Project Plans*, EPA/600/R-98/018, Washington, D.C.

U.S. Army Corps of Engineers, 2001, *Requirements for the Preparation of Sampling and Analysis Plans*, EM200-1-3, Washington, D.C.

4. DEFINITIONS

None

5. RESPONSIBILITIES

5.1 Procedure Responsibility

The Field Sampling Discipline Lead is responsible for maintenance, management, and revision of this procedure. Questions, comments or suggestions regarding this technical SOP should be sent to the Field Sampling Discipline Lead.

5.2 Project Responsibility

Shaw employees performing this task, or any portion thereof, are responsible for meeting the requirements of this procedure. Shaw employees conducting technical review of task performance are also responsible for following appropriate portions of this SOP.

For those projects where the activities of this SOP are conducted, the Project Manager, or designee, is responsible for ensuring that those activities are conducted in accordance with this and other appropriate procedures. Project participants are responsible for documenting information in sufficient detail to provide objective documentation (i.e. checkprints, calculations, reports, etc.) that the requirements of this SOP have been met. Such documentation shall be retained as project records.

6. PROCEDURE

Field logsheets can be prepared to address the specific needs of each project. All field logsheets are to be completed in black indelible ink. Any corrections are to be made by single line cross-out of the incorrect information. The edited data shall be inserted above or beside the incorrect data and the correction shall be initialed by the person making the correction. The following information is the minimum that should be included on the logsheet.

6.1 Site Information

- Site Name
- Project Number
- Weather Conditions

6.2 Sample Information

- Date
- Time of sample collection
- Name of field technician
- Media being sampled
- Sample location (sketch as appropriate)
- Associated photograph log number (as appropriate)
- GPS reading (as appropriate)
- Sample Number
- Sample Description
- Preservation (if any)
- Comments/Observations
- QC samples collected

6.3 Equipment Information

- Equipment used to collect sample
- Equipment decontamination technique
- Final instrument calibration
- Final instrument readings

6.4 Analytical

- Analysis to be performed
- Analytical Laboratory

7. ATTACHMENTS

None.

8. FORMS

- Container Field Logsheet
- Soil/Sediment Field Logsheet
- Surface Water Field Logsheet
- Air Field Logsheet

APPENDIX B
SAMPLE SHIPPING RECORD

Shaw® Shaw E & I

Sample Shipping Log

Site					Project Number:		
			Shipping Information				
Date	COC number (attach copy)	cooler number	date	time	carrier	waybill number	Special Handling

APPENDIX C
SOIL/SEDIMENT FIELD LOG SHEET

Soil / Sediment Field Logsheet

Shaw™ Shaw E & I

Site Name: Project #:

Sample ID:	Sample Location Sketch:
Sample Type*:	
*: SED=Sediment; SUR=Surface soil; SUB=Subsurface Soil; OTH=Other. grab=Grab, comp=Composite	
Date Sampled:	
Time Sampled:	
Depth (ft bgs):	
Physical description:	
Analyses requested:	Photograph Log #:
PID:	Calibration Date:
O2/LEL:	Calibration Date:
Weather:	
Temperature: ° F	
Sampling Equipment:	
Equipment Decontamination Technique:	
QC Samples:	
Analytical Laboratory:	
Comments:	
Field Technician: (Print)	Date:

APPENDIX D
ELECTRONIC DATA DELIVERABLE SPECIFICATION

APPENDIX D

ELECTRONIC DATA DELIVERABLE FILE SPECIFICATIONS

General Guidelines

All data collected to characterize the environmental conditions at RVAAP must be submitted to the COR and contractor responsible for managing the EIMS at the conclusion of the project or at regular intervals specified by the COR for ongoing monitoring projects.

Information that is best presented as drawings (such as boring logs and well construction logs) or on maps (such as geophysical data or UXO locations) should be submitted to the COR and contractor responsible for managing the EIMS in electronic format. Drawings should be submitted in PDF format. Maps should be submitted in an ArcView compatible format. Electronic files containing the maps or drawings should be submitted on 3.5 inch diskettes,r CDs or DVDs.

Field and laboratory measurements of discrete media such as soil, sediment, surface water, groundwater, air, building materials, biological tissues, etc., must be submitted in a standardized electronic format, as described below. A standardized electronic format facilitates the storage, retrieval, and exchange of information.

Data must be submitted in tabular format (rows and columns). Each column is called a field. The name of each field and a description of its contents may be found in the tables below. Some fields are required and some are optional as indicated. If the field is marked as required ("Y"), then the field must have a valid value. Fields marked as Y* are required conditionally as indicated in the field description. Fields that do not have values should be left blank.

Entries in each field should be limited to the maximum length indicated. Numeric fields indicated with an 'N' after the length should contain only numeric entries. Data qualifier fields and comment fields are available for annotation of results. Dates should be written in mm/dd/yyyy format. Time is represented in HH:MM format. Coded fields should include entries chosen from the attached codes tables. New codes may be added with the approval of the COR and contractor responsible for managing the EIMS.

Tables should include a header line with the name of each field. Tables should be submitted on 3.5 inch diskettes, CDs or DVDs in tab-delimited ASCII format.

Four different table formats are available for data submittal. The Station Table contains information that describes each location that was sampled. The Well Construction Table includes information on the location, depth, and type of well developed. The Sample Table includes measurements made on discrete samples. The Field Measurement Table includes information about measurements made directly in the environment. Data should be submitted using the appropriate table or tables.

Table D-1. Station Table

Field #/ Column	Field Name	Maximum Width/ Type	Definition/Comments	Required
1 A	Project Name	50	Name to describe sampling effort associated with the station.	Y
2 B	Station	50	The station name should be unique within a project, although it may be shared between projects.	Y
3 C	Functional Area	50	A name that describes the general area where the station in located. (For example: building number, stream name, pad number, etc.)	
4 D	Easting	14N	The numeric horizontal plane coordinate. *Required for any location that can be mapped at the RVAAP site.	Y*
5 E	Northing	14N	The numeric vertical plane coordinate. *Required for any location that can be mapped at the RVAAP site.	Y*
6 F	Grid Units	3	The measurement units for the coordinates (e.g., ft, m, yd). *Must be present if coordinates are present.	Y*
7 G	Grid System	15	Identifier for grid system. Geographic data must be in UTM NAD83 Zone 17 meters.	
8 H	Coord Method	15	Method identifying how the coordinates were obtained (e.g., Global Positioning System, survey, estimated).	
9 I	Coord Accuracy	10N	Estimate of the accuracy of the coordinates in the units reported.	
10 J	Elevation	10N	The ground surface elevation for the station.	
11 K	Elevation Units	2	Units for measuring elevation (FT, M, etc.). *Must be present if the elevation is present.	Y*
12 L	Elevation Method	10	The method identifying how the elevation was determined (e.g., survey, estimate, contours).	
13 M	Elevation Accuracy	10N	Estimation of the elevation accuracy in the units reported.	
14 N	Station Type	20	The station type: well, borehole, surface, etc.	
15 O	Station Description	50	Additional information about the station.	
16 P	Comments	254	Any desired comments.	

Table D-2. Well Construction Table

Field #/ Column	Field Name	Maximum Width/ Type	Definition/Comments	Required
1 A	Project Name	50	Name to describe sampling effort associated the well development.	Y
2 B	Station	50	The station name should be unique within a project, although it may be shared between projects. This is the name that will be used to identify the well. Location information for the well must be in the Station Table.	Y
3 C	Functional Area	50	A name that describes the general area where the station is located. (For example: building number, stream name, pad number, etc.)	
4 D	Well Type	20	The well type: monitoring well, piezometer, recovery well, etc.	Y
5 E	Vertical RP	20	Vertical reference point (RP) for vertical measurements. For example, top of well casing, top of pad, ground surface, etc. *Required for monitoring wells.	Y*
6 F	RP Elevation	10N	Elevation of vertical reference point (RP). *Required for monitoring wells.	Y*
7 G	Elevation Units	5	Units for measuring elevation (FT, M, etc.). *Must be present if the elevation is present.	Y*
8 H	Elevation Method	10	The method identifying how the elevation was determined (e.g., survey, estimate, contours).	
9 I	Protective Casing Height	10N	Distance of highest point of well protective casing (outer casing) below RP. (Value is negative if above RP.)	
10 J	Well Casing Height	10N	Distance of highest point of well casing (inner casing) below RP. (Value is negative if above RP.)	
11 K	Total Depth	10	Distance from RP to bottom of well. *Required for monitoring wells.	Y*
12 L	Depth Units	5	Units for measurement of vertical distance (FT, M). *Required if depth or heights are reported.	Y*
13 M	Screen Top	10N	Distance from RP to screen top. *Required for screened monitoring wells.	Y*
14 N	Screen Bottom	10N	Distance from RP to screen bottom. *Required for screened monitoring wells.	Y*
15 O	Screen Material	20	Material of which screen is constructed (stainless steel, PVC, etc.) *Required for screened monitoring wells.	Y*
16 P	Diameter Units	5	Units for diameter measurements (IN, CM, FT, etc.).	Y
17 Q	Screen Diameter	10N	Inside diameter of screen. *Required for screened monitoring wells. (Use units from Diameter Units field.)	Y*
18 R	Screen Opening Size	10N	Screen slot size or opening size. (Use units from Diameter Units field.)	Y
19 S	Well Casing Material	20	The inner well casing/riser material (stainless steel, PVC, etc.). *Required for monitoring wells.	Y*
20 T	Well Casing Diameter	10N	Inside diameter of the inner well casing/riser. (Use units from Diameter Units field.)	Y
21 U	Protective Casing Material	20	Material of which the protective (outer) casing is constructed (stainless steel, PVC, etc.).	

Table D-2. Well Construction Table (continued)

Field #/ Column	Field Name	Maximum Width/ Type	Definition/Comments	Required
22 V	Protective Casing Diameter	10N	Inside diameter of protective casing.	
23 W	Borehole Diameter	10N	Diameter of well boring. (Use units from Diameter Units field.)	
24 X	Completion Date	10	Date of completion of the well (MM/DD/YYYY).	Y
25 Y	Date Abandoned	10	Date that well was plugged and abandoned (MM/DD/YYYY). *Required if well is plugged.	Y*
26 Z	Aquifer Zone	20	Name used to describe aquifer intercepted by screened interval. *Required for monitoring wells.	Y*
27 AA	Comments	254	Any desired comments.	

Sample Table

This format is used to transfer information from sample analyses. It is meant to capture as much information as possible; however, it is recognized that not all fields may be relevant or available. Therefore, only a limited number of the fields are required. It is recognized that files in this format may be significantly empty. The format specification has been broken into subsections relating to the basic types of information.

The file should not contain laboratory quality control (QC) samples (e.g., method blanks, surrogates). It may contain field QC data such as field duplicates, results from split samples, trip blanks, and equipment rinsates.

Field names marked with an asterisk are coded fields. Codes for these fields should be chosen from the attached codes table. Codes may be added with the approval of the RVAAP Data Manager.

Table D-3. Sample Table

Field #/ Column	Field Name	Maximum Width	Definition/Comments	Required
Links to Station Coordinate File				
1 A	Project Name	50	Identifies sampling effort associated with the data.	Y
2 B	Station	50	The station name should be unique within a project, although it may be shared between projects.	Y
3 C	Sample Group	50	A name used to group samples into related subsets. For example: 'LL-x Random Grid Samples', 'Waste Characterization Samples', 'Bldg. x Exposure Characterization'.	
Field Sample Information				
4 D	Client Sample ID	22	The client's sample identification number. This sample ID should follow the USACE Nashville District conventions (attached).	Y
5 E	Alternate Sample ID	15	A shorter sample ID used if needed to facilitate field recording and processing by laboratory information management systems.	
6 F	Date Collected	10	The date the sample was collected. Should be reported as MM/DD/YYYY. If reported as MM/DD/YY, the year will be interpreted as 20YY.	
7 G	Time Collected	5	The time the sample was collected in HH:MM format.	
8 H	Field Sample Type*	10	The sample type: regular, field duplicate, trip blank, split, source blank, etc.	Y
9 I	Sampling Method*	20	The sampling method: grab, grab composite, flow composite, etc.	
10 J	Starting Depth	8N	The beginning depth (smaller number) for the sampling interval. For soil samples, this is the depth below ground surface. For groundwater samples, this may be used to indicate the top of the screened interval.	
11 K	Ending Depth	8N	The ending depth (larger number) for the sampling interval. For soil samples, this is the depth below ground surface. For groundwater samples, this may be used to indicate the bottom of the screened interval.	

Table D-3. Sample Table (continued)

Field #/ Column	Field Name	Maximum Width	Definition/Comments	Required
12 L	Depth Units*	5	The measurement units for the sampling interval. *Must be present if depth interval is specified.	Y*
13 M	Media*	15	The medium from which the sample was collected (e.g., soil, groundwater).	Y
14 N	Sampling Device*	20	The sampling device used to collect the sample (e.g., auger, bailer, bucket, split spoon).	
15 O	Comment	50	Short comment about the sample.	
Laboratory Method				
16 P	Laboratory	50	The laboratory performing the analysis.	
17 Q	Matrix*	10	Code for the analytical matrix. Valid values are solid, water, biota, air.	
18 R	Analysis Type*	20	Code or description for the type of analysis (organic, inorganic, rad, pesticide, TCLP).	
19 S	Method*	21	Analysis method identification reported as the method number from the statement of work (e.g., SW846-6010).	
20 T	SDG Number	15	The sample delivery group number assigned by the laboratory.	
21 U	Lab Sample ID	15	The laboratory sample ID.	
22 V	Date Received	10	The date the sample was received by the laboratory. Format as MM/DD/YYYY. If formatted as MM/DD/YY, the year will be interpreted as 20YY.	
23 W	Date Extracted	10	The date the sample was extracted or prepared by the laboratory. Format as MM/DD/YYYY. If formatted as MM/DD/YY, the year will be interpreted as 20YY.	
24 X	Date Analyzed	10	The date the sample was analyzed by the laboratory. Format as MM/DD/YYYY. If formatted as MM/DD/YY, the year will be interpreted as 20YY.	
25 Y	Percent Solids	8N	The percent solids for the sample. Represented as a percentage (25% = 25, not 0.25).	
26 Z	Sample Weight or Volume	8N	The sample weight for solid samples or volume for liquid samples.	
27 AA	Weight Units	5	The units associated with the sample weight. *Must be present if weight or volume is present.	Y*
28 AB	Reported Basis*	5	A flag indicating basis of reported concentration: “DRY”=concentration corrected to dry weight; “WET”=concentration reported on an “as received” reporting basis.	
29 AC	Analysis Level	4	EPA-specified analysis level (e.g. ‘LOW”, ‘MED’).	
Analytical Results				
30 AD	Result Type*	5	Flag to indicate if a result is a regular sample (REG) or a secondary or QC result.	Y
31 AE	CAS Number	15	The CAS number for the analyte. Leave blank if unknown or uncertain.	
32 AF	Chemical	50	The chemical or analyte name.	Y

Table D-3. Sample Table (continued)

Field #/ Column	Field Name	Maximum Width	Definition/Comments	Required
33 AG	Result	15N	Reportable numeric result for the analyte.	Y
34 AH	Units	15	Units for the result.	Y
35 AI	MDL	15N	Method detection limit for chemicals or minimum detectable activity for radionuclides reported in the same units as the result.	
36 AJ	SQL	15	Sample quantitation limit reported in the same units as the result.	
37 AK	Counting Error	15N	The 2 sigma counting error for radionuclide analyses reported in the same units as the result. *Required for when radionuclide results are reported.	Y*
38 AL	Dilution	8N	The overall dilution of the sample aliquot as a factor of the initial sample size. A value of 1 should correspond to nominal conditions for the method. Values less than 1 correspond to concentrations. Blank will be interpreted as 1.	
39 AM	Lab Qualifier	6	The laboratory qualifier originally assigned to the result by laboratory. *Blank is a valid value; hence, the data should contain laboratory qualifiers, but the field may correctly be blank.	Y*
40 AN	Data Qualifier	6	The qualifier assigned based on data validation. This qualifier should be one of the following: J, UJ, U, R, =. The "=" indicates that the sample was detected at the concentration reported.	
41 AO	Validated	1	Flag indicating if the data were validated ("Y/N"). Blank means "N."	
42 AP	Val Code	20	List of codes identifying why data qualifiers were applied. Separate documentation should contain definitions of codes.	
43 AQ	Filtered/Unfiltered	1	*F = Sample filtered in the field or at the laboratory. U or blank means sample was not filtered.	Y*
44 AR	TCLP	1	*T=TCLP (Toxicity Characteristic Leaching Procedure) or extractable/reactivity analysis. Blank means sample is not a TCLP/reactivity analysis. Used to differentiate between analyses that may have been performed with the same method.	Y*
45 AS	TIC Retention Time	10	Any value present indicates the analyte is a TIC (tentatively identified compound). *Value may be numeral or character.	Y*

Table D-4. Field Measurement Table

Field #/ Column	Field Name	Maximum Width	Definition/Comments	Required
1 A	Project Name	50	Identifies sampling effort associated with the data.	Y
2 B	Station	50	The station name should be unique within a project, although it may be shared between projects. If the spa_serial is available, it will be used to determine the appropriate spatial table record instead of the station name.	Y
3 C	Client Sample ID	22	*If the measurement is associated with sample collection, this should refer to the related sample ID.	Y*
4 D	Alternate Sample ID	15	A shorter sample ID used if needed to facilitate field recording and processing by field information management systems.	
5 E	Date Collected	10	Date the measurement was collected and formatted as MM/DD/YYYY. If formatted as MM/DD/YY, the year will be interpreted as 20YY.	Y
6 F	Time Collected	5	The time the measurement was made in HH:MM format.	
7 G	Measurement Name	50	The measurement that was performed (e.g., turbidity, conductivity, depth to water).	Y
8 H	CAS Number	15	CAS number is the measurement of a chemical concentration.	
9 I	Result	15N	The numeric value for the measurement.	Y
10 J	Units	15	The units for the measurement.	Y
11 K	Detection Limit	15N	Detection limit reported in the same units as the result.	
12 L	Result Qualifier	6	Indicates qualifications on the result such as less than detection limit or off-scale. *Blank is a valid entry indicating no qualification.	Y*
13 M	Validation Qualifier	6	Indicates qualification of result based on QC review.	
14 N	Method	21	The method number or instrument name used for making the measurement.	
15 O	Comment	50	Comment on measurement.	

Table D-5. Codes Table

Code	Description
Field Sample Type	
REG	Regular
FB	Field Blank
FD	Field Duplicate
ER	Equipment Rinsate
TB	Trip Blank
AB	Ambient Blank
BB	Bottle Blank
PE	Performance Evaluation
SP	Split Sample
SB	Source Water Blank
WW	Waste Water
Sampling Method	
GC	Grab Composite
GR	Grab
SC	Spatial Composite
TC	Temporal Composite
FC	Flow Composite
WP	Wipe
Depth Units	
FT	feet
M	meters
IN	inches
CM	centimeters
Media	
GW	groundwater
GF	filtered groundwater
SS	surface soil
SO	subsurface soil
SW	surface water
SD	sediment
PR	free product
SP	seep/spring
QC	QC sample defined by sample type
SR	storm water
VG	vegetation
Sampling Device	
CN	Air canister
AP	Pump, air lift
B	Bailer
AC	Auger, continuous flight

Table D-5. Codes Table (continued)

Code	Description
PC	Pump, centrifugal
DP	Dipper
AO	Auger, hollow stem
AH	Auger, hand
KS	Kemmerer Sampler
PI	Pump, piston
PP	Pump, peristaltic
PL	Pump, suction lift
PS	Pump, submersible
SS	Split spoon
W	Swab or Wipe
NA	Not Applicable
SV	Shovel
TR	Trowel
SC	Scoop
CS	Clam shell
blank	Unknown
GP	Geoprobe
BP	Pump, bladder
HP	Hydropunch
BO	Bottle
Matrix	
WATER	Water
SOIL	Solid
GAS	Gas
BIOTA	biological tissue
Analysis Type	
ANALK	Alkalinity
ANION	Common Anions
BACTER	Bacteria
EPTOX	EP TOX Leachate
FIELD	Field Measurements
FLDGC	Field GC
FLDEX	Field explosives
GEOTEC	Geotechnical
INORG	Metals
MISC	Miscellaneous
ORDIOX	Dioxins/Dibenzofurans
OREXP	Explosives
ORHERB	Herbicides
ORPETH	Petroleum Hydrocarbons including diesel, oil, grease, gasoline
ORPPB	Pesticides and/or PCBs
ORSVO	Semi-Volatile Organics

Table D-5. Codes Table (continued)

Code	Description
ORTOC	Total Organic Carbon (TOC)
ORVOA	Volatile Organics
RAD	Radiological
TCLPHB	TCLP Herbicides
TCLPIN	TCLP Metals
TCLPPP	TCLP Pesticides and/or PCBs
TCLPR	TCLP Reactivity, Corrosivity
TCLPSV	TCLP Semi-Volatiles
TCLPVO	TCLP Volatiles
2320B	Bicarbonate, Carbonate
2340B	Hardness
9215-C	Standard Plate Count Standard Method 9215-C
ASTM	% Moisture
ASTM D1429	ASTM D1429
ASTM D2216	Ash Content
ASTM D240-76	BTU Content
ASTM D240-87	BTU
ASTM D2974	ASTM D2974
ASTM D422	Hydrometer Analysis/Mechanical Grain Size Analys
ASTM D-425	ASTM D-425
ASTM D-508	ASTM D-508
ASTMD2460-70	Radium-226
ASTMD2974-87	ASTMD2974-87
CLP 200.7	Metals by ICP, CLP Method 200.7
CLP 204.2	Antimony by Graphite Furnace, CLP Method 204.2
CLP 206.2	Arsenic by Graphite Furnace, CLP Method 206.2
CLP 210.2	Beryllium by Graphite Furnace, CLP Method 210.2
CLP 213.2	Cadmium by Graphite Furnace, CLP Method 213.2
CLP 218.2	Chromium by Graphite Furnace, CLP Method 218.2
CLP 239.2	Lead by Graphite Furnace, CLP Method 239.2
CLP 245.1	Mercury
CLP 245.2	Mercury in Water by Automated Cold Vapor, CLP Method 245.2
CLP 245.5	Mercury in Soil by Manual Cold Vapor, CLP Method 245.5
CLP 270.2	Selenium by Graphite Furnace, CLP Method 270.2
CLP 272.2	Silver by Graphite Furnace, CLP Method 272.2
CLP 279.2	Thallium by Graphite Furnace, CLP Method 272.2
CLP 335.2	Cyanide by one of the CLP Methods
CLPHG	Mercury by CLP Method
CLP-ILM3.0	EPA CLP Inorganic Method, Version 3.0
CLPMET	Metals by CLP Method
CLPPCB	Pesticides/PCBs by CLP Method
CLPSOW	Unknown CLP Method
CLPSVO	Semi-Volatiles by CLP Method
CLPVOA	Volatiles by CLP Method
DOEE-Pu-06	DOEE-Pu-06

Table D-5. Codes Table (continued)

Code	Description
EML AM-01	Americium-241
EPA 120.1	Conductivity
EPA 150.1	pH
EPA 160.1	Total Dissolved Solids
EPA 160.1	Total Suspended Solids (TSS)
EPA 160.2	Total Suspended Solids
EPA 1664	TPH
EPA 200.7	Metals by ICP, Method 200.7
EPA 204.2	Antimony by Graphite Furnace, Method 204.2
EPA 206.2	Arsenic by Graphite Furnace, Method 206.2
EPA 239.2	Lead by Graphite Furnace, Method 239.2
EPA 245.1	Mercury
EPA 245.5	Mercury in Soil by Manual Cold Vapor, Method 245.5
EPA 270.2	Selenium by Graphite Furnace, Method 270.2
EPA 279.2	Thallium by Graphite Furnace, Method 272.2
EPA 300.0	Anions by ion chromatography
EPA 310.1	Alkalinity by Titrimetric (ph 4.5), CAWW Method 310.1
EPA 310.2	Alkalinity
EPA 325.1	Chloride by Colorimetric Automated Ferricyanide AA I, CAWW Method 325.1
EPA 325.2	Chloride by Colorimetric Automated Ferricyanide AA II, CAWW Method 325.2
EPA 325.3	Chloride by Titrimetric Mercuric Nitrate , CAWW Method 325.3
EPA 335.2	Cyanide
EPA 335.3	Cyanide, total
EPA 340.2	Fluoride by Potentiometric SIE, CAWW Method 340.2
EPA 350.1	Ammonia
EPA 350.2	Ammonia
EPA 350.3	Ammonia
EPA 351.2	Total Nitrogen
EPA 351.3	Nitrogen, CAWW Method
EPA 352.3	Nitrate-Nitrite
EPA 353.1	Nitrate/Nitrite
EPA 353.2	Nitrate-Nitrite by Colorimetric Manual Cadmium Reduction, CAWW Method 353.2
EPA 354.1	Nitrite by Spectrophometric, CAWW 354.1
EPA 365.1	EPA 365.1
EPA 365.2	Total Phosphorous
EPA 365.3	Total Phosphorous
EPA 365.4	Total Phosphorous
EPA 375.2	Sulfate by Colorimetric Automated Methyl Thymol Blue AA II, CAWW Method 375.2
EPA 375.4	Sulfate by Turbidimetric, CAWW Method 375.4
EPA 376.2	Sulfide
EPA 405.1	Biochemical Oxygen Demand

Table D-5. Codes Table (continued)

Code	Description
EPA 405.1	Biological Oxygen Demand (BOD)
EPA 410.4	Chemical Oxygen Demand (COD)
EPA 413.1	OIL & GREASE
EPA 415.1	Total Organic Carbon by Combustion or Oxidation, CAWW Method 415.1
EPA 415.2	Total Organic Carbon by UV Prokmotion and Persulfate Oxidation, CAWW Method 415.2
EPA 418.1	Total Recoverable Petroleum Hydrocarbons, CAWW Method 418.1
EPA 420	Phenols, Total
EPA 420.2	Phenols, Total
EPA 900	Gross Alpha and Gross Beta Radioactiviey, Method 900
EPA 901.0	Radioactive Cesium, Method 901
EPA 901.1	EPA 901.1
EPA 903	Alpha-Emitting Radium Isotopes, Method 903
EPA 903.1	EPA 903.1
EPA 904.0	EPA 904.0
EPA 905	Radioactive Strontium, Method 905
EPA 905.1	EPA 905.1
EPA 906.0	Tritium, Method 906
EPA 906.1	Tritium, Method 906
EPA 907.0	EPA 907.0
EPA 9070	OIL & GREASE
EPA 9071	OIL & GREASE
EPA 908.0	Uranium by Radiochemical, Method 908
ESM430	ESM430
E-TC-01	Technetium-99
FLD GC	Field GC
HASL 300	Unknown HASL 300 Method
MADEP	MADEP VPH & MADEP EPH
NAS 1960	Thorium Isotopes / Strontium-90
NAS 1962	Uranium Isotopes
NAS 1965	Plutonium Isotopes
NDI 1986	NDI 1986
NDI1986	Gamma Spectrometry
ORPPB	ORPPB
SM18TH 254	Ash Content
SM4500 D	Carbon Dioxide
SW846 1311	TCLP (VOC, SVOC, Pest, Herb, Metals)
SW846 3810	Methane, ethane, ethene
SW846 6010	Metals
SW846 6020	Metals for ICP-MS
SW846 7070	Mercury
SW846 7131	Cadmium
SW846 7196	Hexavalent chromium
SW846 7470	Mercury in water by SW846 7470

Table D-5. Codes Table (continued)

Code	Description
SW846 7471	Mercury in soil by SW846 7471
SW846 7740	Selenium
SW846 7841	Thallium by SW846 7841
SW846 8010	Halogenated Volatile Organics, SW846 Method 8010
SW846 8015 M	Diesel/Gasoline Range Organics SW846 8015 Mod
SW846 801M	Diesel/Gasoline Range Organics SW846 8015 Mod
SW846 8020	Volatile Organics SW846 Method 8020
SW846 8021	Volatile Organics by Purge & Trap GC/PID, SW846 Method 8021
SW846 8030	Acrolein, Acrylonitrile, Acetonitrile
SW846 8080	Organochlorine Pesticides/PCBs, SW846 Method 8080
SW846 8081	Pesticides/PCBs
SW846 8082	Pesticides/PCBs
SW846 8100M	Diesel/Gasoline Range Organics SW846 8100 Mod
SW846 8120	Chlorinated Hydrocarbons, SW846 Method 8120
SW846 8151	Herbicides by SW846 8151
SW846 8240	Volatiles by GC/MS, SW846 Method 8240
SW846 8260	Volatiles
SW846 8260A	SW846 8260A
SW846 8270	Semi-Volatiles by GC/MS Capillary Column, SW846 Method 8270
SW846 8270B	Semi-Volatiles by GC/MS Capillary Column, SW846 Method 8270B
SW846 8280	Polychlorinated Dibenzo-p-Dioxins/Dibenzofurans, SW846 Method 8280
SW846 8290	SW846 8290
SW846 8330	Explosives
SW846 8460	SW846 8460
SW846 9010	Cyanide by SW846 9010
SW846 9012	Cyanide by SW846 9012
SW846 9013	Cyanide by SW846 9013
SW846 9020	TOX, Method 9020
SW846 9036	Sulfate by Colorimetric Automated Methyl Thymol Blue AA II, SW846 Method 9036
SW846 9045	pH
SW846 9056	Anions (Cl,Fl,NO3,NO2,SO4,PO4) SW846 Method 9036
SW846 9060	Total Organic Carbon (TOC)
SW846 9060 M	Total Organic Carbon (TOC), Method SW846 9060 Modified
SW846 9065	Phenols
SW846 9073	Total Petroleum Hydrocarbons, Method 9073
SW846 9081	SW846 9081
SW846 9250	Chloride by Colorimetric Automated Ferricyanide AA I, SW846 Method 9250
TDMS	TDMS
UNKNOWN	Unknown method

Table D-5. Codes Table (continued)

Code	Description
Reported Basis	
DRY	result value corrected to dry weight of sample
WET	result value reported on sample weight as received
Result Type	
REG	regular sample result
REA	reanalysis
REO	result before reanalysis
REDILO	dilution
FLD	field analysis
MS	matrix spike
MSD	matrix spike duplicate
SUR	surrogate result
LCS	laboratory control sample
BLK	laboratory blank

FINAL

Waste Management and Minimization Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant Ravenna, Ohio

Contract Number DACA45-03-D-0026
Task Order 0001

Prepared for:

United States Army Corps of Engineers
Louisville District

Prepared by:

Shaw Environmental, Inc.
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November 2006

WASTE MANAGEMENT AND MINIMIZATION PLAN
Remediation of Soils at Load Lines 1, 2, 3 and 4
Ravenna Army Ammunition Plant
Ravenna, Ohio

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LIST OF ACRONYMS

AOC	Area of Concern
BMP	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Constituents of Concern
DOT	Department of Transportation
FPRI	Fixed Price Remediation with Insurance
FS	Feasibility Study
FSP	Field Sampling Plan
FSAP	Facility-wide Sampling and Analysis Plan
FSP	Field Sampling Plan
H&S	Health & Safety
HAZMIN/PP	Hazardous Waste Minimization Plan and Pollution Prevention Plan
IRIP	Interim Remedy In-Place
LLs 1-4	Load Lines 1, 2, 3 and 4
MEC	Munitions and Explosives of Concern
O&M	Operations and Maintenance
OhioEPA	Ohio Environmental Protection Agency
OAC	Ohio Administrative Codes
ORC	Ohio Revised Codes
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PMP	Project Management Plan
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RDX	Hexahydro-1,2,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SERCP	Security, Emergency Response, and Contingency Plan
SHERP	Safety, Health and Emergency Response Plan
SVOCs	Semi-Volatile Organic Compounds
T&D	Transportation and Disposal
TAL	Target Analyte List
TNT	2,4,6-Trinitrotoluene

LIST OF ACRONYMS

TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage and Disposal Facility
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WMMP	Waste Management and Minimization Plan

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) was contracted by the United States Army Corps of Engineers (USACE) Omaha District to perform remediation activities associated with impacted soils and dry sediments in Load Lines 1, 2, 3 and 4 (LLs 1-4) at the Ravenna Army Ammunition Plant (RVAAP) under the Fixed Price Remediation with Insurance (FPRI) Indefinite Delivery/ Indefinite Quantity Contract No. DACA45-03-D-0026. Work by Shaw at RVAAP in LLs 1-4 will be performed under Task Order 0001 of the above referenced contract. As part of the remediation activities, Shaw has been tasked with preparing a Waste Management and Minimization Plan (WMMP) to document procedures for managing various types of wastes generated by the remedial action and minimizing the generation of wastes during the completion of work under this Task Order. This WWMP will reference and adhere to existing facility wide and FPRI project specific work plans, but it is not an element of the Remedial Action Work Plan that is forthcoming under the FPRI. The following document will serve as the basis for Shaw's waste management and minimization procedures for work at RVAAP.

Excavation and off-site disposal has been selected as the primary remedial option to address soils and dry sediments found to be exceeding expected cleanup criteria at LLs 1-4. As of preparation of this document, the Record of Decision (ROD) for LLs 1-4 is being finalized for regulatory approval.

This WMMP was developed in accordance with the federal and state regulations listed in Table 1-1 and the following documents:

- Hazardous Waste Minimization Plan and Pollution Prevention Plan for the Ravenna Army Ammunition Plant (Toltest 2004);
- Hazardous Waste Management Plans for Generators of Resource Conservation and Recovery Act (RCRA) Regulated Hazardous Wastes (USACE 1997); and
- Project Management Plan (PMP) for the Remediation of Soils at Load Line 1-4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio (Shaw 2004a).

This WMMP is divided into sections based on each step in the waste disposal process. The various waste streams are discussed within each section. Cross-references are used within each section, where appropriate, to maintain report organization and minimize large sections of duplicated text. This report is organized as follows:

- Section 2.0 Project Management Organization
- Section 3.0 Health and Safety
- Section 4.0 Compounds of Concern
- Section 5.0 Waste Generating Activities
- Section 6.0 Container Types
- Section 7.0 Labeling Requirements
- Section 8.0 Waste Storage Locations
- Section 9.0 Inspection Requirements
- Section 10.0 Disposal Requirements

- Section 11.0 Waste Minimization Plan
- Section 12.0 Reporting

Table 1-1
References for Federal and State Hazardous Waste Management Regulations

Code	Regulation Title
DOT 4500.9R	Defense Transport Regulation, Chapter 204, Hazardous Material
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 302	Designation, Reportable Quantities, and Notification
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce and Use Prohibitions
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 173	Shippers – General Requirements for Shipments and Packaging
49 CFR 178	Specifications for Packaging
ORC 3734	Ohio Solid & Infectious Waste Regulations
OAC 3745-52	Ohio Waste Determination Regulations
OAC 3745-270	Ohio Land Disposal Restrictions
OAC 3745-66	Ohio Generator Requirements

DOT – Department of Transportation
CFR – Code of Federal Regulations
ORC – Ohio Revised Codes
OAC – Ohio Administrative Codes

2.0 PROJECT MANAGEMENT ORGANIZATION

Project personnel and organization for work under this Task Order are identified in Section 4.4 of the PMP (Shaw 2004a), including key Shaw personnel, interested parties and roles and responsibilities. As identified in Section 4.4.1 of the PMP, Shaw's Project Manager will be responsible for the planning, execution and completion of the Task Order. Other key Shaw personnel identified in Section 4.4.1 of the PMP for activities conducted specific to this WMMP include the Transportation and Disposal (T&D) Coordinator, Mr. Greg Norden; the Health and Safety (H&S) Officer, James Joyce; and the Field Superintendent, Mr. Franklin Holcomb.

The T&D Coordinator shall serve as the single point of contact for environmental regulatory matters for Shaw under this Task Order and shall have overall responsibility for total environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging requirements; completion of waste profiles, hazardous waste manifests, bill of ladings, exception and discrepancy reports; and all other environmental documentation required under this Task Order. The T&D Coordinator is certified under 49 CFR 172, Subpart H.

3.0 HEALTH AND SAFETY

Work under this Task Order will be conducted in accordance with this WMMP and both the Science Applications and International Corporation (SAIC) Facility-wide Safety and Health Plan (SAIC 2001a) and the Shaw Safety, Health, and Emergency Response Plan (SHERP; Shaw 2004e)). As indicated in these safety plans, personnel involved in handling and management of hazardous waste are required to have the 40-hour Occupational Safety and Health Administration (OSHA) 29 CFR 1910.120 training with an 8-hour OSHA refresher annually.

Emergency response and contingency in the event of a fire, explosion, spill, or other situation related to the waste generated during the remediation of soils and dry sediments at LLs 1-4 will be handled in accordance with the procedures identified in the emergency response section of the SHERP (Shaw 2004e) and the Security, Emergency Response, and Contingency Plan (SERCP; Shaw 2004f). In the event of an emergency, Shaw will contact Post 1 at (330) 358-2017.

4.0 CONSTITUENTS OF CONCERN

Based upon the results of previous environmental investigations conducted at LLs 1-4 reported in the Phase I and Phase II Remedial Investigation (RI) reports, the constituents of concern (COCs) in the soil and dry sediment of LLs 1-4 which may impact waste streams from these areas include semi-volatile organic compounds (SVOCs), metals (e.g., arsenic, lead, manganese), PCBs, explosives (e.g., 2,4,6-trinitrotoluene (TNT) and hexahydro-1,2,5-trinitro-1,3,5-triazine (RDX)) and pesticides (Dieldrin) (USACE 1996; SAIC 2002; Shaw 2004b; c; d).

The scope of work under this Task Order does not include designation and clearing of munitions and explosives of concern (MEC) but will address soils and dry sediments found to be impacted by explosives contaminants identified as being used at the site. If MEC is detected by Shaw during the completion of work, Shaw will be responsible for notifying RVAAP and USACE so that the proper precautions and avoidance programs can be implemented by others.

5.0 WASTE GENERATING ACTIVITIES

Due to the scope of the proposed remediation effort, RVAAP is subject to large quantity generator standards and the wastes are not expected be stored on site for more than ninety (90) days as defined in Code of Federal Regulations (40 CFR 262.34). The proposed remediation of soils at LLs 1-4 can be separated into three waste generating phases as follows:

- Pre-excavation of soils and dry sediments for waste characterization,
- Excavation of soils and dry sediments, and
- Groundwater monitoring, including baseline and long-term sampling, to show that the selected remedy has not deteriorated groundwater quality.

The specific type of wastes, activities and processes generating the wastes and expected volumes for each of the three remediation phases are described in the following sections in more detail. Container types, labeling requirements, and waste storage locations are discussed in Sections 6.0, 7.0 and 8.0, respectively.

5.1 Pre-Excavation Waste Characterization Sampling

Pre-excavation sampling may be conducted at certain areas at LLs 1-4 for disposal facility waste characterization purposes. This will include soils and dry sediments sampling as described in Section 4.2 of the Field Sampling Plan (FSP) portion of the Sampling and Analysis Plan (SAP) Addendum (Shaw 2006a).

The potential waste streams generated as a result of this phase include the following:

- Soils and sediments from the excavation estimated to be at a maximum depth of three feet below ground surface, including shallow soil and dry sediment residuals from sample collection. Recovered soils and dry sediment not used for the analytical samples will be place in labeled, DOT-approved, 55-gallon drums. The soil drums will be consolidated at a field staging area (FSA) within a load line but segregated by load line.
- Decontamination fluids, including wash waters and detergents (excluding methanol and acid rinses) derived from decontamination of sampling equipment will be placed in labeled, DOT-approved, 55-gallon drums. The liquid drums will be consolidated at an FSA with secondary containment within a load line but segregated by load line.
- Expendables/solid wastes, including personal protective equipment (PPE) and disposable sampling equipment will be consolidated in labeled, DOT-approved, 55-gallon drums. Expendables will be consolidated from the four load lines but segregated as clean or potentially contaminated.

5.2 Excavation of Soils and Dry Sediments

Of the three general phases of the proposed remediation effort, the excavation of soils and dry sediments from LLs 1-4 will generate the largest volume of waste to be managed. Wastes will include excavation spoils, field testing sample residuals, equipment rinse water, used PPE and accumulated waters.

The potential waste streams generated as a result of this phase include the following:

- Soil and sediment from depths estimated to be at a maximum depth of three feet below ground surface. An estimated 15,000 cubic yards of soil and sediment waste are

anticipated to be excavated during proposed remediation activities. Excavated soil will be segregated into temporary stockpiles at a central stockpile location within each load line based upon existing or pre-excavation analytical data.

- Significant amounts of solid waste (e.g., demolition debris) are not expected to be encountered during the proposed excavation activities. Solid waste will be separated from soil, to the extent practicable, and will be stockpiled in a similar manner to excavated soils.
- Decontamination fluids, including wash waters and detergents derived from decontamination of equipment will be consolidated in labeled, DOT-approved, 55-gallon drums or polyethylene tanks, as appropriate to accommodate liquid volume. Liquids will be consolidated at the FSA with secondary containment within a load line but segregated by load line.
- Expendables/solid wastes, including PPE and disposable sampling equipment will be consolidated in labeled, DOT-approved, 55-gallon drums. Expendables will be consolidated from the four load lines but segregated as clean or potentially contaminated.
- Water accumulated in protected areas (i.e., precipitation accumulated on stockpile cover) will be pumped to labeled, DOT-approved drums or polyethylene tanks, as appropriate to accommodate liquid volume. Water from protected areas will be consolidated within a load line but segregated by load line.

5.3 Groundwater Monitoring

Prior to excavation (baseline sampling) and following the remediation of soils at LLs 1-4, groundwater monitoring at selected wells at LLs 1-4 will be performed to show there has been no deterioration of the groundwater quality as a result of implementing the remedy. Liquid waste is expected to be generated during O&M including the following:

- Purge water collected from wells that may require re-development;
- Purge water collected during groundwater sampling;
- Decontamination fluids, including wash waters and detergents derived from decontamination of sampling equipment will be consolidated in labeled, DOT-approved, 55-gallon drums. All decontamination fluids and purged water from wells will be consolidated at the FSA with secondary containment within a load line but segregated by load line.
- Expendables/solid wastes, including PPE and disposable sampling equipment will be consolidated in labeled, DOT-approved, 55-gallon drums. Expendables will be consolidated from the four load lines but segregated as clean or potentially contaminated.

Purged water generated from well re-development and groundwater sampling activities will be coordinated for characterization with SpecPro and the FGWMPP.

5.4 Hazardous Materials and Wastes Definitions

Hazardous materials are designated under the provisions of 49 CFR 172.101 and 172.102 and materials which meet the defining criteria for hazard classes and divisions in 49 CFR 173. Wastes are designated as hazardous by the criteria established in RCRA and specified by the United States Environmental Protection Agency (USEPA) in 40 CFR 261.

The waste streams identified above will be coded in accordance with 40 CFR 261 subparts C and D. It is expected that solid RCRA hazardous waste and materials requiring handling under the Toxic Substances Control Act (TSCA) will be encountered during the performance of proposed remediation activities. Wastes will be properly labeled during storage (Section 7.0) and properly characterized prior to off-site disposal or treatment (Section 10.0).

6.0 CONTAINER TYPES

The types of containers used to accumulate, store and transport liquid and solid non-hazardous and hazardous wastes will be determined based on the specific waste stream and expected volume. In general, containers for packaging hazardous wastes will:

- conform to the general packaging requirements of 49 CFR 173, Subpart B;
- conform to the requirements of 49 CFR 178 at the specified packing group performance level;
- be compatible with the material to be packaged as required by 40 CFR 262; and
- satisfy packaging notifications per 49 CFR 172.178 regarding type and dimensions of closures, including gaskets, needed to satisfy performance test requirements.

All containers will be visually inspected for deficiencies prior to placing wastes in them. Labeling requirements and storage for the waste containers are discussed in Sections 7.0 and 8.0, respectively.

6.1 Liquid Wastes

Liquid waste will be segregated by waste stream (e.g., detergent/water rinse; methanol rinse; accumulated water from open excavations, bermed stockpiles and storm water runoff; well re-development water and sampling purge water, etc.) and by load line, and contained in labeled, DOT-approved, closed-top, 55-gallon drums. If the volume of accumulated water (i.e., precipitation accumulated on stockpile cover) is expected to be significant, the water will instead be stored in an appropriately labeled, DOT-approved, polyethylene holding tank. Liquid wastes will be treated or disposed as discussed in Section 10.1.3.

6.2 Solid Wastes

Solid waste streams may include pre-excavation soils collected for waste characterization purposes, excavated soil, excavated solid waste and expendables solid waste.

6.2.1 Pre-Excavation Soils for Waste Characterization

Soil and dry sediment waste collected from pre-excavations for waste characterization purposes will be consolidated from various locations within a load line but segregated by load line resulting in at least four containers. Soil and sediment waste will be contained in labeled, DOT-approved, open-top, 55-gallon drums equipped with plastic drum liners and sealed with gasketed, bung-top lids.

6.2.2 Excavated Soils and Dry Sediments

Excavated soils and dry sediments, if not direct loaded for transport off-site, will be segregated into temporary stockpiles at a central storage location within each load line based on existing analytical or pre-excavation sample data. If stockpiled, the soils and dry sediments will be placed on plastic sheeting with a minimum of 6-millimeter thickness, and completely covered with 6-millimeter plastic so that the entire stockpile is encapsulated and the cover will be anchored. The liner will be durable enough to withstand the mechanical stresses induced by heavy equipment and machinery used to load, unload, and work the soil. The stockpiles will be labeled with spray paint or small marked flags. Additional sedimentation and erosion control

measures and storm water control requirements will be presented in the Remedial Action Work Plan to be prepared by Shaw prior to mobilization for remediation activities.

6.2.3 Excavated Solid Waste

Solid waste encountered during excavation (e.g., demolition debris) will be managed separately from the excavated soil and dry sediments stockpiles. Similar to the excavated soil and dry sediments, solid waste will be stockpiled on a plastic liner and covered with an anchored plastic liner. The solid waste stockpiles will be labeled as such with spray paint or small marked flags.

6.2.4 Expendables Solid Waste

Expendables solid waste (e.g., disposable sampling equipment and general trash) will be combined from each load line but segregated as either non-contaminated or potentially contaminated material. Potentially contaminated and non-contaminated expendable wastes will be identified in the field on the basis of visual inspection (e.g., soiled versus non-soiled), usage of the waste material (e.g., outer sampling gloves versus glove liners), and field screening of the material using available field instrumentation (e.g., organic vapor analyzer). Non-contaminated solid waste will be contained in trash bags. Potentially contaminated solid waste will be contained in labeled, DOT-approved, open-top, 55-gallon drums equipped with plastic drum liners and sealed with gasketed, bung-top lids.

7.0 LABELING REQUIREMENTS

This section includes a discussion of identifying waste storage areas, labeling waste storage containers, marking waste for transport and placarding transport vehicles.

7.1 Waste Storage Area Identification

Waste storage areas will be identified using appropriate signage including caution signs to clearly identify the area as a waste storage area with potentially hazardous materials and delineate the storage area perimeter. Storage containers in these areas will be labeled unless they are not being used. Emergency contact information will be posted within this area in the event of an emergency or spill response (Section 3.0).

7.2 Labeling

Shaw will provide primary and subsidiary labels for hazardous waste containers consistent with the requirements in 49 CFR 172.101. Labels will meet the design specifications required by 49 CFR 172, Subpart E including size, shape, color, printing, and symbol requirements. Labels shall be durable and weather resistant and capable of withstanding, without deterioration or substantial color change, a 90-day exposure to conditions reasonably expected to be encountered during container storage and transportation.

Weather resistant labels will be affixed to and located on the upper one-third of each storage container. Labels will be placed on a smooth surface and not across drum bungs, seams, ridges or dents. Information to be recorded on each label with a permanent marker or paint pen will include container number, contents, source of waste, source location, project name and site identification, physical characteristic of the waste, and generation date(s). Stockpiles will be labeled with spray paint on the plastic cover or with small marked flags with the same information. This information will also be recorded in the field logbook along with the volume in the container.

In addition to the label information identified in 49 CFR 172, each container of 110 gallons or less will be individually marked with the following verbiage:

"HAZARDOUS WASTE – Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
Generator: Ravenna Army Ammunition Plant
8451 State Highway 5
Ravenna, Ohio 44266

Manifest Document Number _____.

In case of emergency, contact Chem Tel
Phone 800-255-3924"

The manifest number will be filled in with permanent pen just prior to loading the containers for transport off-site (Section 10.0).

7.3 Markings

Shaw will provide markings for each hazardous waste package, freight container, and transport vehicle consistent with the requirements of 49 CFR 172, Subpart D and 40 CFR 262.32 (and 40

CFR 761.45 for PCB waste, if applicable). 49 CFR 172 includes the hazardous materials table, special provisions, hazardous material communications, emergency response information, and training requirements. Markings shall be capable of withstanding, without deterioration or substantial color change, a 90-day exposure to conditions reasonable expected to be encountered during container storage and transportation.

7.4 Placards

For each off-site shipment of hazardous waste, Shaw or the transporter will provide primary and subsidiary placards consistent with the requirements of 49 CFR 172, Subpart F. Placards shall be provided for each side and each end of bulk packaging, freight containers, and transport vehicles requiring such placarding. Placards may be plastic, metal, or other material capable of withstanding, without deterioration, a 30-day exposure to open weather conditions and shall meet design requirements specified in 49 CFR 172, Subpart F.

8.0 WASTE STORAGE LOCATIONS

The Shaw Field Superintendent will designate a FSA within each load line prior to waste generation for the consolidation and storage of wastes generated from each load line pending characterization and disposal. The location(s) will be approved by the RVAAP Environmental Coordinator. Where possible, unused buildings will be designated as FSAs to protect the waste containers from the weather and safeguard the integrity of the stored wastes over time. If a centralized decontamination area is utilized to support the work in the four load lines, an FSA will also be established and co-located with the decontamination facility.

The location and perimeter of each FSA will be visibly marked as an FSA and with emergency information (Section 7.0). Waste will be stored on-site for 90 days or less in compliance with 40 CFR 262.34. Shaw will maintain a running log of wastes entering and leaving the storage areas to ensure that wastes are removed in 90 days or less. The logs are subject to regular inspection (Section 9.0).

Labeled waste containers (drums and polyethylene tanks) will be placed on top of plastic sheeting or pallets and covered while in the FSA. Wastes will be segregated by origination location and waste stream within each FSA and stored in a manner to accommodate inspections and sampling. Additional storage guidelines specific for the various waste streams are described in more detail in the following sections.

8.1 Liquid Wastes

Liquids stored in a FSA during the winter months may include detergent/water rinse; methanol rinse; accumulated water from open excavations, bermed stockpiles and storm water runoff; and sampling purge water, etc. and will require special management to prevent accidental releases due to freezing. To the extent possible, Shaw will complete disposal before freezing conditions arise. Shaw will construct secondary containment for liquid wastes stored during potential freezing conditions.

8.2 Solid Wastes

Soil and solid waste stored in drums, such as pre-excavation investigation soil and expendables solid waste, will comply with the storage requirements for drums identified above. Excavation with off-site disposal is selected as the remedy for soils in LLs 1-4 at RVAAP, soil from the proposed excavation activities will require additional storage management as described in this section.

Excavated soil will either be stored in designated temporary stockpiles while characterization for disposal is being conducted or loaded directly for transport to a disposal facility as described below. In addition, management of dust, groundwater and surface water are detailed later in this section.

8.2.1 Direct Loading of Excavated Soils and Dry Sediments

Based on the results of pre-excavation waste characterization and existing RI sampling data, certain impacted excavation areas may be designated for direct transport for disposal. This will likely be the method utilized for TSCA characterized soils and dry sediments.

8.2.2 Stockpiled Soils and Dry Sediments

Excavated waste soils and dry sediments which will not immediately be loaded for transport to a disposal facility or backfill area will be stockpiled in controlled areas pending waste characterization. Waste segregation, stockpile size, storage locations, and stockpile protection are discussed below.

Excavated soils and dry sediments from the various locations at each load line will be transported to a central temporary storage area within the load line and segregated based on existing analytical data or pre-excavation sample results. For example, TSCA characterized soil and dry sediments will not be combined with hazardous soils to prevent commingling of COCs that require different handling and disposal management. RCRA hazardous wastes will be managed in accordance with the appropriate technical requirements established in the Ohio Administrative Code, Chapter 3745-55, Management of Hazardous Waste (40 CFR 264, Subparts I and J). To the extent practicable, like waste streams will be combined.

To ensure quality waste characterization, Shaw will maintain stockpiles at approximately 1,000 cubic yards or less. However, larger stockpiles may be generated if soils and dry sediments are agreed upon to have been adequately characterized from pre-excavation waste characterization sampling and from existing RI data.

Excavated soil and dry sediment will be temporarily stockpiled on plastic sheeting of at least 6-millimeter thickness, and completely covered with 6-millimeter plastic so that the entire stockpile is encapsulated and anchored to prevent the elements (i.e., weather conditions) and trespassers from disturbing the excavated soils. Soils and dry sediments stockpiles will be secured within the load line boundary and will remain on-site until waste characterization has been completed. Specific stockpile management considerations for dust, groundwater and surface water are described in the subsections below.

8.2.3 Dust Management

The excavation of contaminated soil may generate dust which may pose risks to the health of both workers and the general public. Shaw will conduct the excavation in a manner that will mitigate exposure risks. This includes leaving excavated soil exposed and excavations open for only the minimum time necessary and using covers to reduce fugitive dust. To prevent excessive emissions of fugitive dust, excavated soil will be kept covered, and the cover anchored to secure it from wind effects. Shaw may also apply potable water as a wetting agent or pre-approved environmentally friendly sequestering agents during the proposed excavation. Shaw will conduct perimeter dust monitoring as needed.

8.2.4 Groundwater and Surface Water Management

Risk of further contamination to groundwater and surface water within LLs 1-4 due to the proposed excavation activities is expected to be minimal based on site conditions and removal action control measures. In addition, as a result of Shaw's proposed remedy, the source will have been removed mitigating further impacts to potential receptors. Shaw intends to implement several control measures and management procedures during the proposed excavation activities to minimize the impact on potential receptors. In general, excavations, decontamination areas, and stockpiles will be managed in such a way as to avoid infiltration or collection of significant amounts of surface water or precipitation.

Shaw believes there is minimal risk of further impact to groundwater at LLs 1-3 and surface water within all four LLs as a result of the proposed excavation based on the following site conditions:

- Historical groundwater elevations indicate that the water table is within the bedrock formation and remains below impacted soil in most areas of LLs 1-3. There is a greater than minimal impact potential to groundwater at LL 4 since the monitoring wells are screened in unconsolidated materials.
- Impacted soils and dry sediments designated for excavation are relatively shallow (maximum depth of three feet) and are situated above the bedrock surface at all four LLs. Groundwater is not expected to be encountered or come in contact with impacted soils during the proposed removal action.
- Bedrock is shallow in most areas where soil is designated for removal resulting in the ability to remove impacted soil to bedrock in those areas to minimize potential future impacts to groundwater.
- Removal actions are directed at removing potential future sources of contamination to groundwater.
- The nature of the COCs in soil and dry sediment at LLs 1-4 limits the potential pathways for migration of COCs to groundwater; and eliminating the source by removing the impacted soil, further limits those pathways.

In addition to the site conditions, Shaw believes there is minimal risk of further impact to groundwater and surface water within LLs 1-4 as a result of the proposed excavation based on the following control measures:

- The remaining building foundations and slabs of LLs 1-4 will be sealed, effectively capping potentially contaminated soil underneath and eliminating the pathway of migration of COCs from soil under these foundations to groundwater via infiltrating precipitation or to surface water via runoff.
- Shaw will implement Best Management Practices (BMPs) during the proposed excavation to prevent migration of COCs from impacted soil to groundwater, surface water bodies, collection ditches and swamps due to excavation and handling of soils.
- Install haybales and silt fences to protect potential surface receptors from storm water runoff and sediment deposition;
- Areas surrounding stockpiles, excavations, and catch basins will be ditched, bermed, or otherwise graded to divert surface drainage around the protected area and re-directed into a natural stream course or low area, once the surface drainage is safely below the protected area;
- Cover soil stockpiles and collect runoff where possible;
- Place wheel wash stations at points of entry to the soil excavation and stockpile areas or limit entry;
- Plug manhole pipe entries during sediment removal from the structure; and

- Inspect existing monitoring wells for tightness prior to the commencement of excavation activities.

Shaw will procure sufficient tank volume to collect and store accumulated water, if necessary, pending characterization for disposal or treatment. Accumulated waters include surface water or precipitation protected from contact with potentially impacted soil or dry sediment collected on a barrier within a protected area (e.g., precipitation collected on an impermeable excavation cover). Accumulated waters will be pumped to a holding tank. The water in the holding tank will be sampled to determine disposal or treatment requirements. If the results of the analyses indicate that the water is within the RVAAP background concentrations and the State of Ohio Administrative Code Water Quality Standards (OAC 3745-1), the water will be discharged to ground surface as approved by the USACE, RVAAP personnel and OhioEPA. If the results of the analysis indicate that the water is contaminated above RVAAP background concentrations or the applicable water quality standards, the holding tank will be appropriately re-labeled and the water will be treated on-site or disposed of off-site.

9.0 INSPECTION REQUIREMENTS

Inspections will be conducted periodically of the contents and controls of FSAs, excavations and soil stockpiles. The focus of the inspections in each of the areas is described below. The Shaw Field Superintendent, or his designees, will be responsible for conducting and documenting inspections. Random inspections may also be conducted by QC personnel.

9.1 Field Staging Areas

Inspections of waste storage containers will be performed in accordance with 40 CFR 265.174 (and, if tank systems are used, 40 CFR 265.195). Waste containers in the FSAs will be inspected for leaks and deterioration caused by corrosion or other factors on a weekly basis. Similarly, empty drums and holding tanks in the FSAs will be inspected prior to use. Storage container labels will be inspected for deterioration. FSA identification signs, barrier tape and emergency contact information postings will be inspected for deterioration. Missing labels or signage will be noted in the inspection log for corrective action. When holding tanks are being used, the hoses to and the condition of the tanks will also be inspected. The inspection log will contain the number of containers inspected, summary of contents, the condition of the containers and corrective actions required. Items found to be deficient will be corrected immediately to prevent the potential release of stored wastes. As indicated in Section 8.0, documentation will be maintained of compliance with 90-day waste removal guidelines established in 40 CFR 262.34. The inspection will include a review of this log to ensure wastes are being removed from the storage area within 90-days of the accumulation date.

9.2 Excavations

The inspection of excavations will include excavation management techniques described in Section 8.2. Open excavations will be inspected for adequate cover, accumulated water and barrier controls (e.g., berms, silt fence) on a daily basis. This includes the inspection of barrier controls on nearby catch basins and protected surface waters. Items found to be deficient will be corrected immediately to prevent impacts to potential receptors.

9.3 Stockpiles of Soils and Dry Sediments

The inspection of stockpiles of excavated soils and dry sediments will include stockpile management techniques described in Section 8.2. Stockpile covers will be inspected daily to ensure they are properly secured and repaired or replaced in order to maintain the integrity of the cover. Surface water diversion barriers will also be inspected. Items found to be deficient will be corrected immediately to prevent the potential release of stockpiled soils and dry sediments. At a minimum, the inspection log will contain the following information:

- inspection date and time,
- inspector,
- checklist of items to be inspected,
- changes in conditions,
- potential hazards,
- threat of release,
- corrective action plans, and
- action item results.

Inspection records will be retained on-site in the Field Superintendent's files with copies maintained by the Technical/Regulatory Lead.

10.0 DISPOSAL REQUIREMENTS

This section describes the disposal processes that will be implemented for the wastes generated during the remedy of excavation and off-site disposal as described in the Proposed Plan (Shaw 2005) and presented at the public meeting. Subsequently, the disposal plan for wastes will be more clearly defined in the Remedial Action Work Plan, which will be developed by Shaw and approved by USACE, RVAAP and OhioEPA prior to remediation. At the conclusion of field activities for the remediation of soil and dry sediment at LLs 1-4, letter reports will be submitted to the USACE, RVAAP Environmental Coordinator and OhioEPA summarizing waste disposal activities (Section 11.0). Final results will be included in the Interim Remedy In-Place (IRIP) closure documents (Section 11.0).

10.1 Waste Characterization and Classification for Disposal

The waste streams identified in Section 4.0 from each activity will be characterized to determine the available off-site disposal and treatment options prior to designation for disposal. Shaw will evaluate, prior to shipment of any material off-site, whether the waste is regulated for the purpose of determining proper shipping descriptions, marking requirements, etc. The waste streams include soils, excavated solids, liquids, expendables and, potentially, MEC. The characterization methods for each are discussed below.

Shaw will notify RVAAP, USACE and OhioEPA a minimum of 15 days prior to sampling in the event duplicates or splits are desired.

10.1.1 Soil Waste

Soil wastes include pre-excavation sample residuals in drums and excavated soil in stockpiles. Drummed soil waste will be characterized using a composite grab sampling technique described in Section 7.4.1 of the Facility-wide Sampling and Analysis Plan (FSAP; SAIC 2001b).

Stockpiles will be sampled for characterization in accordance with the procedures identified in Section 4.2 of the FSP Addendum (Shaw 2006a). In general, stockpile sampling will consist of the collection of a series of random grab samples as part of multi-increment sampling within the stockpile. Locations and depths of the samples will be logged in a field book and flagged in the stockpile to the extent possible. These samples will be composited to create one representative waste sample to submit to an environmental chemistry laboratory for analysis consistent with the Quality Assurance Project Plan (QAPP) Addendum. The number of samples required per stockpile will be based on the disposal facility acceptance criteria and state and federal requirements. The required chemical analyses will also be based on disposal facility acceptance criteria. At a minimum, it is assumed that analyses will be conducted for Target Analyte List (TAL) metals, pH, corrosivity/reactivity, PCBs, pesticides, polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), SVOCs, and explosives consistent with the QAPP Addendum (Shaw 2006a).

10.1.2 Excavated Solid Waste

It is not expected that significant amounts of solid waste (e.g., construction and demolition debris) will be encountered during excavation of soils at LLs 1-4; however, recovered solid waste will be considered for recycling prior to disposal. Characterization of the solid waste will depend on the material recovered and a protocol for characterization will be developed as an addendum and approved by RVAAP and the OhioEPA.

10.1.3 Liquid Waste

As previously described, liquid wastes will include decontamination liquids; field analysis residuals; accumulated waters from open excavations, bermed stockpiles, storm water runoff; well re-development liquids and sampling purge water. Contained liquid waste will be characterized using a composite grab sampling technique described in Section 7.4.2 of the FSAP (SAIC 2001b). Liquid wastes will be disposed off-site based on waste characterization analysis with the exception of purge and development waters from the monitoring wells, rain water that accumulates on plastic sheeting, etc. These liquids may be treated and discharged to ground surface only after analytical results are obtained, approved and are subject to strict state and federal discharge conditions. Treatment options, if applicable, will be evaluated based on the volume of liquids generated.

10.1.4 Expendables Solid Waste

Non-indigenous solid wastes, such as disposable sampling equipment, will be disposed of as sanitary trash only after decontamination of potentially contaminated expendable sampling equipment. Generated PPE may be disposed as non-regulated non-hazardous waste.

10.1.5 Munitions and Explosives of Concern

The scope of work under this Task Order does not include designation and clearing of MEC but will address soils and dry sediments found to be impacted by explosives contaminants identified as being used at the site. If MEC is detected by Shaw during the completion of work, Shaw will be responsible for notifying RVAAP and USACE so that the proper precautions and avoidance programs can be implemented by others. Similarly, the characterization and disposal of this waste stream will be determined by RVAAP and USACE.

10.2 Waste Disposal

The actual disposal options will be based on waste characterization results and will likely include the components identified in Table 10-1.Upon approval of waste classification reports by RVAAP, USACE and OhioEPA, wastes will be disposed of by a licensed waste disposal contractor in accordance with applicable state and federal regulation. Disposal of soil remediation related wastes will be coordinated with remediation activities. Under Shaw's proposal, hazardous waste will be transported off-site to an approved hazardous waste treatment, storage, or disposal facility within 90 days of the accumulation start date on each container or stockpile. Shipment of wastes off-site will be coordinated through the RVAAP Environmental Coordinator. Record keeping for disposal activities is discussed in Section 10.3.

Characterized soil will either be directly loaded or loaded from stockpiles on-site into lined, watertight, dump trailers for transport to an appropriate hazardous or non-hazardous disposal facility. Excavated soil will be disposed of in accordance with applicable local, State and federal rules, laws and regulations. Trucks will be labeled as appropriate for DOT compliance. Shaw will implement BMPs to minimize the short-term impact to the community during soil transport for off-site disposal due to dust. Such practices include the following:

- Using sprayed water and polyethylene covers to minimize dust generated from excavated materials during transport; and
- Washing truck and vehicle tires prior to leaving the "dirty" zone to minimize tracking of soils to other areas within and outside each load line.

Under Shaw's proposal, contaminated soil will be transported to an appropriate disposal facility. The proposed treatment, storage and disposal facilities (TSDFs) for non-hazardous and hazardous wastes are listed below. The actual disposal facilities will be selected from an approved list in the Remedial Action Work Plan based on the waste characterization and the determination of Shaw's T&D Coordinator.

Table 10-1
Potential Disposal Options for Waste Streams

Waste Stream	Non-Hazardous, Non-Contaminated	Non-Hazardous, Contaminated	Hazardous, Contaminated
Solid (soil, dry sediment)	Spread, seed and mulch at the designated area within the AOC	Store in FSA until remediation of contaminated media in the AOC and dispose off-site at permitted waste facility	Dispose off-site at permitted hazardous-waste facility
Liquid (purge and development waters from monitoring wells)	Discharge on ground surface at designated area following Ohio EPA, USACE and RVAAP approval.	Store in FSA until remediation of contaminated media in the AOC, with secondary containment if necessary, and dispose/treat off-site at permitted waste facility	Dispose off-site at permitted hazardous-waste facility
Liquid (vehicle wash, decontamination fluids, laboratory reagents, residues)	Store in FSA until remediation of contaminated media in the AOC, with secondary containment if necessary, and dispose/treat off-site at permitted waste facility	Store in FSA until remediation of contaminated media in the AOC, with secondary containment if necessary, and dispose/treat off-site at permitted waste facility	Dispose off-site at permitted hazardous-waste facility
Expendable sampling equipment, PPE and trash	Dispose as sanitary trash	Dispose off-site at permitted facility	Dispose off-site at permitted hazardous-waste facility

AOC – Area of Concern
FSA – Field Staging Area

All liquids generated from well purging, field testing, vehicle washing and other equipment decontamination activities will be collected and analyzed for off-site disposal options. Water purged from wells as part of re-development and sampling activities may be considered for discharge onto ground surface based on adequate test results and concurrence from USACE, the RVAAP authorized representative and OhioEPA.

Record keeping for disposal activities is discussed in Section 10.3. A letter certifying that the USEPA considers the facilities to be used for all off-site disposals to be acceptable in accordance with the off-site policy in 40 CFR 300.440 will be obtained and maintained in the records.

Non Hazardous Waste Disposal

1. WMX American Landfill: 7916 Chapel Street SE, Waynesburg, OH 44688
   Telephone: 330-866-3265
   ID# 760008

2. Republic Countywide R&D Landfill: 3619 Gracemont Street, East Sparta, OH 44626
   Telephone: 330-874-3855
   ID# 650872404
3. Petro Environmental Technologies: 8200 Seville Road, Lodi, OH 44254
   Telephone: 330-948-1494
   ID# OHR000002659

Hazardous Waste Disposal (non reactive, heavy metals only)

1. EQ Michigan Disposal Waste Treatment Plant: 49350 I-94 Service Drive, Belleville, MI 48111
   Telephone: 800-592-5489
   ID# MID000724831
2. Envirite of Ohio, Inc.: 2050 Central Avenue SE, Canton, OH 44707
   Telephone: 330-456-6238
   ID# OHD980568992
3. Envirosafe Services of Ohio, Inc.: 876 Otter Creek Road, Oregon, OH 43616
   Telephone: 419-698-3500
   ID# OHD045243706

PCB Waste Disposal

1. EQ Michigan Disposal Waste Treatment Plant: 49350 I-94 Service Drive, Belleville, MI 48111
   Telephone: 800-592-5489
   ID# MID000724831
2. WMX Model City: 1550 Balmer Road, Model City, NY 14107
   Telephone: 716-754-8231
   ID# NYD049836679

10.2.1 Transporter Requirements

Trucks used for transportation of hazardous wastes will be permitted to haul the designated waste through the states of travel between RVAAP and the destination facility. Shaw will obtain and maintain documentation that employees preparing or transporting hazardous materials have been trained, tested, and certified per 49 CFR 172, Subpart H, including general security awareness requirements and, where applicable, site-specific security plan requirements. Transporters will have valid licenses for operation of the vehicles.

Shaw will inspect motor vehicles used to transport hazardous wastes in accordance with the 49 CFR and DOT safety regulations. The items inspected and the condition of the vehicle will be recorded in an inspection log.

As indicated in the SERCP (Shaw 2004f), Shaw will be responsible for complying with the emergency contact provisions in 49 CFR 172.604 . When hazardous waste is shipped off-site, Shaw will provide a 24-hour emergency response contact and phone number of a person knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that waste, or has immediate access to a person who possesses such knowledge and information. The phone must be monitored on a

24-hour basis at all times when the hazardous wastes are in transportation, including during storage incidental to transportation. Shaw will ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. Shaw will designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

- The name of the emergency coordinator and the phone number through which the emergency coordinator can be contacted on a 24-hour basis:
  - On-site emergency (Post 1) at 330-358-2017; or
  - Off-site hazardous materials shipping related emergency (Chem Tel) at 800-255-3924
- The telephone number of the local fire department:
  - City of Ravenna Fire Department at 330-297-5738
- The location of fire extinguishers and spill control materials.

10.3 Record Keeping

Records include the information necessary to file state annual or USEPA biennial reports for all hazardous waste transported, treated, stored or disposed of under this Task Order. Record preparation and maintenance will be the responsibility of Shaw's T&D Coordinator. These responsibilities include assessing disposal and treatment options based on the waste characterization as described in the previous section and documenting the selection, generating waste acceptance profiles and permit requirements, obtaining generator signature, prepare disposal documents (manifest, bill of lading), distribute records as appropriate, and maintain the master waste disposal records file.

10.3.1 Shipping Documents

Shaw will provide preliminary transportation related shipping documents to RVAAP for review a minimum of seven (7) days prior to anticipated pickup. These documents may include the following:

- Draft hazardous waste manifest;
- Draft land disposal restriction notifications;
- Draft manifests for PCBs;
- Draft bill of ladings for hazardous materials; and
- Lists of corresponding proposed labels, packages, marks, and placards to be used for shipment.

Shaw will also provide waste profiles and supporting waste analysis documents to RVAAP for review; although, this will likely occur several weeks prior to the preparation of the above listed shipping documents.

When shipments are originated, Shaw will maintain the following transportation related documents:

- "Generator Copy" of hazardous waste manifests,

- Land disposal restriction notifications,
- "Generator Copy" of manifests used for initiating shipments of PCBs,
- Bill of ladings, and
- Supporting waste analysis documents.

No more than 35 days after initiation of initiation of a shipment, Shaw will provide the "Receipt Copy" of hazardous waste manifests and PCB manifests from the designated disposal facility. Bill of ladings will be maintained for a minimum of 375 days from the date of shipment.

10.3.2 Hazardous Waste Manifest

The state of Ohio does not have its own version of the hazardous waste manifest. According to OAC rule 3745-52-22, USEPA Form 8700-22 must be used. A copy of this Uniform Hazardous Waste Manifest form is included in Appendix A. The form that will be used is a multi-copy document. The form has 20 numbered fields to be completed by the generator, the transporter and the destination facility. General instructions for completing the manifest are identified in 40 CFR 262, Subpart B. Shaw will prepare all shipping documents and the RVAAP Facilities Coordinator will review and sign all waste manifests as the generator.

If hazardous wastes will be transported out of the state of Ohio to reach the destination facility, the manifesting requirements may vary from those identified on USEPA Form 8700-22. The manifest requirements for each state traveled through will be met. There is the potential that more than one manifest may be required for a shipment.

Copies of the completed manifests will be distributed as required by state and federal regulations in a timely fashion. In the event that a manifest copy documenting receipt of hazardous waste or PCB waste at the TSDF is not received by RVAAP within 35 days of shipment initiation, Shaw will prepare and submit an exception report to the RVAAP Facilities Coordinator within 37 days of shipment initiation.

The RVAAP Facilities Coordinator will sign all shipping documents as "Generator," and oversee the disposition of all waste at RVAAP. Weights of shipments will be estimated upon departure from RVAAP and confirmed at the disposal facility.

10.3.3 Shaw Waste Tracking

In order to adequately manage and track waste materials to be transported off-site, Shaw will prepare a continuous waste tracking summary sheet to be maintained at the site by the Shaw T&D Coordinator. At a minimum, this tracking document shall include a summary of waste type, hauler or shipment company, truck or vehicle number, date and time that the transport vehicle left the site, and ultimate destination of the waste material.

11.0 WASTE MINIMIZATION PLAN

Shaw will minimize the generation of hazardous waste to the extent practicable during remediation of soils at LLs 1-4. Shaw will take the necessary precautions to avoid mixing clean and contaminated wastes. Shaw will identify and evaluate recycling and reclamation options as alternatives to land disposal. Efforts to mitigate impacts to and potential contamination of groundwater and surface water in the area of soil and sediment remediation are described in Section 8.2.

11.1 Soil Volume Minimization

The amount of soils to be disposed of as a hazardous waste will be minimized by implementing the following approaches:

- Sample appropriate volumes of soil required for laboratory analyses to minimize the composite soil requiring disposal.
- Use of field test kits for COCs driving the excavation to minimize over-excavation of the impacted area. Site personnel will monitor excavation sidewalls and bottoms for COCs throughout the excavation process to ensure only impacted materials will be removed. Accuracy correlation relationships will be determined between field test kits and laboratory results from existing RI data prior to the commencement of excavation activities.
- Commence soil removal activities at the spot of the highest COC detection and move away from the assumed source location. This will serve to remove the most grossly impacted soils in the areas and allow for reducing excavation sizes using field test kits discussed above.
- Use of statistical averaging under a risk-based approach to eliminate AOCs where possible. A number of AOCs exhibit a minimal amount of COC concentrations in excess of cleanup levels. By reevaluating the COC detections within certain aggregate areas based on final cleanup levels, it may be possible to eliminate a number of smaller excavations thus resulting in the potential for hazardous material generation.

11.2 Liquid Volume Minimization

The volume of liquids to be disposed of as waste will be minimized by implementing the following approaches:

- Using sprays for decontamination, where appropriate.
- Segregating accumulated water (open excavations, bermed stockpiles, stormwater runoff, etc.) pumped to holding tanks by water that has or has not contacted potentially contaminated waste.
- Limiting purge water generated during monitoring well re-development and sampling only to what is necessary prior to collecting sample and stopping the pump when the well is fully developed and when sample collection is complete.

11.3 Solids Minimization

The quantity of solids requiring disposal will be minimized by implementing the following approaches:

- Using re-usable sampling equipment where possible will reduce the volume of expendables waste.
- Recycling solid waste to the extent possible, such as metal from construction debris removed from proposed excavation areas.

11.4 Recycling Facilities

It is not expected that wastes generated during the remediation of soil at LLs 1-4 will be suitable for recycling. However, if solid waste is encountered during the excavation activities that is in a form suitable for recycling (e.g., scrap metal), and it is not cost prohibitive to do so, then recycling facilities for the specific type of material will be evaluated at that time. An addendum to this WMMP will be prepared to provide the name, address and phone number of the facility proposed for recycling. As indicated in the HAZMIN/PP (Toltest 2004), RVAAP has an established recycling program for paint, aluminum cans, fluorescent bulbs, paper, ballast and solid sheets of lead. Shaw will observe the procedures established for those programs if the solid waste is classified by one of those categories.

12.0 REPORTING

Shaw will prepare letter reports summarizing waste disposal activities on a monthly basis during the remediation with final results presented in an Interim Remedy In-Place (IRIP) closure document. Shaw will supply the information necessary for RVAAP's annual Environmental Quality Report, if necessary. This information includes a record of solid hazardous waste and recycled material generated during the year. Shaw will maintain a log to record tonnage of hazardous materials transported off-site for disposal, the facility that received the waste and copies of manifests.

13.0 REFERENCES

1. Science Applications and International Corporation (SAIC) 2001a. "Final Facility-Wide Health and Safety Plan for Environmental Investigations at the Ravenna Army Ammunitions Plant, Ravenna, Ohio". March 2001.
2. SAIC 2001b. "Final Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio". March 2001
3. SAIC 2002. "Final Phase II Remedial Investigation Report for Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2002.
4. Shaw Environmental, Inc. (Shaw) 2004a. "Final Project Management Plan for the Remediation of Soils at Load Lines 1-4, Ravenna Army Ammunition Plant, Ravenna, Ohio". April 2004.
5. Shaw 2004b. "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
6. Shaw 2004c. "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
7. Shaw 2004d. "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". September 2004.
8. Shaw 2004e. "Final Safety, Health, and Emergency Response Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". October 2004.
9. Shaw 2004f. "Final Security, Emergency Response, and Contingency Plan for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". October 2004.
10. Shaw 2005. "Final Proposed Plan for the Remediation of Soils as Load Lines 1 through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2005.
11. Shaw 2006. "Final Sampling and Analysis Plan Addendum No. 1 for the Remediation of Soils at Load Lines 1, 2, 3 and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". November 2006.
12. Toltest 2004. "Hazardous Waste Minimization Plan and Pollution Prevention Plan for the Ravenna Army Ammunition Plant, Ravenna, Ohio". January 2004.
13. USACE 1996. "Preliminary Assessment for the Ravenna Army Ammunition Plan, Ravenna, Ohio". 1996.
14. USACE 1997. "Hazardous Waste Management Plans for Generators of RCRA Regulated Hazardous Wastes." HTRW Center of Expertise Information – Fact Sheet #97-01. 1997

APPENDIX A

HAZARDOUS WASTE MANIFEST: FORM 8700-22

Please print or type *(Form designed for use on elite (12 - pitch) typewriter)* *Form Approved. OMB No. 2050 - 0039 Expires 9 - 30 - 91*

UNIFORM HAZARDOUS WASTE MANIFEST

1 Generator's US EPA ID No. | Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law

GENERATOR

3. Generator's Name and Mailing Address

4. Generator's Phone ( )

A. State Manifest Document Number

B. State Generator's ID

5. Transporter 1 Company Name | 6. US EPA ID Number

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name | 8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address | 10. US EPA ID Number

G. State Facility's ID

H. Facility's Phone

11. US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	12. Containers No.	12. Containers Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.					
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR,** if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name | Signature | Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in item 19.

Printed/Typed Name | Signature | Month Day Year

EPA Form 8700 - 22 (Rev. 9 - 88) Previous editions are obsolete.

FINAL

Public Relations Plan Addendum No. 1
for the
Remediation of Soils at Load Lines 1, 2, 3 and 4
at the
Ravenna Army Ammunition Plant
Ravenna, Ohio

Contract Number DACA45-03-D-0026
Task Order 0001

Prepared for:

United States Army Corps of Engineers
Louisville District

Prepared by:

Shaw Environmental, Inc.
100 Technology Center Drive
Stoughton, MA 02072

November 2006

DISCLAIMER: This document is prepared for the United States Army Corps of Engineers, Louisville District (USACE) by Shaw Environmental, Inc. (Shaw). Some of the information in this document has not been given final approval by the Ohio Environmental Protection Agency (OhioEPA). The opinions, findings and conclusions expressed are those of Shaw and not necessarily those of OhioEPA and USACE.

PUBLIC RELATIONS PLAN ADDENDUM NO. 1
Remediation of Soils at Load Lines 1, 2, 3, and 4
Ravenna Army Ammunition Plant
Ravenna, Ohio

TABLE OF CONTENTS

LIST OF ACRONYMS

AEC	U.S. Army Environmental Center
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CRP	Community Relations Plan
EPA	United States Environmental Protection Agency
FPRI	Fixed-Price Remediation Insured
FFS	Focused Feasibility Study
IRIP	Interim Remedy in Place
LL #	Load Line 1, 2, 3, or 4
MKM	MKM Engineering, Inc.
O&M	Operation and Maintenance
OhioEPA	Ohio Environmental Protection Agency
PMP	Project Management Plan
PRP	Public Relations Plan
RAB	Restoration Advisory Board
RI	Remedial Investigation
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
USACE	United States Army Corps of Engineers

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) was contracted by the U.S. Army Corps of Engineers (USACE) Omaha District to perform remediation activities associated with impacted soils and dry sediments in Load Lines 1, 2, 3, and 4 (LLs 1-4) at the Ravenna Army Ammunition Plant (RVAAP) under the Fixed Price Remediation Insured (FPRI) Indefinite Delivery/Indefinite Quantity Contract No. DACA45-03-D-0026. Work by Shaw at the Ravenna facility in LLs 1-4 will be performed under Task Order 0001 of the above referenced contract. As part of the remediation activities, Shaw has been tasked with preparing a Public Relations Plan (PRP) to document public relations efforts required for completion of work under this Task Order. This PRP will reference and adhere to existing facility wide and FPRI project specific work plans, but it is not an element of the Remedial Action Work Plan (RAWP) that is forthcoming under the FPRI. The following document will serve as the basis for Shaw's public relations procedures for work at RVAAP.

This PRP was developed as an addendum to the Community Relations Plan (CRP) developed by USACE (USACE, 2003) for facility-wide activities to be performed at RVAAP. This PRP specifically addresses additional public relations efforts resulting from activities associated with the remediation of soils at LLs 1-4 and was developed in accordance with Shaw's Project Management Plan (PMP; Shaw 2004a).

2.0 OVERVIEW OF PUBLIC RELATIONS PLAN ADDENDUM

Public involvement is essential for receiving community input and maintaining community understanding and support for the cleanup actions. The CRP (USACE 2003) identifies issues of community concern regarding the RVAAP and serves as a guide for public involvement goals and objectives.

This PRP was developed to identify project-specific actions that differ from the CRP (USACE 2003) relative to the remediation of soils at LLs 1-4 as described in the following sections.

3.0 HIGHLIGHTS OF COMMUNITY RELATIONS PROGRAM

Shaw's public relations efforts will be consistent with those developed in Section B of the CRP (USACE 2003) including addressing target audiences, establishing open communication, attending community meetings, publicizing information, and maintaining media relations.

4.0 CAPSULE SITE DESCRIPTION

The site is described in Section C of the CRP (USACE 2003) and includes Site Location, Description and History; Environmental Progress-To-Date; and Installation Restoration Program History. Since the CRP (USACE 2003) was developed, the environmental progress has continued in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 process. Shaw is responsible for the community relations activities during several phases of the CERCLA process identified in the table in Section C.3 of the CRP (USACE 2003). The specific stages of the CERCLA process for which community relations has and will continue to be managed by Shaw are discussed in the following subsections.

4.1 Remedial Investigation

The Remedial Investigation (RI) phase of work for the LLs 1-4 was completed in September 2004 with the issuance of the Final RI for LL-4 to the Ohio Environmental Protection Agency (OhioEPA) by Shaw. Prior to Shaw's involvement under the FPRI contract, Science Applications International Corporation (SAIC), the consultant responsible for the completion of the RIs prior to the FPRI contract award, attended Restoration Advisory Board (RAB) meetings and presented RI data, analysis, and results to the RAB and the public in attendance. SAIC issued the Final RI for LL 1 in June 2003. Upon issuance of the FPRI contract, Shaw immediately continued the RI process by attending and presenting relevant information related to the completion of the RIs as deemed necessary by the RVAAP Facility Manager. SAIC completed the RI reports for LLs 2-4 under subcontract to Shaw. The RI reports (SAIC 2003; Shaw b, c, d) have become part of the information repository discussed in Section 6.1 of this PRP.

4.2 Feasibility Study

Shaw issued the Final Focused Feasibility Study (FFS; Shaw 2005a) for LLs 1-4 to USACE, OhioEPA, RVAAP, RAB, and the U.S. Army Environmental Center (AEC) in May 2005 for review and comment as required per the PMP (Shaw 2004a). Preliminary draft versions of the FFS (Shaw 2005a) were submitted to USACE for review prior to distribution to all other interested parties unless otherwise directed by USACE. During the development and finalization of the FFS (Shaw 2005a), pertinent Shaw personnel attended the RAB meetings, presented the proposed remedial action and were available for questions and comments from interested parties.

4.3 Proposed Plan

Based on the recommendations in the regulator-approved FFS (Shaw 2005a), Shaw prepared the Proposed Plan (PP; Shaw 2005b), which was reviewed and approved by the OhioEPA. As part of the PP (Shaw 2005b) approval process, Shaw published announcements in three primary newspapers for the availability of the PP (Shaw 2005b) for public review. In coordination with the USACE and RAB, Shaw presented the PP (Shaw 2005b) at a public meeting immediately during the public comment period to provide the public the opportunity to comment on the PP (Shaw 2005b). The public meeting was held on August 1, 2005.

4.4 Record of Decision

As of the preparation of this plan, Shaw is currently in the process of preparing the Record of Decision (ROD) which will present the selected remedy for surface and subsurface soils and dry sediment at LLs 1-4 at the RVAAP under the requirements of CERCLA. The ROD will

ultimately be reviewed and approved by the OhioEPA and will be included in the information repository discussed in Section 6.1 of this PRP.

4.5 Remedial Design/Remedial Action

Once the selected remedy as outlined in the ROD is approved by the regulators, Shaw will prepare a RAWP that will outline the proposed construction activities for the remedial action for shallow soils and dry sediment at LLs 1-4 at the RVAAP. As remedial action activities progress, a Shaw representative will continue to attend the RAB meetings as necessary. If requested, the Shaw representative will present the updated schedule of site activities, changes in the remedial action schedule, and any new findings at the site.

4.6 Operation and Maintenance

A Shaw representative will continue to attend RAB meetings for the first year of the Operation and Maintenance (O&M) period.

5.0 COMMUNITY BACKGROUND

The community background is described in Section D of the CRP (USACE 2003) and includes Community Profile, Chronology of Community Involvement, and Key Community Concerns (USACE 2003). Several key concerns identified by the community were related to the extent of cleanup necessary to protect human and environmental health, cleanup funding and future land use scenarios. Shaw will address these concerns in communications with the community.

6.0 COMMUNICATION TECHNIQUES AND ACTIONS

The following subsections identify the means of communication to be used by Shaw during the remediation of soils at LLs 1-4.

6.1 Information Repository and Administrative Record File

Locations for information repositories and an administrative record file have been established and are identified in Section E.1 of the CRP (USACE 2003). Shaw will send a copy of reports related to the remediation of soil at LLs 1-4 that are released to the public to these locations. These reports will include but are not limited to the following project documents:

- RIs, FFS, PP, and ROD for Remediation of Soils at LLs 1-4;
- Proposed RAWP for Remediation of Soil at LLs 1-4;
- Shaw project plans for Soils at LLs 1-4 and related documents and addendums;
- Responsiveness Summary;
- Remedial Progress Reports; and
- Interim Remedy in Place (IRIP) Closure Report for Soil at LLs 1-4.

Additional reports that are not the responsibility of Shaw but will be added to the repository by other parties will include RAB meeting minutes prepared by MKM Engineers, Inc. (MKM). It is possible that additional reports will be added to the repository throughout the duration of project activities.

6.2 Revised Public Relations Plan Addendum

As discussed in Section E.2 of the CRP (USACE 2003), this addendum will be revised as necessary.

6.3 Fact Sheets and Newsletters

Fact sheets and newsletters will be generated by Shaw as appropriate to inform the community of remedial actions and progress at LLs 1-4, as discussed in Section E.3 of the CRP (USACE 2003).

6.4 Information Contact

The Shaw Project Manager will be responsible for final approval of items generated by Shaw for release to the public. Shaw will initiate, coordinate, schedule, etc., public activities under the direction and oversight of the RVAAP Facility Manager, Mr. Irv Venger. Shaw public relations activities will be subject to the Facility Manager's oversight. Mr. Venger will continue to be the media spokesperson and community point of contact.

6.5 Media Kit

If necessary, Shaw will prepare media kits to distribute information to the media at press conferences as described in Section E.5 of the CRP (USACE 2003).

6.6 Web Site Development

As indicated in Section E.6 of the CRP (USACE 2003), a web site is being developed by RVAAP for public access. Shaw will add information about the remediation of soils and dry

sediments at LLs 1-4 to the site, as necessary. This includes electronic reports available for viewing and a community feedback link.

6.7 News Releases and Press Conferences

If necessary, Shaw will prepare news releases and schedule press conferences as described in Section E.5 of the CRP (USACE 2003).

6.8 Speaker's Bureau

The RAB holds meetings four times per year that are open to the public. A Shaw representative will attend each meeting leading up to and during remediation activities. The Shaw representative will provide a synopsis of field activities including the following:

- Follow-up/closure to previous meetings' outstanding items;
- Current activities;
- Schedule progression update; and
- Future activities.

In addition, the Shaw representative will be available at that time to answer any questions regarding the soil remediation activities at LLs 1-4. Minutes of the meetings are recorded by MKM and will be included in the RVAAP information repository available to the public.

7.0 REFERENCES

1. Science Applications International Corporation (SAIC) 2003. "Final Phase II Remedial Investigation Report for the Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". June 2003.
2. Shaw Environmental, Inc. (Shaw) 2004a. "Final Project Management Plan, Remediation of Soils at Load Lines 1-4, Ravenna Army Ammunitions Plant, Ravenna, Ohio". April 2004.
3. Shaw 2004b. "Final Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
4. Shaw 2004c. "Final Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2004.
5. Shaw 2004d. "Final Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio". September 2004.
6. Shaw 2005a. "Final Focused Feasibility Study for Load Lines 1-4 for the Remediation of Soils at the Ravenna Army Ammunition Plant, Ravenna, Ohio". May 2005.
7. Shaw 2005b. "Final Proposed Plan for Load Lines 1-4 for the Remediation of Soils at the Ravenna Army Ammunition Plant, Ravenna, Ohio". July 2005.
8. USACE 2003. "Community Relations Plan for the Ravenna Army Ammunitions Plant, Ravenna, Ohio". September 2003.
9. EPA 1988. "Community Relations in Superfund: A Handbook". OSWER Directive 9230.0-3B. June 1988.

COMMENT RESPONSE TABLE

Draft Construction Field Plans, Structural Analyses and MEC Support for Load Lines 1- 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio

Reviewer: Eileen T. Mohr Date: September 11, 2006

Cmt.#	Page # Line #	Comment	Recommendation	Response
Over-Arching Comments (i.e.,: SAP, QAMP, DMMP, WMMP and PRP):				
1	Global	Thanks for number the lines – it really helps.	No changes needed.	No response required
2	Global	There should be additional verbiage in the beginning of these documents that clarifies what these plans represent and how they will be used.	Provide this additional clarification. Clearly indicate that these are documents required under the contract and that they do not represent the RD plans.	A statement has been added to each document in the introduction that states "This plan will reference and adhere to existing facility wide and FPRI project specific work plans, but it is not an element of the remedial action work plans that are forthcoming under the FPRI."
3	Global	The correct reference is the "Final, Facility-Wide Sampling and Analysis Plan for the Environmental Investigations at the Ravenna Army Ammunition Plant," March 2001.	Please do a global search and correct throughout the entire document.	The correct reference has been incorporated globally into the plans.
4	Global	There are references to the Draft Phase II RI at Load Line 2.	Do a global search and correct throughout the entire document. Final documents and dates should be cited.	This comment has been incorporated globally.
5	Global	There are references to the Draft Phase II RI at Load Line 3.	Do a global search and correct throughout the entire document. Final documents and dates should be cited.	This comment has been incorporated globally.

Cmt.#	Page # Line #	Comment	Recommendation	Response
6	Global	There are references to the Draft Phase II RI at Load Line 4.	Do a global search and correct throughout the entire document. Final documents and dates should be cited.	This comment has been incorporated globally.
7	Global	The term RGO is used to represent both the actual RGOs and the established cleanup levels.	Do a global search and replace throughout the entire document. Where RGO is being used to represent the cleanup levels, replaced RGO(s) with cleanup level(s).	This comment will be incorporate globally.
8	Global	The term "composite" is frequently used throughout the document. It is unclear as to whether or not the intent was to reference multi-increment (MI) samples.	Check throughout the entire document. Where the term should actually be MI, please replace.	This comment will be incorporated globally.
9	Global	UXO/OEW acronyms.	Use newer acronyms – MEC, MC, etc. Change in applicable places in the document.	The new acronym has been incorporated globally throughout the plans where applicable.
10	Global	There needs to be a discussion regarding the groundwater sampling at the various Load Lines. In many places in the document, it states that the sampling will be done after remediation activities are complete. There would be value in having baseline information prior to remediation activities occurring, to see whether or not there has been an impact on the groundwater. Additionally, we need to discuss and agree upon the number of wells that need to be sampled, locations, whether or not re-development needs to occur, whether or not sampling can be	Discussion required.	It is agreed that there would be value in having baseline groundwater data prior to remediation activities. Shaw has already discussed this with the Army and it appears there is enough data from the FGWMMP sampling events that could serve as the baseline groundwater data. Discussions will be held prior to the issuance of the Remedial Action Work Plan so the results can be incorporated into the work

Cmt.#	Page # Line #	Comment	Recommendation	Response
		coordinated with the FGWMPP, etc.		plan and designate how the events will be sequenced and what wells serve as the compliance points for comparison before and after the removal activities.
11	Global	In many places in the text, there are references made to the use of field test kits to guide excavation activities. Field test kits have been used at the RVAAP with some success in the past. However, the correction between XRF metals data and laboratory data has been poor.	Further discussion on metals field analysis is warranted. Although all confirmation results to determine that excavation can be halted will be based on lab results, be advised that you may wind up over-excavating, if there is too much reliance on metals XRF data to determine excavation limits.	Shaw will utilize past XRF data collected during previous investigations, including the RIs, to create a correlation table to best utilize the XRF data as a screening guide. The correlation data will be verified early in the field activities throughout comparison with actual lab data sot that the work proceeds with the most accuracy. Ultimately confirmation sample results will be the final determination factor for deeming an excavation as "clean".
Sampling and Analysis Plan (SAP) Addendum:				
12	iii	COC acronym. Also applicable to 1-2/10.	Change to constituents or chemicals of concern.	The text has been revised as requested.
13	iii	UXO/OEW acronyms.	Use newer acronyms – MEC, MC, etc. Change in applicable places in the document.	The text has been revised as requested.

Cmt.#	Page # Line #	Comment	Recommendation	Response
14	3-1/16-17	The text indicates that it is Shaw's intent to pre-characterize the soils for disposal.	Provide additional details on how this will be done.	Section 4.2 in this document has been revised to discuss waste characterization sampling and provides additional detail on how and when this will be performed.
15	4-1/3-4	Text change required.	Revise the text to read: "the groundwater monitoring will be conducted after the remediation efforts are complete. Prior to the removal, a baseline set of groundwater data will be obtained."	The text has been revised as requested.
16	4-1/31-32	Text change required.	Revise to read: "Soil samples will be collected within the excavation area from the floor and sidewalls..."	The text has been revised as requested.
17	4-1/33-34	The text references the number of confirmation samples to be obtained from the sidewalls and floors of the excavations.	Please clarify how this number was determined. Further discussion may be warranted.	Section 4.1 and more specifically Section 4.1.1.2 of the FSP has been revised to incorporate MI sample procedures for post-excavation confirmatory analyses which have an established number of sample points.
18	4-2/2-4	Text change required.	Change text to read: "...identifies the required location / sample identification..."	The text has been revised as requested.
19	4-2/table 4-1	Text change required.	Change "C" to solely read floor (i.e., remove reference to the center of the floor).	This comment has been incorporated.
20	4-2/10	The text in this line references a "####"	Rectify the disconnect.	This referenced text has

Cmt.#	Page # Line #	Comment	Recommendation	Response
		designation that appears in Table 4-1. There isn't a reference to "####" in the table.		been removed from the SAP addendum.
21	4-2/14-15	The text references staking the sample locations, so that they can be GPS'ed in at a later time. Also applicable to 4-6/4-6.	Clarify what type of GPS unit will be used (i.e., it should be extremely accurate); and, what is meant by "a later time".	The text has been revised to state the following: "Field personnel will identify the sample numbers in a field log book and the sample locations will be staked so that they can be surveyed using a Trimbal ProXRS (or approved equal) Global Positioning System (GPS) with an accuracy determination capable of within one meter. At a minimum, sample locations will be surveyed on a bi-weekly basis. The sample locations will be downloaded and identified on plans to be prepared by Shaw." "at a later time" will be removed from the text.
22	4-2/16-25	This entire section should be re-written to incorporate MI sampling and processing procedures. Also applicable to section 4.2.1 on pgs 4-3/4-4 and section 4.2.3 on pg 4-4.	Please re-write.	This section has been revised to incorporate MI sampling and processing procedures that have been previously approved by OhioEPA and performed by others during previous sampling events at the RVAAP. This procedure has been included as

Cmt.#	Page # Line #	Comment	Recommendation	Response
				Appendix B in the FSP.
23	4-3/1	Text revision requested.	Revise text to read: "Multi-increment sampling will be used..."	The text has been revised as requested.
24	4-3/28	The text references that if an excavation's confirmation sampling results are less than the established cleanup levels, that it will be backfilled.	Provide additional information. Back-filled with what and from what source? And how will it be determined to be "clean?"	Suitable backfill material has been analyzed from various off-site sources for gradation and chemistry parameters. The final source will be determined based on pricing and availability at the time Shaw mobilizes for remediation activities. Additional details regarding material standards, compliance with applicable regulations and type of material will be provided in the Remedial Action Work Plan to be submitted prior to mobilization.
25	4-3/31-36	Cross-reference the section(s) that details erosion and sedimentation controls and how the piles will be stabilized.	Add additional text/cross references to the revised plan.	Details regarding erosion, sedimentation control and stockpile stabilization will be discussed in the Remedial Action Work Plan.
26	4-4/16	Text change required.	Change composite to MI.	The text has been revised as requested.
27	4-4/17-22	The text references sample collection from a front end loader.	Additional discussion on this needs to occur. There would be issues regarding making sure that representative samples are collected, no cross contamination,	Reference to sample collection from a front end loader has been deleted. Characterization samples will be collected using the MI

Cmt.#	Page # Line #	Comment	Recommendation	Response
			etc.	sample procedures (or portions thereof) depending on the analysis required as presented in Appendix B of the FSP Addendum. Section 4.2 will be revised accordingly.
28	4-5/5	Text revision required.	Change text to read: "…will be disposed of off-site as non-hazardous, but contaminated."	The text has been revised as requested.
29	4-5/9-12	Text revision required.	Revise to read: "Groundwater monitoring will be conducted to evaluate the impact of the source removal action. Prior to the removal, a baseline set of groundwater data will be obtained. Groundwater monitoring will also be conducted after remediation activities have been completed.	The text has been revised as requested.
30	4-5/15-17	This text speculates on the number of wells to be monitored at the 4 load lines.	Remove the text.	This text has been removed as requested
31	4-5/table 4-3	The table references well points.	Remove this reference, as no well points will be installed and/or monitored.	Reference to the well points has been removed.
32	4-6/2-3	The text indicates that the location and sample will be assigned matching numbers, if possible.	Please clarify why this would not be possible.	The text has been revised and "if possible" will be deleted accordingly.
33	4-6/19	Groundwater samples are to be analyzed for full suite.	Please add this into the text.	Agreed. The sampling parameters will be consistent with those already in place so that potential deviation

Cmt.#	Page # Line #	Comment	Recommendation	Response
				from baseline sampling can be determined.
34	5-1/27	Text revision required.	Revise text to read: "...groundwater monitoring program, reports..."	The text has been revised as requested.
35	7-1/17-18	This section of the text discusses the generation of decontamination fluids. It is unclear if the volume represented in the current text also would represent the decon of heavy equipment.	Please clarify.	This reference to decontamination fluids has been revised to also include fluids from the decontamination of heavy equipment. The anticipated volume will also be revised.
36	7-2/28	Text revision requested.	Revise text to read: "Letter reports will be submitted to the USACE, Ohio EPA, and RVAAP Environmental Coordinator...:	The text has been revised as requested.
37	7-2/35	Text revision requested.	Revise text to read: "...State, Federal, and local rules, laws and regulations.	The text has been revised as requested.
38	App A	Schedule revision requested.	The schedule in the draft plan will need to be revised based upon recent development with respect to the ROD. Please ensure that all necessary iterations of documents are presented, as well as the required review times.	The schedule has been revised accordingly to include recent discussion with respect to the ROD and the use of the Remedial Action Work Plan. Schedule will include three iterations of the work plan unless it is determined that three iterations will not be required. Other EPA review periods will be shown as 45 days.
39	App B	General comment. This section needs	Revise this section.	This section has been revised

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		to be revised. Please review MI sampling and processing procedures developed by MKM. There needs to be more details regarding sample handling, chain of custody, PPE issues, etc.		to incorporate MI sampling and processing procedures that have been previously approved by OhioEPA and performed by others during previous sampling events at the RVAAP. This procedure has been included in Appendix B of the FSP.
40	App B	Multi incremental should be multi-increment.	Revise throughout.	This comment has been incorporated throughout the guidance document as requested.
41	App B	There are several misspelled words in this appendix.	Run spell check.	Spell checked document.
42	App B/sec 1c	The text references the use of MI sampling in human health and ecological risk assessments. This has not been agreed to by Ohio EPA.	Remove reference to using MI samples in HH and eco risk assessments.	This guidance document has been revised per Cmts #22 and 39 and will not reference using MI samples in HH and eco risk assessments. MI sampling will only be used for waste characterization and confirmation of meeting cleanup standards.
43	App B/sec 1d	The text indicates that discrete data is legally indefensible. This is not correct.	Remove the statement from the text.	This statement has been removed.
44	App B/sec 2	The text references that the floors of the load lines were routinely rinsed and the water discharged out of the doorways. Walls were also routinely steam cleaned in the same manner.	Add walls to the text.	This Guidance for MI Sampling has been revised per Cmts #22 and #39. Text reference with regards to discharges at the RVAAP have been removed from

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				this guidance since remediation areas are already delineated and discussions of source methodologies does not seem appropriate to be included within this guidance.
45	App B/sec 2	The text indicates that the higher elevation areas on all 4 sides of the building would be appropriate sample areas.	Change this to lower elevation areas.	This Guidance for MI Sampling has been revised per Cmts #22 and 39. Text reference with regards to appropriate sample locations at the RVAAP have been removed from this guidance since the remediation areas are already delineated and MI sampling will only be conducted to ensure that source soils from these areas have been adequately removed.
46	App B/sec 4	The text indicates that decontamination "can" be conducted between sampling locations.	Decon of non-dedicated equipment must be done between sampling areas.	Section 1(f) of Appendix B will state: "Decontaminate all non-dedicated sample tools and equipment between sample areas."
47	App B/sec 6A	The number of QA/QC samples needs to follow U.S. EPA protocol. Adjust accordingly.	Adjust the text accordingly.	This section will reference the U.S. EPA publication, Test Methods for Evaluation Solid Wastes (SW-846 in addition to the Louisville Chemical

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				Guidelines for the collection of QA/QC samples.
Quality Assurance Project Plan (QAPP) Addendum:				
48	iv	TCLP is Toxicity Characteristic Leaching Procedure.	Make this change to the acronym list.	The acronym list has been revised as requested
49	1-1/28-30	The text references that it was the FPRI proposal that selected the excavation and off-site soil disposal option.	Change to the Proposed Plan and cite the correct date. Also, change RGOs to cleanup levels.	The text has been revised as requested.
50	1-2/2-3	The text indicates that it is Shaw's intent to pre-characterize the soils for disposal.	Provide additional details on how this will be done.	Section 1.6 in this document has been revised to discuss waste characterization sampling and provides additional detail on how this will be performed. In general, pre-excavated soils will be collected in accordance with the revised MI Guidance for Multi-Incremental Sampling presented in Appendix B of the FSP Addendum.
51	1-2/22	Text revision required.	Change text to read: "...the performance of the remedial..." (It is no longer proposed.)	The text has been revised as requested.
52	1-2/33	Text revision required.	Revise to read: "...groundwater monitoring will be conducted..."	The text has been revised as requested.
53	1-3/19-20	The text references the number of confirmation samples to be obtained from the sidewalls and floors of the excavations.	Please clarify how this number was determined. Further discussion may be warranted.	Confirmation sample protocols have been revised to incorporate MI sample procedures which have an established number of sample points.

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54	1-3/29-30	Text change required.	Revise text to read: "identifies the required location/sample identification..."	The text has been revised as requested.
55	1-4/table 1-1	Text change required.	Change "C" to solely read floor (i.e., remove reference to the center of the floor).	The table has been revised to incorporate MI sample procedures which require a total of 30 grab samples. References to specific sample location along the walls and floor of the excavations have been removed from this table.
56	1-4/4	The text in this line references a "####" designation that appears in Table 4-1. There isn't a reference to "####" in the table.	Rectify the disconnect.	This sentence has been removed.
57	1-4/5	The text indicates that the location and sample will be assigned matching numbers, if possible. Also applicable to 1-7/22-23.	Please clarify why this would not be possible.	"if possible" has been deleted from the text.
58	1-4/7-9	The text references staking the sample locations, so that they can be GPS'ed in at a later time. Also applicable to pg 1-7/24-26.	Clarify what GPS unit will be used (i.e., it should be extremely accurate); and, what is meant by "a later time."	Shaw has revised the text to state the following: "Field personnel will identify the sample numbers in a field log book and the sample locations will be staked so that they can be surveyed using a Trimbal ProXRS (or approved equal) Global Positioning System (GPS) with an accuracy determination capable of within one

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				meter. At a minimum, sample locations will be surveyed on a bi-weekly basis. The sample locations will be downloaded and identified on plans to be prepared by Shaw." "at a later time" will be removed from the text.
59	1-4/10-19	This entire section should be re-written to incorporate MI sampling and processing procedures. Also applicable to section 4.2.1 on pgs 4-3/4-4 and section 4.2.3 on pg 4-4.	Please re-write.	This section has been revised to incorporate MI sampling and processing procedures that have been previously approved by OhioEPA and performed during prior sampling events by others at the RVAAP. The MI sampling guidance procedures has been included in Appendix B in the FSP.
60	1-4/26	COC acronym is used.	Add to the acronym list.	"COC" has been added to the acronym list.
61	1-5/15	Text revision requested.	Change text to read: "When the four sidewall samples and the floor sample(s) do no exceed…"	The text has been revised as requested.
62	1-5/20	Text revision requested.	Change target to established.	The text has been revised as requested.
63	1-5/20	The text references that if an excavations confirmation sampling results are less than the established cleanup levels, that it will be backfilled.	Provide additional information. Backfilled with what and from what source? And how will it be determined to be "clean?"	Suitable backfill material has been analyzed from various off-site sources for gradation and chemistry parameters. The final source will be

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				determined based on pricing and availability at the time Shaw mobilizes for remediation activities. Additional details regarding material standards, compliance with applicable regulations and type of material will be provided in the Remedial Action Work Plan to be submitted prior to mobilization.
64	1-5/27-28	The text briefly mentions samples from the soil stockpiles.	The number of samples will need to be determined in consultation with Ohio EPA.	Agreed; however, disposal facility requirements will ultimately determine the number of stockpile soil samples. The text has been revised to state "The number of samples required per stockpile will be determined in consultation with OhioEPA and in accordance with disposal facility acceptance criteria and state and federal requirements."
65	1-5/33-38	The text briefly mentions samples from the soil stockpiles.	The number of samples (and where collected) will need to be determined in consultation with Ohio EPA.	Agreed; however, disposal facility requirements will ultimately determine the number of stockpile soil samples.
66	1-6/9-14	The text references sample collection from a front end loader.	Additional discussion on this needs to occur. There would be issues regarding making sure that	Reference to sample collection from a front end loader has been deleted.

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			representative samples are collected, no cross contamination, etc.	Characterization samples will be collected using the MI sample procedures (or portions thereof) depending on the analysis required as presented in Appendix B of the FSP Addendum. Section 1.6 in the QAPP will be revised accordingly.
67	1-6/24	TCLP is Toxicity Characteristic Leaching Procedure.	Make this change to the text.	The text has been revised as requested.
68	1-6/26	Text revision required.	Change text to read: "...will be disposed of off-site as non-hazardous, but contaminated."	The text has been revised as requested.
69	1-7/2-5	Text change requested.	Revise to read: "Groundwater monitoring will be conducted to evaluate the impact of the source removal action. Prior to the removal, a baseline set of groundwater data will be obtained. Groundwater monitoring will also be conducted after remediation activities have been completed."	The text has been revised as requested.
70	1-7/8-10	This text speculates on the number of wells to be monitored at the 4 load lines.	Remove the text.	This text has been removed as requested.
71	1-7/table 1-3	The table references well points.	Remove this reference, as no well points will be installed and/or monitored.	Reference to well points has been removed as requested.
72	1-9/table 1-4	The text discusses the sampling and analytical requirements.	Make sure that all the analyses would have detection limits below any applicable MCLs or Region 9	Ensuring that a contracted laboratory can meet the applicable MCL or Region 9

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			values.	value will be a prerequisite prior to using that laboratory. This requirement will be established as part of the contracting process to be performed by Shaw prior to mobilizing to the field.
73	1-9/table 1-4	The text discusses the sampling and analytical requirements.	Clarify why reactivity and flash point characterizations are not going to be done for disposal characterization.	This is a typo. This table has been revised to include reactivity and flash point for disposal characterization.
74	7-1/9-15	Clarification requested.	Please clarify where the language regarding MRLs came from. Also, please clarify what is meant by "specific site cleaning?"	Language regarding the MRLs is based on direction provided in the Louisville Chemical Guidelines. "Specific site cleaning" has been removed from the text to avoid further confusion. The text has been revised to state "MRLs are threshold values above which results are reported as positive quantities, and below which results are reported as non-detects or as estimated. The MRL is set based on the Method Detection Limit (MDL), action level, and risk assessment levels. It should be set at $\geq$ 3MDL and below one half of the project action level. Furthermore, MRL must be set below risk

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				assessment levels."
75	7-3/36-37	The text references TICs.	TICs are not reported on the RVAAP project.	Reference to TICs has been removed from the text.
76	7-4/table 7-1	The table references BTEX in parenthesis after VOCs.	More than BTEX needs to be run. Ensure that this is full VOC scan.	This text has been revised to include the full VOC scan.
77	7-4/table 7-1	The table references method 8083 for explosives.	Confirm that it is 8083 and not 8330. What is the difference between the two methodologies, especially in terms of detection limits?	There is no method "8083" referenced in the SW-846 sample protocols. This was apparently a typo in the text. The correct method is 8330 which is an analytical method for explosives. This correction has been made in the table.
78	9-1/7	Data validation starts out with a 10% frequency. If problems are found, then additional percentages needs to be validated.	Revise the text to be consistent with the FSAP.	The text has been revised to state the following: "The frequency of data validation may be increased based on the extent of deficiencies noted in the initial data and the importance of the data to the overall context of the project in accordance with Section 9.2 of the FSAP."
79	10-1/5	Text revision requested.	Revise to read" "...and groundwater sampling." (Specifically – remove "if necessary.")	The text has been revised as requested.
80	12-1/23-25 QAMP	This text references change orders.	Field change orders must also be approved ahead of time by Ohio EPA. Add this to the revised text.	The text has been revised to read: "The Project Manager has notified the USACE and Ohio

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				EPA followed by the Army of the issue and the planned course of action for concurrence. Changes to previously approved field activities must be approved by Ohio EPA, USACE, and RVAAP prior to implementation from an execution standpoint. Shaw will also require contractual approval from USACE prior to the implementation of any changes in field activities unless it may result in imminent danger to human health and the environment."
81	13-1/table 13-1 QAMP	This table references change orders.	Field change orders must also be approved ahead of time by Ohio EPA. Add this to the revised table.	Reference to the Change Order Form is a contractual obligation under the FPRI. Also see response to comment #80.
82	16-3/6 and 9 QAMP	Text change requested.	Change EMIS to EIMS.	The text has been revised as requested.
83	16-3/6-10 QAMP	The text references data entry into the EIMS.	Please confirm proper procedure with Pat Ryan of SAIC.	Confirmation of the data entry procedures referenced in this section of the QAMP and in the DDMP has been requested from Pat Ryan of SAIC. If procedural changes are warranted, the DDMP will

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				be revised accordingly.
84	16-3/32-33 QAMP	Clarification requested.	Please clarify what is meant by this statement in the text.	This sentence has been revised to state: "An Operations and Maintenance Plan will be completed during remedial activities. The O&M Plan will document required activities to monitor the remedy's effectiveness". Reference to any potential impacts for long-term operations, maintenance and monitoring at the RVAAP will be deleted.
85	17-1/19-27 QAMP	This section of the text describes the entries in an Audit Summary Report.	The report should also discuss the impact on the overall project schedule. Be advised that Order milestones must be adhered to.	A bullet item has been added to this section that identifies "impact to overall schedule" to be included in any Audit Summary Report.
86	App D	This section is the deficiency report form.	The form should also discuss the impact on the overall project schedule. Be advised that Order milestones must be adhered to.	This form follows the format for deficiency reports as required by USACE for contractor quality control. Any impact to the overall project schedule would be identified as a deficiency and included on this form as such.
Data and Document Management Plan (DDMP):				
87	lii	Acronym list needs revising.	Remove JMC.	The text has been revised as requested.

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88	2-1/13	Text revision required. Remove reference to JMC.	Remove JMC.	The text has been revised as requested.
89	2-1/16	Text addition requested.	Add the general public in as a user of the EIMS.	The text has been revised as requested.
90	3-3/7	Text change required. Ohio EPA has approval authority.	Change "comment" to "approval".	The text has been revised as requested.
91	3-3/24	Text change required.	Change "site" to "Site" as the later is defined in the Order and means the installation as a whole.	The text has been revised as requested.
92	3-3/31-32	Clarification requested. Also applicable to tables 3-1 and 3-2 on page 3-4.	The text references surface soil samples that will be collected. Subsurface samples will also be collected as part of the soil excavation process, or are you considering that as excavation proceeds, the visible soil horizon becomes a "surface" sample?	Although, excavations at some locations may proceed below 2-3 feet bgs, Shaw will only collect samples from the visible soil horizon of the excavation and will not collected samples greater than 2 feet below the bottom of the excavation at any time. To avoid further confusion, Shaw has added the following text to this bullet item: "(samples to be collected at the bottom of excavation for confirmatory analysis)".
93	3-5/32 – 3-6/1	The text indicates that the COC forms will be provided to Ohio EPA for "sample tracking and reconciliation as needed."	Just provide Ohio EPA with the COCs in the report.	"as needed" has been removed from the text.
94	3-6/16-17	The text indicates that it is Shaw's intent to pre-characterize the soils for disposal.	Provide additional details on how this will be done.	Section 3.31 has been revised to provide additional

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				details as to how the pre-characterization of soils will be performed. This information has also been included in Section 4.2 of the FSP and Section 1.6 of the QAPP documents.
95	3-6/38	The text references confirmation samples.	Use MI samples for confirmatory purposes.	The text in Section 3.3.2 has been revised to reference the MI sampling procedures in Appendix Bo of the FSP for both pre-excavation waste characterization and post-excavation confirmatory sampling.
96	3-10/22-23	The text references data entry into the EIMS. Also applicable to 3-11/3-4	Please confirm the proper procedure with Pat Ryan of SAIC.	Confirmation of the data entry procedures referenced in the DDMP has been requested from Pat Ryan of SAIC. If procedural changes are warranted, the DDMP will be revised accordingly.
97	App A	Shaw SOP T-FS-002, page 2 of 3. Clarification needed.	Clarify that the corrected information will also include the initials of the person making the correction.	This Shaw SOP has been revised to state "The edited data shall be inserted above or beside the incorrect data and the correction shall be initialed by the person making the correction."
Waste Management and Minimization Plan (WMMP):				
98	lii	COC acronym. Also applicable to title on pg 4-1/line 1.	Change to constituents or chemicals of concern.	This change has been made to the acronym list.

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99	3-1/12	Text change requested. Also applicable to: 10-5/6-7	Change text to read: "…Shaw will contact Post 1 at…"	The text has been revised as requested.
100	5-1/223	Revision requested.	Change text to read: "Soil from the excavation…'	The text has been revised as requested.
101	5-1/26-28	Recommendation. Also applicable to 5-2/8-11; 5-2/25-28.	Do not include any decon rinses that contain methanol or acid in with the other decon fluids. Segregate these out.	The text has been revised to state "Decontamination fluids, including wash waters and detergents (excluding methanol and acid rinses)…"
102	5-1/35	Text revision requested.	Revise text to read: "…from LL1-4 will generate the largest…"	The text has been revised as requested.
103	5-2/24	The wells used for groundwater sampling may require re-development.	Be advised, because this will increase the volume of water needing characterization. Coordinate information with SpecPro- - the FGWMPP contractor.	The following statement has been added to the text; "Purged water generated from well re-development and groundwater sampling activities will be coordinated for characterization with SpecPro and the FGWMPP"
104	6-1/31-39	Additional text requested. Also applicable to: 6-2/1-5; 8-2/18-23; 9-1/27-41	Add in details of other needed sedimentation and erosion controls, storm water permits, etc.	The following sentence has been included in this section; "Additional sedimentation and erosion control measures and storm water control requirements will be presented in the Remedial Action Work Plan to be prepared by Shaw prior to mobilization for remediation activities."
105	8-1/28	Text change requested.	Revise text to read: "…identified	The text has been revised as

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			above. Excavation..."	requested.
106	8-2/30	The text references the use of wetting or sequestering agents for dust control. Also applicable to 10-3/13.	Use only potable water if water is utilized and describe what other agents might be used. (They need to be environmentally friendly.)	The text has been revised to indicate "potable water" only as a wetting agent. Other agents that might be used will be evaluated and included as part of the Remedial Action Work Plan which will describe the proposed field activities.
107	8-3/1-2	Text revision requested.	While it is true that most wells in Load Lines 1, 2 and 3 are installed in bedrock, the wells in Load Line 4 are screened in unconsolidated materials.	The text has been revised to state "Shaw believes there is minimal risk of further impact to groundwater at LLs 1-3 and surface water within at all four LLs as a result of the proposed excavation based on the following site conditions:". Additionally, the first bullet in this section has been revised to state "... in most areas at LLs 1-3. There is a greater than minimal impact potential to groundwater at LL 4 since the monitoring wells are screened in unconsolidated materials."
108	8-3/17	Text revision requested.	Revise text to read: "The remaining building foundations and slabs of LL 1-4..."	The text has been revised as requested.

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109	8-3/36-37	The text references the potential decommissioning of wells.	Is this actually being proposed? Are there wells in the delineated excavation areas? Further discussion is warranted.	This bullet item has been removed. The maximum anticipated depth of excavation is three feet and should not impact the migration of COCs to groundwater
110	8-4/4	The text references discharge limits.	What discharge limits are being referenced? Water shall not be discharged directly into existing surface water areas, drainage swales, etc. There has been discharge to the ground surface of water (after review of analytical results and approval by Ohio EPA) to the ground surface and subject to strict criteria. Further discussion is needed.	The applicable discharge limits are RVAAP background concentrations and the OhioEPA water quality standards (OAC 3745-1). These requirements will be referenced in the WWMP accordingly. Shaw does not intend to discharge directly into existing surface water areas, drainage swales, etc. If analytical results of collected accumulated waters meet the OhioEPA criteria, then Shaw will seek approval from the agencies indicated to discharge to ground surface. The sentence has been revised to state; "If the results of analyses indicate that the water is within ....(OAC 3745-1), the water will be discharged to ground surface as approved by the

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				USACE, RVAAP and OhioEPA."
111	10-1/14-16	Text revision requested.	Revise text to read: "…during the remedy of excavation and off-site disposal as described in the Proposed Plan and presented at the public meeting. Subsequently…"	The text has been revised as requested.
112	10-1/20	Text addition requested.	Add Ohio EPA to the list of letter report recipients.	The text has been revised as requested.
113	10-1/30-31	Text addition requested.	The Order requires that Ohio EPA be notified 15 days in advance of the sampling.	The text has been revised as requested.
114	10-1/28	The text reference taking samples from discrete locations.	Use MI sampling techniques on the stockpiles.	The text has been revised to include MI sampling for confirmatory purposes.
115	10-2/14-15	The text discusses the generation of a protocol for characterization.	Ohio EPA must also approve the protocol.	The text has been revised to include Ohio EPA's approval of the protocol for characterization.
116	10-2/36	Text addition requested.	Add RVAAP to the list of entities reviewing the waste characterization reports.	The text has been revised as requested.
117	10-3/table 10-1	The table indicates that decon fluids, lab reagents, and residues may be discharged to the ground if determined to be non-hazardous/non-contaminated.	None of these will be discharged to the ground. They will be containerized and disposed of off-site. The only fluids that will be considered for ground surface discharge are purge and development waters from the monitoring wells, rain water that accumulates on plastic sheeting, etc., and only after analytical results	Agreed. This table has been revised to state that all decon fluids will be analyzed and disposed off-site accordingly. The text in 10.1.3 of the WMMP will also be revised to state the following: "Liquid

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			are obtained, approved and subject to strict discharge conditions.	wastes will be disposed off-site based on waste characterization analysis with the exception of purge and development waters from the monitoring wells, rain water that accumulates on plastic sheeting, etc. These liquids may be discharged to ground surface only after analytical results are obtained, approved and are subject to strict state and federal discharge conditions."
118	10-3/9	Text addition requested.	Add rules to the laws and regulations.	The text has been revised as requested.
119	10-3/15	Clarification requested.	Will the truck washing be collected.	Yes, truck washing liquids will be collected, analyzed and disposed off-site accordingly. This has been clarified in Table 10-1 and in the text.
Public Relations Plan (PRP) Addendum:				
120	4-1/26	Text change requested.	Revise text to indicate that Ohio EPA has approval authority.	The text has been revised as requested.