The success of silt fences depends on a proper installation (on the contour with each end turned up slope) that causes the fence to develop maximum efficiency of sediment trapping. Silt fences should be carefully installed to meet the intended purpose. Silt fences are effective at trapping coarse sediment but do not effectively reduce turbidity as water passes through the geotextile fabric.

A silt fence is specifically designed to retain sediment transported by sheet flow from disturbed areas, while allowing water to pass through the fence. Water flow through the silt fence often decreases over time as silts and trash "blind" or seal the geotextile fabric. Silt fences should be installed to be stable under the flows expected from the site. Generally, silt fences should not be installed across streams, ditches, waterways, or other concentrated flow areas. When properly designed and installed, silt fence can be used as a Check Dam (See Check Dam).

Silt fences are composed of geotextile (i.e., woven and non-woven) supported between steel or wooden posts. Silt fences are commercially available with geotextile attached to the post and can be rolled out and installed by driving the post into the ground. This type of silt fence is simple to install, but more expensive than some other installations. Silt fences must be trenched in at the bottom to prevent runoff from undermining the fence and developing rills under the fence. Locations with high runoff flows or velocities should use either a wire or polypropylene net reinforcement. In addition, decreasing the spacing between support posts will improve the structural integrity of the silt fence in these areas.

Design professionals should consider specifying an "off-set" trench installation. This involves a conventional 6 in. x 6 in. trench to bury the geotextile with the posts and wire installed 6 in. downslope of the trench. The wire is on top of the ground surface and not in a trench. This installation has proven to have less potential for undermining than any installation tested at the Auburn University Erosion and Sediment Control Test Facility.

A rather recent innovation that is still being tested and refined is referred to as a "sediment retention barrier with flocculant." It is used to introduce flocculant to turbid runoff causing flocculation. A sediment retention barrier should only be used in conjunction with effective erosion and sediment control practices upstream that have removed sediment and turbidity as much as possible without chemical additive. The measure consists of a double row of netting on the contour that allows runoff to easily pass through. Material such as jute is secured to the ground between the rows of netting and adjacent to the downslope row. Loose straw is placed between the rows (see Figure SB-1). An approved flocculant powder is added at a designed rate to all the jute and in layers within the straw. The measure is located upstream of sediment control (sediment basin, sediment trap, or sediment barrier) which will pond, allow for flocs to settle, and capture flocs prior to runoff leaving the site. Design professionals should get details needed to design this measure from a research professional or a qualified industry representative.

Figure SB-1 Sediment Retention Barrier

Design Criteria (for silt fence)

Silt fence installations are normally limited to situations in which only sheet or overland flow is expected because the practice cannot pass the volumes of water generated by channelized flows. Silt fences are normally constructed of synthetic fabric (geotextile) and the life is expected to be the duration of most construction projects. Silt fence geotextile should conform to the property requirements found in AASHTO M288 shown in Table SB-1 as follows:

Table SB-1 Silt Fence Geotextile Fabric Requirements per AASHTO M288

Requirement	Test Methods	Units	Type A supported fence	Type B unsupported fence
Grab Strength	ASTM			
Machine Direction	D4632/D4632M	N	400	550
X-Machine Direction			400	450
Permittivity	ASTM D4491	sec^{-1}	0.05	0.05
Apparent Opening Size	ASTM D4751	mm	0.60 max avg roll value	0.60 max avg roll value
Ultraviolet stability (retained strength)	ASTM D4355/4355M	%	70% after 500 h of exposure	70% after 500 h of exposure

Note: ALDOT has an approved products list for geotextile

The drainage area behind the silt fence should not exceed ¼ acre per 100 linear feet of silt fence for non-reinforced fence and ½ acre per 100 feet of reinforced silt fence. When all runoff from the drainage area is to be stored behind the fence (i.e. there is no stormwater disposal system in place) the maximum slope length behind the fence should not exceed those shown in Table SB-2.

Table SB-2 Slope Limitations for Silt Fence

Land Slope (Percent)	Maximum Slope Length Above Fence (Feet)
<2	100
2 to 5	75
5 to 10	50
10 to 20*	25
>20	15

*In areas where the slope is greater than 10%, a flat area length of 10 feet between the toe of the slope to the fence should be provided.

Type A Silt Fence

Type A fence shall be a minimum of 24" and not more than 32" above ground with wire reinforcements and is used on sites needing the highest degree of protection by a silt fence. The wire reinforcement is necessary because this type of silt fence is used for the highest flow situations and has almost 3 times the flow rate as Type B silt fence. Wire fence should be made of 14-gauge wire with 6 in. x 6 in. openings (Note: ALDOT wire spacing may differ). Type A silt fence should be used where runoff flows or velocities are particularly high or where slopes exceed a vertical height of 10 feet. Staked tie backs on each end of a Type A silt fence may be necessary to prevent overturning. Tie backs should also be used at points of possible concentration and overtopping if site conditions do not allow for the silt fence to be installed on the contour.

Provide a riprap splash pad with a geotextile underlay or other outlet protection device for any point where flow may overtop the silt fence.

The silt fence should be installed as shown in Figure SB-2. Maximum post spacing is 10 ft. In situations where runoff flows parallel with the silt fence when in perimeter control applications, 10 ft. spacing is adequate. J-hooks should also be considered for long parallel flow scenarios to slow flow velocity and create areas of impoundments, thereby reducing scour potential under the silt fence. For the portion of the silt fence that creates the J-hook impoundment area, the post spacing should be reduced to 5 ft. to support the hydrostatic loads. For all installations that intercept flow perpendicularly to the slope causing a concentrated impoundment, the maximum post spacing should be reduced to 5 ft. Materials for posts, post size, and fasteners are shown in Tables SB-3 and SB-4. Do not use "light weight" steel posts commonly found at building supply stores. Details for overlap of Type A silt fence is available from The Alabama Department of Transportation construction drawings.

Geotextile silt fence material should be looped over each post and the top of the wire to prevent sagging. A "hog ring" attachment should be made each 2 feet along the top of the wire.

Table SB-3 Post Size for Silt Fence

	Minimum Length	Type of Post	Size of Post
Type A	5'	Steel "T" Post	1.25 lb./ft. min.
Type B	4'	Soft Wood Oak Steel	3" diameter or 2X4 1.5" X 1.5" 1.25 lb./ft. min.

Table SB-4 Wood Post Fasteners for Silt Fence

	Gauge	Crown	Legs	Staples/Post
Wire Staples	17 min.	¾" wide	½" long	5 min.
	Gauge	**Length**	**Button Heads**	**Nail/Post**
Nails	14 min.	1"	¾" long	4 min.

Type B Silt Fence

This 36" wide geotextile fabric should be used on developments where the life of the project is short (6 months or less) and there is less need for protection from a silt fence.

The silt fence should be installed as shown in Figure SB-3. Post spacing is either 4 ft. or 6 ft. based on geotextile elongation % (see note on Figure SB-3). Materials for posts and fasteners are shown in Tables SB-3 and SB-4. Details for overlap of the silt fence and fastener placement are shown in Figure SB-4.

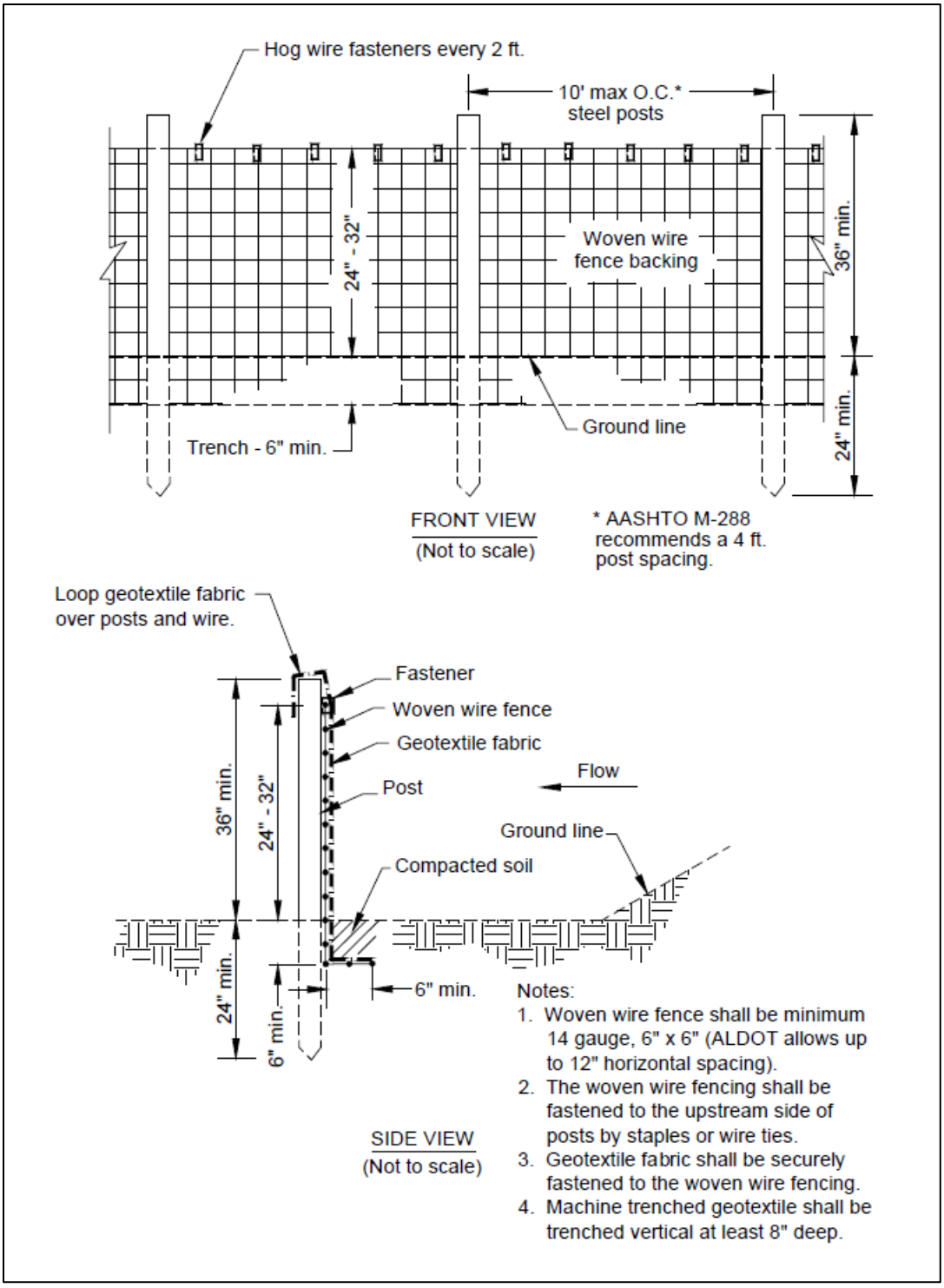

Figure SB-2 Silt Fence-Type A
(For post material requirements see Tables SB-3 and SB-4)

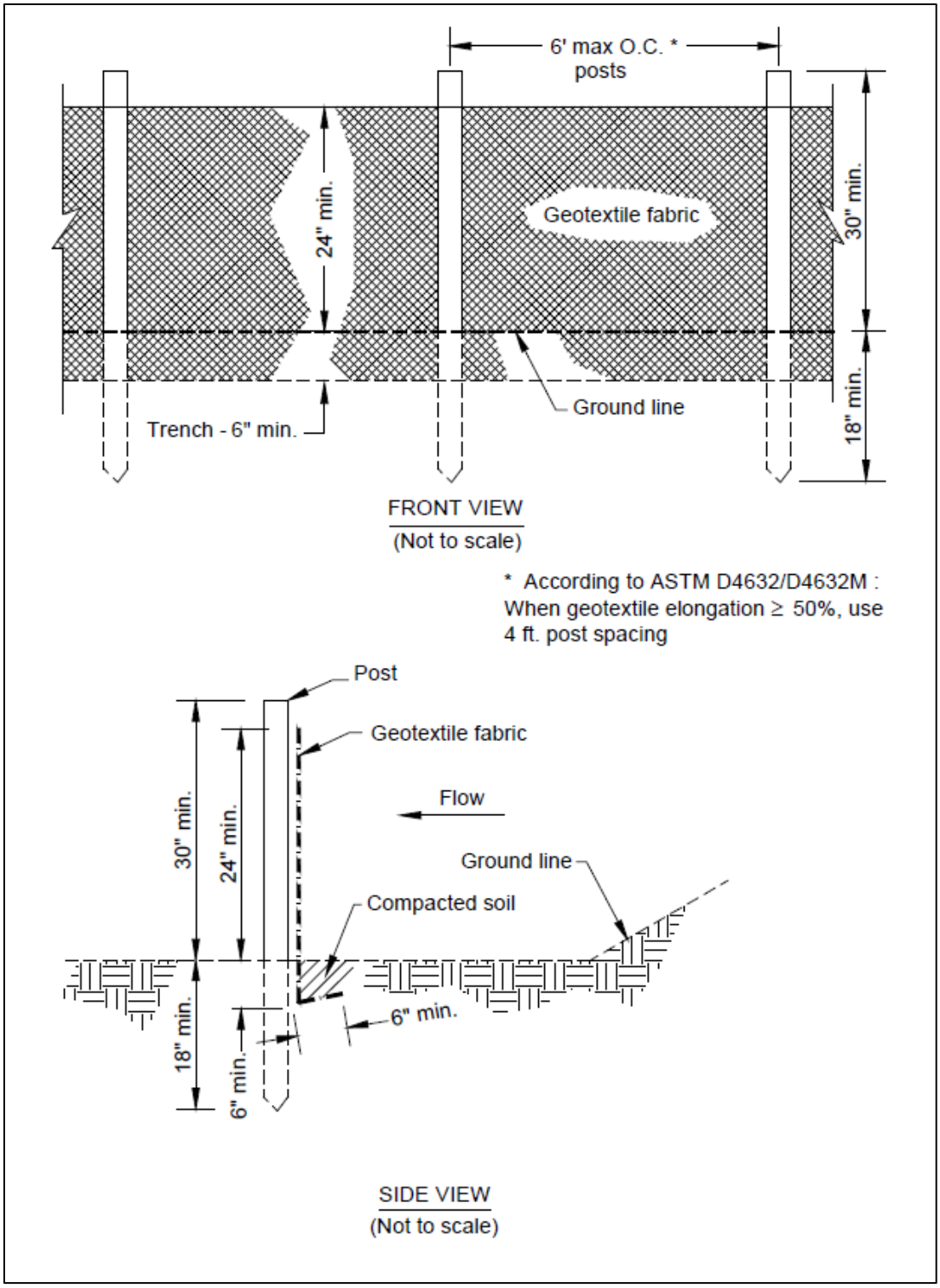

Figure SB-3 Silt Fence - Type B

(1) For post material requirements see Tables SB-3 and SB-4

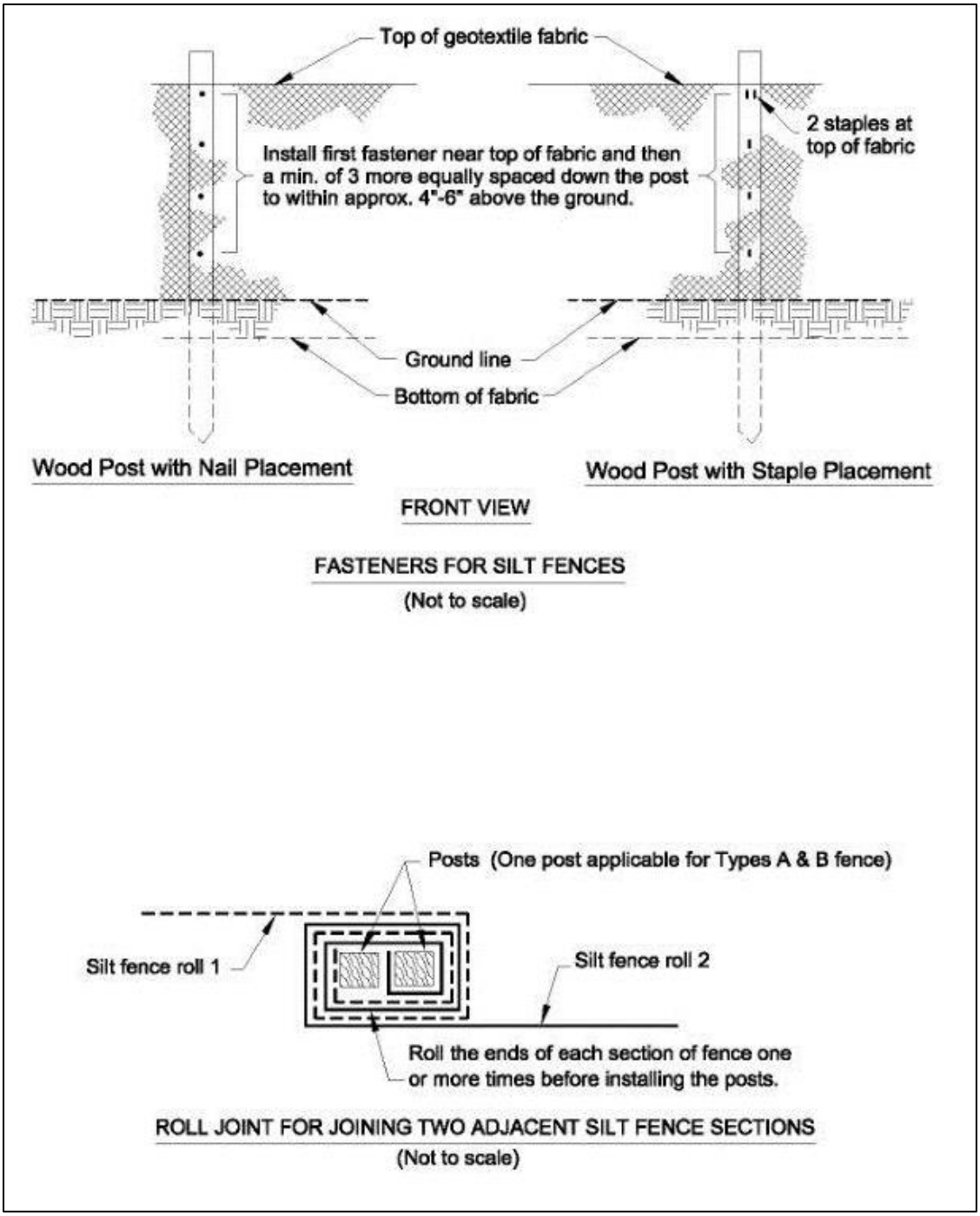

Figure SB-4 Silt Fence Installation Details

I. Corrective Action Log

Attachment I – Corrective Action Log

Project Name:
CBMPP Contact:

Inspection Date	Inspector Name(s)	Description of BMP Deficiency	Corrective Action Needed (including planned date/responsible person)	Date Action Taken/Responsible person

J. CBMPP Amendment Log

Attachment J - CBMPP Amendment Log

Project Name:
CBMPP Contact:

Amendment No.	Description of Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

K. Grading and Stabilization Log

Attachment K - Grading and Stabilization Activities Log

Project Name:
CBMPP Contact:

Date Grading Activity Initiated	Description of Grading Activity	Date Grading Activity Ceased (Indicate Temporary or Permanent)	Date When Stabilization Measures are Initiated	Description of Stabilization Measure(s) and Location(s)

L. Rainfall Documentation Log

Attachment L - Rainfall Documentation and Observations

Project Name or Description:
Project Location:
ADEM Permit Number:

Date	Start Time	End Time	Total Depth (to tenth of inch)	Observations (rainfall intense, moderate, etc.)	Initials

APPENDIX H

CONSTRUCTION QUALITY ASSURANCE PLAN

Appendix H

Construction Quality Assurance Plan
RSA-014S, Unlined Inactive Burn Trench, Unit #2
Operable Unit 14
U.S. Army Garrison-Redstone
Madison County, Alabama
EPA ID No. AL7 210 020 742

Prepared for:

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Contract No. W912DY-17-D-0003
Delivery Order No. W912DY19F1116

March 2022

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H1.0 Introduction

This construction quality assurance plan (CQAP) presents the overall program for construction quality assurance (CQA) to be implemented during corrective measures implementation (CMI) activities at RSA-014S. This document establishes a program to comply with requirements established in the CMI work plan and those of the Alabama Department of Environmental Management (ADEM) and U.S. Environmental Protection Agency. The scope of work for the project is detailed in the CMI work plan for RSA-014S (to which this CQAP is an appendix).

H1.1 Overall Directive

The procedures and practices set forth in the CQAP should be adhered to and specifically applied to all quality-related work on the project. It is the responsibility of all personnel performing work on the project to be familiar with and implement the technical requirements referenced in this CQAP or otherwise specified for the project, as included in the CMI work plan.

Conformance to the requirements of this CQAP will provide results which will verify that the contract, when completed, will conform to the specified requirements and will be documented by defensible evidence that the work performed meets or exceeds the standards set forth for the project.

H1.2 Project Background

RSA-014, Unlined Inactive Burn Trenches Unit #2, is located in the southwestern portion of Redstone Arsenal (RSA) and overlies the RSA-151 groundwater unit (Figure 1-1 in the CMI work plan). RSA-014 is located east of Blueberry Road and southwest of an embayment of the Tennessee River. The site is located just east of the active open burn (OB)/open detonation (OD) area. The OB/OD area includes active sites RSA-012 (Active Open Burn Pans [OB]) and RSA-131 (Active Open Detonation Area [OD]).

RSA-014 consists of two noncontiguous parcels identified as RSA-014 North (RSA-014N) and RSA-014 South (RSA-014S). RSA-014N occupies approximately 9.7 acres (Figure 1-2 in the CMI work plan) and RSA-014S occupies approximately 9.8 acres (Figure 1-3 in the CMI work plan) for a total of approximately 19.5 acres. No habitable buildings are or have been located within either parcel. No chemicals of concern (COC) were present in RSA-014N surface media; only RSA-014S soils require corrective measures and are the focus of this CQAP. COCs in groundwater under both parcels will be addressed by the RSA-151 groundwater unit corrective measures.

The RSA-014S parcel consists of two former burn trenches (referred to as north and south trenches) (Figure 1-3 in the CMI work plan). During their use from the mid-1950s to 1991, the unlined, open trenches were approximately 150 to 200 feet long, 35 feet wide, and 6 to 12 feet deep. The trenches were designed for disposal and burning of packaging and pallets used to ship munitions and contaminated metals (the metals reportedly were recovered for recycling). Diesel fuel and kerosene were reportedly used as starter materials for the burning of the materials. Some of the ash, residue, and metal debris from the burn pads at the nearby RSA-013 site were disposed at the RSA-014S trenches. Additionally, unsanctioned burning and disposal of propellant-contaminated solvents and explosives from Thiokol Corporation's manufacturing and production areas occurred in the trenches until 1984. All burning and disposal activities ceased after 1991, and the trenches were filled and covered with clean fill.

The RSA-014N and RSA-014S parcels lie within the boundary of the former Gulf Chemical Warfare Depot, which operated from 1942 to 1947 for receipt, storage, and shipment of chemical agents, bulk chemicals, munitions, decontaminating equipment, and protective materials. Aerial photographs during this time frame show roads through both parcels and possible open staging areas in RSA-014S due to its location near the designated Toxic Gas Yards (e.g., RSA-110).

Investigations at RSA-014S have concluded that exposure to soil poses an unacceptable risk to potential current and future construction workers due to trichloroethene (TCE) in ambient air in a future construction area. No COCs are present in surface media at RSA-014N. The COCs in groundwater under both RSA-014N and RSA-014S will be addressed by the RSA-151 groundwater unit corrective measures.

RSA-014S has a Moderate/High unexploded ordnance (UXO) probability. Site receptors will be protected from potential munitions and explosives of concern (MEC) by implementation of land-use controls (LUC).

H1.3 Objectives of the Construction Quality Assurance Program

The objective of the CQA program is to provide a system of procedures, practices, guidelines, and controls which, when implemented, will provide the confidence that project activities are accomplished in accordance with the specified contracts, design criteria, plans, drawings, and CMI plan developed during implementation of the corrective measures. This CQAP establishes requirements for developing the overall site-specific construction quality control (CQC) system to be implemented at RSA-014S. The CQAP will be implemented during all phases of the project, including preliminary site activities, remediation, and close-out activities.

Aptim Federal Services, LLC (APTIM) has been selected as the contractor to implement corrective measures at RSA-014S. The U. S. Army Garrison-Redstone Site Manager and/or U.S. Army Engineering and Support Center, Huntsville (CEHNC) Technical Manager will observe the work during its performance by APTIM and subcontractors and will approve the work upon acceptable completion. APTIM has prepared a Quality Assurance Surveillance Plan under this contract; this plan sets forth procedures and guidelines that the CEHNC will use in evaluating the technical and safety performance of APTIM and its subcontractors (APTIM, 2019).

The CQAP is also applicable to off-site suppliers of equipment or services to the project, which could affect the quality of the CMI. In particular, the following items must be adhered to during the CQA activities:

- Guidelines and requirements prepared and documented in the CMI work plan
- Construction verification as it is performed, by inspection and verification testing, so that the design features are implemented as intended
- Evaluation of variance to the design that may occur during construction and remediation and its effect upon system performance
- Complete documentation prepared and maintained during and after construction and remediation so that it can be demonstrated that the design has been implemented and that the performance requirements have been met.

H1.4 Presentation of the Construction Quality Assurance Plan

This CQAP is designed so that the CQC activities for all portions of the remediation are executed and managed from a common set of quality objectives and practices as described in the CQC plan and the project-specific quality assurance project plan (QAPP) (CMI Work Plan Appendix D). The CQA and CQC activities, as described herein, serve as the minimum requirements to verify that all work is in compliance with the quality requirements set forth in the CMI work plan and is consistent with the local, state, federal, and other appropriate regulatory agencies for the types of environmental activities performed.

H2.0 Responsibility and Authority

APTIM will perform the CMI for RSA-014S. The RSA Site Manager and/or CEHNC Technical Manager or designee will observe the work as it is performed to ensure compliance with the CMI work plan. ADEM personnel may be present during some or all of the corrective measures at RSA-014S as their schedule allows.

It is the responsibility of all project personnel to report activities that could adversely affect the CQC requirements set forth by the contract documents. The dedicated Quality Control Site Manager (QCSM) is responsible for identifying, reporting, and documenting activities affecting quality and for verifying correction of materials and activities that do not conform to the specified contract requirements. The QCSM will maintain a close working relationship with the Project Manager (PM), RSA Site Manager, and CEHNC Technical Manager, keeping them advised of all situations that if not corrected or controlled could affect the resulting quality of the project.

APTIM will designate an authorized representative to be responsible for CQA, referred to as the QCSM. The RSA Site Manager will ultimately be responsible for providing the relevant documentation to the oversight agency (ADEM). APTIM will be responsible for furnishing appropriate documentation (outlined in this CQAP) to RSA and CEHNC for submittal to the oversight agencies, as required.

H2.1 CQA Organization and Key Elements

The APTIM PM will be responsible to ensure the execution of the CQA duties for RSA-014S, which will be performed by the QCSM. CEHNC has retained the services of APTIM to perform the required CMI at the site. APTIM, including its subcontractors, will be responsible for field activities and laboratory testing requirements for the project CQC. The responsibility of key personnel involved in the CQA and CQC activities are described Sections H2.1.1 through H2.1.6.

H2.1.1 Project Manager

The PM has the overall responsibility to ensure the execution of the work to be performed by APTIM, including efforts to ensure compliance with the requirements of ADEM. Among other duties, the PM will coordinate all financial and project-required resources (technical as well as administrative) necessary for the implementation of the project. The PM will maintain overall responsibility of the project through coordination activities with APTIM personnel, ADEM, and the Army. The PM will verify that the corrective measures have been implemented in accordance

with the CMI work plan. The PM has the authority to select and dismiss organizations charged with implementation of the corrective measures and is vested with the authority to stop work if conditions adverse to quality are persistent and need to be corrected before proceeding further.

H2.1.2 Oversight Agency (ADEM)

The primary oversight agency for the RSA-014S CMI is ADEM. The oversight agency will provide review and comment on the CQAP to ensure that the proposed CQA program will provide for sufficient confirmation that work is being performed as intended. The oversight agency has the responsibility to review CQA documentation and, upon completion of the corrective measures, to confirm that the CQAP has been followed and that the construction/remediation has been performed in accordance with the regulatory requirements.

H2.1.3 Quality Control Site Manager

The QCSM will be responsible for the review and approval of the equipment and materials supplied by APTIM (including its subcontractors). The APTIM QCSM reports directly to the APTIM Corporate Quality Management Director. The work that the QCSM produces is subject to the review and approval of the PM, APTIM Corporate Quality Management Director, and Project Engineer.

A few deviations from the CMI work plan are not uncommon during the implementation of remedial actions. As such, activities may need to be adjusted accordingly during the progress of construction and remediation. The QCSM may be requested to change some aspects of the design and/or CMI work plan if unexpected conditions (e.g., a change in site conditions, unanticipated logistical problems, change in construction or remediation methodology, or lack of availability of certain materials) are encountered during the construction work. Accordingly, the QCSM will be responsible for preparing the appropriate variances and providing necessary feedback to the PM or the APTIM Corporate Quality Management Director.

The QCSM is responsible for coordinating all required field activities and laboratory CQC testing activities, including sample collection and shipment and verification of the test results. The results will be documented on the daily construction log. Additional responsibilities include preparing addenda to the CQAP and formulating corrective actions or variances when required.

H2.1.4 CQC Analytical Laboratory

In accordance with the contract documents, CQC activities will be performed by a subcontracted laboratory for confirmation analysis with the soil excavation. The testing laboratory must have its own internal QC procedures to ensure that laboratory analyses conform to the appropriate regulatory requirements and applicable testing standards. The CQC laboratory is responsible for

ensuring that analyses are performed in accordance with applicable test methods and standards for following internal QC procedures, for maintaining sample chain-of-custody records, and for reporting data. In addition, the CQC laboratory must be willing to allow announced or unannounced inspections by authorized project personnel, including representatives from RSA and ADEM in order to observe the sample preparation and analysis procedures. The laboratory must be willing to accommodate such inspection as long as the observer does not interfere with the testing process.

H2.1.5 The Contractor and Subcontractors

APTIM has the overall responsibility for conducting the remediation in accordance with the approved CMI work plan. APTIM, including its subcontractors, must perform CQC tests, as required by the CMI work plan, during project remediation activities and provide CQC documentation as specified and report variances and nonconformances as outlined in this CQAP.

H2.1.6 Construction Quality Control Personnel

Field quality assurance (QA)/quality control (QC) personnel are individuals designated by APTIM and its subcontractors whose duty it is to ensure products and services are provided to RSA and CEHNC in accordance with the CMI work plan.

H2.2 Qualifications

CQA and CQC activities will be accomplished by appropriately qualified personnel. Each individual will understand and enforce the specified quality requirements and recommend improvements in processes and/or services which, when implemented, could affect the cost, schedule, and quality of the project in a positive manner.

The key personnel involved in the CQA/CQC program and their minimum recommended qualifications are provided in the following table:

Key Personnel in CQA/CQC Organization	Role/Minimum Qualifications Requirements
PM	The specific individual(s) to certify that the construction activities have been completed in accordance with project design CMI Plan.
Project Engineer	The individual who prepared the CMI work plan and designated representative of APTIM with knowledge of the design and contract requirements.
APTIM Corporate Quality Management Director	Independent supervisor of the field QA/QC personnel. Five years of QA/QC project work.
Qualified Credentialed Inspector	The individual responsible for completing the Construction Storm Water Inspections.
Qualified Credentialed Professional	Responsible for updating the Best Management Practices Plan and certifying the plan.

Key Personnel in CQA/CQC Organization	Role/Minimum Qualifications Requirements
QCSM	Responsible for the review and approval of the equipment and materials and coordinating all required field and laboratory CQC testing activities, including record keeping, and sample collection and shipment. Five years project work; college degree in science or technical field.
Field QA/QC Personnel	Designated APTIM and/or subcontractor personnel (or independent third parties) to perform specific CQC testing. Training required when appropriate (moisture-density testing, concrete testing, etc.) for assigned tasks, certifications.

H2.3 Personnel Training

APTIM personnel assigned to the project, including subcontractors, are trained to ensure competence commensurate with the responsibility and qualifications necessary to perform the tasks to which they are assigned. In addition to education and experience, job-specific training may be required to qualify individuals to perform certain activities. The PM and QCSM will review and document the personnel qualifications and training to verify compliance to the subcontract requirements.

All personnel will be trained per Occupational Safety and Health Administration (OSHA) Section 1910.120. Project personnel will receive an orientation to the CMI work plan as appropriate to their responsibilities before participation in project activities.

The PM and QCSM will review the qualifications and training of all personnel assigned to the project. Training and qualification records will be maintained at the project site and available for review. Training of site personnel will be verified and documented as applicable to the work to be performed. The QCSM will monitor the training activities to verify all required training is completed for personnel performing work on the project and verify that the training is documented and that current records are maintained.

Training will include all phases of the work as necessary and will be commensurate with the complexity of the activities being performed. Training methods may include formal classroom, required reading, on-the-job training, or combination of these methods. Training procedures will be reviewed and approved by qualified CMI APTIM project personnel.

Training programs are conducted according to organizational needs and policies so that personnel:

- Have an acceptable understanding of the safety consideration of the work tasks
- Possess knowledge of the processes adequate to perform assigned tasks

- Have a working knowledge of the project or facility basis requirements
- Have an understanding of systems, terminology, reasons for performance of specific control functions and the acceptance and rejection criteria for the work
- Know the consequences of inadequate quality attainment.

The training program will be evaluated to determine the effectiveness of the program and instruction. If it is determined that the program content, instructor capabilities, or other conditions require changes, the program will be updated at that time. At a minimum, the training will be reviewed as part of the management assessment.

APTIM shall maintain qualification and training records for each employee. Training records should include all documents that establish the employee's capabilities, including outside training and training performed by approved training organizations. The QCSM will verify compliance with the project requirements.

H2.4 Communication Within the CQA Organization

Communication between the CQA program participants includes the exchange of information that allows work to proceed and the required reporting so that activities can be reviewed. Communication in the form of construction documents, inspection reports, audit reports, verification test results, and daily CQC reports must be timely so that reviews and evaluations can be performed by all the parties responsible for execution of the work.

CQA personnel, the PM, and the subcontractors must communicate as required and as addressed in this CQAP to maximize the efficiency and effectiveness of the CMI and to minimize variance or nonconformance.

H2.5 CQA Meetings

CQA meetings will be held throughout the progression of construction and remediation activities on an as-needed basis. Progress meetings will be documented in the form of meeting minutes prepared by the QCSM and maintained in the on-site CQA files.

H3.0 Contract Scope of Work

The complete and detailed scope of work for the planned construction/remediation activities are presented in the CMI work plan and the supporting documents therein. Additionally, the CMI work plan provides the proposed schedule and sequencing of the activities. This chapter provides a general overview of the activities and an outline of the CQC testing requirements referenced in the CMI work plan. Subsequent to this chapter, Chapters 4.0 through 10.0 present the necessary supporting aspects of the CQC/CQA program that must be implemented to ensure the overall objectives of the program are met and to provide evidence of compliance with all applicable project and regulatory requirements.

H3.1 Proposed Work Activities

The general scope of work for RSA-014S to be conducted with UXO escort and/or UXO support for surface clearance and subsurface removal as necessary includes the following:

- Mobilization/demobilization
- Surface clearance activities (select areas)
- Utility clearance and marking
- Installation of surface water and erosion controls
- Vegetation clearance
- Surveying and marking of the proposed excavation areas
- Protection of existing monitoring wells located in the vicinity of excavation areas
- Surface clearance and subsurface removal at planned excavation areas
- Excavation of contaminated soil and confirmation sampling and analysis
- Waste characterization sampling
- Transport and disposal of excavated soils contaminated with TCE as nonhazardous waste (Subtitle D landfill)
- MEC and munitions debris (MD) disposal, if necessary
- Posting of signage and conduct initial fencing inspection using UXO escort if entry within site boundary is required
- Site restoration, including application of backfill and topsoil, and revegetation with approved grass mixtures

- Annual routine LUC inspections, sign/fence repairs, and reporting.

The general scope of work not requiring UXO escort includes the following tasks:

- Establish LUC boundary.
- Outline land use restrictions for this site in the RSA Property Master Plan.
- Comply with requirements in Alabama Administrative Code r. 335-5-1-.02(3)(a).

H3.2 CQC Requirements and Responsibilities

Sections H3.2.1 through H3.2.4 present a summary of the CQC testing requirements and responsibilities of APTIM's QCSM during implementation of corrective measures at RSA-014S. The information presented herein is intended only to provide an overview of the requirements; the complete and full details of the planned work is contained in the CMI work plan and supporting documents.

H3.2.1 Preliminary Activities

Preliminary activities include mobilization, surface clearance for potential MEC (select areas), requirements for base access, surveying of excavation areas, dig permits and utility marking, site control, installation of storm water erosion and sediment controls, vegetation clearing, protection of existing monitoring wells, and establishment of soil stockpiles. The dig permit will be obtained from the RSA Directorate of Public Works ([256] 876-9881) prior to commencement of the CMI. During these activities, the QCSM will be responsible for reviewing purchase orders and packing slips to ensure all materials received are in accordance with the CMI specifications. Storm water erosion and sediment controls will be implemented in compliance with the *Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas* (Alabama Soil and Water Conservation Committee [ASWCC], 2018). Site controls will be enforced in accordance with the site-specific safety and health plan prepared by APTIM. A licensed land surveyor will be subcontracted to delineate the project work boundary and mark the excavation areas. Temporary roads will be built to access the excavation areas, if deemed necessary, as discussed with storm water and sediment controls. The instrument-aided surface clearance will be conducted at all utilization areas (ingress/egress areas, laydown areas, soil stockpile area, etc.). Attachment H-2 provides a checklist to record this surface clearance activity.

H3.2.2 Subsurface Removal in Support of Excavation Activities

The UXO team will conduct a subsurface removal to reduce the potential for exposure to MEC at the planned excavation areas prior to conducting the excavations. MEC response, handling, and destruction will be conducted in accordance with procedures provided in the Explosives Safety

Submission (ESS) (Appendix K). Attachment H-2 provides a checklist to record this subsurface removal activity.

H3.2.3 MEC/MD Disposal

The UXO team will be responsible for destroying MEC/material potentially presenting and explosive hazard that is not transferred to the adjacent OB/OD area in accordance with the ESS (Appendix K) and the Explosives Management Plan (Appendix L). All MD excavated during removal activities will be removed from the site.

H3.2.4 MEC/MD Records Management

APTIM will maintain a detailed accounting of all MEC and MD items encountered during the corrective measures. Data from the removal operation activities will be entered in the geographical information system database and included in the CMI Report. The database will track all MEC recovered. Required forms are included in Appendix N.

H3.2.5 Soil Excavation, Confirmation Sampling, and Disposal

Following completion of the surface clearance and subsurface removal activities as necessary, the corrective measure consisting of excavation of TCE-contaminated soil will commence. Soil will be excavated to meet the cleanup goal specified in the CMI work plan. Excavation will be accomplished according to the Safety and Health Regulations for Excavations (OSHA 29 Code of Federal Regulations Part 1926 Subpart P). The soil excavations for removal of TCE-contaminated soil within each of the three areas will be performed using a backhoe or excavator. The UXO team will continuously observe the soil as it is excavated. Should an item in the excavated soil or within the excavation be visually observed, the UXO personnel will identify the item in accordance with Section H.3.2.2. Should initial visual observation conducted by UXO personnel determine that an item is cultural (i.e., wire, can, etc.), excavation will continue using the same protocol until the depth and lateral area is reached where confirmation soil samples for TCE from the sidewalls and floors are at or below the cleanup goal. Items found to represent MD will be managed as described in Section H.3.2.3.

A licensed land surveyor will be contracted to survey the final excavation limits at each area. Surveying will be conducted in accordance with the Alabama Society of Professional Land Surveyors Standards of Practice for Surveying in Alabama (www.aspls.org).

Contaminated soils will be stockpiled during the excavation at RSA-014S. Based on site knowledge and data from similar sites, it is expected that the excavated soils will be managed as a nonhazardous special waste and that the soil will likely be able to be disposed as special waste (nonhazardous) at a Subtitle D landfill. APTIM will employ a licensed transportation and

disposal subcontractor to complete these activities. The waste characterization results will be submitted to the landfill for approval. An ADEM waste certification number will be obtained prior to disposal of any excavated soils at a landfill in Alabama.

H3.2.6 Backfill and Revegetation

Upon completion of all soil excavation activities, approximately 80 cubic yards of clean fill material will be brought in from an RSA borrow area or another approved off-site borrow source. If sampling of the borrow source material has not been conducted, APTIM will sample the material to confirm it is acceptable for use as backfill at the site. The borrow material sampling, if required, will include one 5-point composite sample analyzed for target compound list (TCL) semivolatile organic compounds, TCL pesticides/polychlorinated biphenyls, and target analyte list metals, and one sample analyzed for TCL volatile organic compounds. The backfill material will be placed by the excavator, spread in maximum 12-inch loose lifts, and compacted using the excavator. Any uncontaminated soil removed during excavation activities will also be placed in the excavation. Once the areas have been backfilled and compacted, clean topsoil will be placed over the affected areas.

Soil excavation will disturb/destroy site vegetation. Any vegetated areas that are disturbed or destroyed will be restored following completion of the remediation and removal of all equipment. Restoration will include reseeding and mulching the area. The ASWCC should be consulted to determine the grass species to use. The QCSM will be responsible for verifying the proper fill and revegetation materials are used.

H3.2.7 Implementation of Land-Use Controls

During the corrective measures, LUCs will be implemented at RSA-014S. A certified surveyor will be contracted to provide a survey plat for the LUC boundary. A total of 27 signs are planned on the existing fencing at spacing of 100 feet around the LUC boundary (Figure 4-6 in the CMI work plan). The fencing will be inspected to ensure that it provides adequate engineering controls as part of the site LUCs. A full site walk around the fencing perimeter will be conducted to ensure the fencing and fence posts have not been damaged to the extent that it could compromise the controls. A functioning lock will be checked for each gate. The QCSM will be responsible for verifying the correct signage and its installation along the fencing around the site.

Monitoring of the signs and fencing will be conducted annually as well as ensuring the site use is consistent with the LUCs imposed in a notice of environmental use restriction. The results of the annual monitoring will be included in an annual monitoring report to ADEM.

H3.2.8 Final Inspection and Demobilization

When planned remediation activities have been completed, temporary field structures (e.g., fencing and best management practices) will be removed and disposed off site. A final inspection of the project site will then be conducted in accordance with the requirements as outlined in this CQAP.

After the completed work has been accepted by RSA and/or CEHNC, all personnel and equipment will be demobilized from the project site. During these activities, the QCSM will be responsible for the performance or oversight of the following:

- Oversee the removal of temporary field structures.
- Obtain required waste characterization samples as necessary for off-site disposal.
- Coordinate disposal with RSA personnel (including obtaining appropriate RSA signatures on waste manifests or bills of lading) and the subcontracted transportation and disposal vendor.
- Participate in final field inspection and note deficiencies that require corrective action.
- Coordinate implementation of corrective actions and arrange for reinspection.
- Submit final approved inspection report to RSA and CEHNC.
- Oversee demobilization activities.

H3.3 Additional Considerations

The information contained in this chapter only represents an overview of the proposed work activities and is intended to serve as a guide to the complete details of work as included in the contract CMI work plan and other supporting documents. As noted previously, the remaining chapters of this CQAP contain discussions of the additional components included in the overall CQA/CQC program which are implemented to ensure the generation of defensible evidence of compliance with contract and regulatory requirements.

H4.0 Document Control

The CQAP is a controlled document, and measures are included to maintain the currency and the use of the plan so that the CQC functions defined within are in accordance with the latest specified requirements. Distribution of the plan is controlled so that all revisions to the plan are issued to the plan holders and the superseded requirements revised accordingly in the existing plans.

Issuance and distribution of the plan will be controlled by the PM or his/her designee, the document controller. The plan will be transmitted to each plan holder on the distribution list. The transmittal document will reference the assigned document control number, which will appear in the top right corner of the transmittal letter included within each document. The assigned number will be kept on a log and maintained by the PM's designee in the home office. Copies will be maintained at specific locations and available to the individuals performing the work.

Revisions to the plan will be made by sections or by the addition of supplements or amendments and will be noted with change pages or with a new final or revised document. All accepted revisions to the plan will be transmitted to the plan holders according to the distribution list. Individuals or organizations designated as plan holders will be responsible for updating their copies of the plan.

H4.1 Documentation

The PM will provide a document control system to provide measures for the control of issuance, distribution, storage, and maintenance of documents relating to quality, including those from APTIM and its subcontractors and other vendors or suppliers.

Preparation, review, issuance, and revisions to documents affecting construction quality will be controlled so that the specified contract, regulatory, and permitting requirements are clearly defined and made available to the personnel performing the work. Such documents may include but not be limited to the following:

- Correspondence
- Drawings
- Procedures
- Plans
- Reports
- CMI work plan.

The PM or his/her designee will review the documents to verify inclusion of the appropriate QA requirements.

H4.2 Daily Construction Log

CQC reporting will be addressed in the daily construction log, and APTIM will document all project activities as required by the contract. The log will cover conforming and nonconforming work and will include but not be limited to the following:

- Weather conditions
- Site instructions
- Nonconforming conditions
- Results of inspections and tests
- Types of defects or causes for rejection
- Corrective actions - proposed and taken
- On-site personnel and major equipment log
- Delays and causes
- Verbal instructions.

A copy of a typical daily CQC report is included as Table H4-1. RSA and CEHNC will be provided a copy of the daily QC reports throughout the duration of the project.

H4.3 Records

H4.3.1 Evidence of Contract Compliance

Records will be prepared to furnish documented evidence that design, construction, and operation activities, including laboratory analysis, are in compliance with the quality requirements of the contract. The records will be consistent with the applicable sections of the project technical CMI work plan and may include one or more of the following:

- Daily CQC report
- Technical reviews
- Inspection and test reports
- Audit reports
- Monitoring and surveillance activities
- Personnel qualifications
- As-built drawings
- Nonconformance reports and corrective actions
- Design documents
- Laboratory analyses reports
- Other specified documents.

H4.3.2 Storage of Field Records

Copies of field records will be maintained and stored at the project site until turnover as specified by CEHNC. On-site records will be readily retrievable for review and audit purposes by ADEM, RSA, and CEHNC. The records will be controlled so that the possibility of loss, damage, or other detrimental conditions of the records is avoided. The original project documents will be stored at APTIM's home office.

H4.4 Project Submittals

Project submittals include documents generated or revised in the home office or in the field site office at RSA. Project submittals will have tracking numbers issued with each new or revised document. In addition, project submittals specified in the contract documents and CMI work plan will be prepared by APTIM and submitted to the QCSM. The PM is responsible for the preparation and maintenance of the specified submittals for the project.

H4.4.1 Document Submittal Register

The project submittal register will be maintained by APTIM. Submittals returned unapproved or with comments requiring revisions will be so noted on the submittal register and re-entered as a revision. The Project Engineer or his/her designee will monitor the submittal register to verify submittals are being controlled, scheduled, and tracked, and the status kept in an effective manner. The project submittal register will be updated continuously, as applicable, and reviewed by the Project Engineer or his/her designee to determine the status of the submittals and compliance to the project schedule requirements.

H4.4.2 Submittal Preparation and Transmittal

Submittals will be prepared by the PM or his/her designee. Submittals from subcontractors or vendors will be reviewed by the QCSM prior to transmitting the submittals to the PM and Project Engineer or designees. All appropriate information will be completed prior to transmittal of the submittals. Submittals will be scheduled to coincide with the needed dates and adequate time allowed for review and approval in accordance with the contract requirements. The submittals will be reviewed for conformance to specified requirements, completeness, and accuracy. Submittals requiring modifications or changes will be returned to the PM or his/her designee for corrective actions and resubmitted for review.

H4.4.3 Resubmittals

Submittals that are not approved by the QCSM or returned with comments that require resubmittal for approval will be processed in the same manner as the original submittals. The submittal number used for the original submittal will be used for each resubmittal followed by a

numerical notation indicating the revision. The resubmittals will be re-entered on the project submittal register with the new revision numbers.

H5.0 Nonconformances And Corrective Actions

This chapter addresses the procedure for reporting nonconformances and corrective actions for variance from the contract documents.

H5.1 Nonconformance Report

Work, field testing, laboratory testing, or materials not conforming to the CMI work plan or contract requirements, including noncompliances and deficiencies identified by RSA and CEHNC, will be documented on a nonconformance report (NCR). A sample NCR is shown in Table H5-1. At a minimum, the NCR will detail the nonconforming conditions, recommended corrective action(s), and disposition of the corrective action(s). Noncompliances or deficiencies identified by the QCSM will be immediately corrected. A master log of all NCRs will be kept by the QCSM for review by the PM. All NCRs will remain open until the nonconforming condition has been satisfactorily resolved and verified as acceptable by the APTIM Corporate Quality Management Director.

H5.2 Identification of Nonconforming Items

Items identified as nonconforming will be documented on the NCR, which, as applicable, will include the following:

- Description of nonconforming item or activity
- Detailed description of nonconformance
- Cause of nonconformance
- Referenced criteria
- Recommended disposition
- Disposition and verification of corrective action
- Responsible organization.

H5.3 Nonconformance Tracking Register

Each identified nonconformance will be documented on the sample NCR tracking register (Table H5-2) which, at a minimum, will include the following information:

- NCR tracking number
- Description of nonconformance
- Issue date
- Distribution parties
- Individual or organization assigned responsibility
- NCR closed-out date and initial of party responsible for closure.

The QCSM is responsible for maintaining the NCR tracking register and for the verification that the corrective actions were implemented and verified prior to closing the NCR. RSA and

CEHNC will be notified in advance of verification of the corrective actions to permit their participation in the inspections and acceptance of the results prior to closing the NCR.

H5.4 Control and Segregation

Nonconforming materials or items will be controlled to prevent inadvertent use or further processing which would cause the nonconforming condition to be inaccessible for correction. All items identified as nonconforming will be clearly identified and segregated from acceptable items except where size, installation status, and other conditions would make it impractical to segregate from conforming items. When nonconforming items are not segregated, they will be identified and clearly marked so that they may be easily recognized as nonconforming to prevent further activities prior to the implementation of the corrective action(s).

H5.5 Disposition

The disposition of NCRs will include the necessary actions required to bring the nonconforming condition to an acceptable condition and may include reworking, replacing, retesting, or re-inspecting. Implementation of the disposition will be in accordance with the original procedural requirements, a specific procedure, or other acceptable written instructions by the APTIM Corporate Quality Management Director.

H5.6 Documentation

Notifications of noncompliance and the proposed corrective actions will be documented on an NCR and processed in accordance with the provision described in this section. Corrective actions will be implemented upon receipt of the notification. The NCR will remain open until the noncompliance is resolved.

H5.7 Corrective Actions

In addition to resolving identified nonconforming conditions, corrective actions will address the cause of adverse conditions contributing to the nonconformance and establish methods and controls to preclude the recurrence of the same or similar types of nonconformances.

The QCSM will track corrective actions to identify trends in the causes of the nonconforming conditions and initiate necessary actions to prevent recurrence. Additionally, the QCSM will monitor the corrective actions to verify that corrective actions were properly implemented and accepted and the NCR was closed.

H5.8 Stop Work Notice

Nonconforming conditions that affect the quality of the project, threaten safety, or cause an environmental threat will be stopped through the use of a stop work notice (Table H5-3). Stop work notices may also be issued in the event of insufficient corrective actions resulting in

recurring nonconforming work. The issuance and tracking of stop work notices will be documented on a stop work notice log (Table H5-4) to be maintained by the PM (or his/her designee).

H5.9 Conflict Resolution

Conflicts arising from nonconformance and corrective actions that cannot be resolved at the project management and QC levels will be directed to successive levels of management as necessary to obtain resolution. The levels of management will include the QCSM, APTIM Corporate Quality Management Director, and PM. All conflicts will be resolved within the specified requirements of the contract and the governing regulatory documents.

H6.0 Procurement Control

This chapter addresses the procedure for ensuring that procured items and services meet established requirements and perform as specified within procurement standard operating procedures.

H6.1 Overview

Prospective suppliers will be evaluated and selected on the basis of the specified criteria. APTIM will ensure that approved suppliers can provide acceptable items and services as required by the contract. The Project Engineer will review and approve all materials and supplies that may affect quality of the project. Upon approval of purchase requisitions, the QCSM will receive a copy of the approved purchase requisition. When materials and supplies arrive at the project site, the QCSM will be responsible to ensure the items and services meet the requirements listed in the purchase requisition and that no items are installed prior to approval of applicable submittals.

The procurement details include provisions for the following, as applicable to the scope of work or services:

- ***Scope of Work***. A statement of the scope of work to be performed by the subcontractor will be in the procurement documents.
- ***Technical Requirements.*** Technical requirements will be specified. Where necessary, these requirements will be specified by reference to CMI work plan, codes, regulations, procedures, QA program documents, and statement of work requirements that describe the services to be furnished. The procurement documents will provide for identification of inspection, verification, and acceptance requirements for monitoring and evaluating the supplier's performance.
- ***QA Program Requirements.*** Procurement documents will require that subcontractors have a documented quality system that implements portions or all of the requirements of this plan, as applicable. The extent of the suppliers' quality system will depend on the type and use of the service being procured.
- ***Right of Access.*** At each tier of procurement, the procurement documents will provide for access to supplier's facilities and records for inspection or audit by APTIM or its authorized representative.
- ***Documentation Requirements.*** Procurement documents at each tier of procurement will identify the documentation required to be submitted to APTIM for information, review, or approval and the time of submittal. The retention times and the disposition requirements for specific quality records will be prescribed.

- ***Questionable or Unusable Data.*** The procurement documents will include requirements for reporting and approving disposition of questionable or unusable data.

H6.1.1 Review of Procurement Documents

The QCSM will ensure that site-initiated procurement documents and changes transmitted to the prospective supplier include adequate requirements, performance standards, and quality criteria. The purchase requisition will then go through the proper approval process including the PM, the Project Engineer, and the Procurement Leader.

The review of changes and their effects will be completed prior to transmittal to the prospective supplier. This review will include the considerations that the appropriate requirements are specified, additional or modified performance criteria determined, and analysis of exceptions or changes requested or specified by the supplier.

H6.1.2 Source Evaluation and Selection

The selection of suppliers and subcontractors will be based on an evaluation of their capability to provide items and/or services in accordance with the specified requirements. Measures for evaluating and selecting procurement sources will be documented and may include one or more of the following:

- Evaluation of the supplier's history of providing an identical or similar service, which reflects the current capability
- Supplier's current QA records supported by documented qualitative and quantitative information that can be objectively evaluated
- Supplier's technical and quality capability as determined by a direct evaluation of their facilities and personnel, an evaluation of the effectiveness of their implementation of their quality system, and, in the case of subcontracted analytical data acquisition services, the successful analysis of a set of performance evaluation samples
- Submittals pertaining to the items or services to be provided must be approved prior to use or initiation of the work on the project site.

H6.1.3 Acceptance of Services

The procurement control will include flow-down provisions of the contract and site-specified task order. The acceptance methods used (e.g., source verification, receipt inspection, and technical verification of data produced) will be verified. Confirmation of specific characteristics will be performed at intervals and to a depth consistent with the service's complexity, quantity and frequency of procurement, and statement of work requirements.

H6.1.4 Receipt Inspection and Verification

The QCSM or designee will develop and implement procedures for receipt inspection and verification of purchased items. These controls will provide for the following, as applicable:

- Verification that the items received is in accordance with purchase order requirements
- Inspection for evidence of breakage, damage, or otherwise being unfit for use
- Verification that required documentation is received and acceptable
- Verification that the items conform to the supplier's published requirements that were provided submitted and approved.

H6.1.5 Handling, Storage, Packaging, and Shipping

The handling, storage, cleaning, preservation, packaging, and shipping of items will be controlled to prevent damage or deterioration that would jeopardize the specified performance of the items.

Procurement documents will include the following:

- Requirements for sellers to establish special procedures, when necessary, to ensure cleanliness, identification, and proper handling
- Requirements for the preparation of items for shipment, as necessary, to prevent damage or deterioration of the supplied items
- Requirements for material and equipment storage instructions, when specified, to be available at the site well in advance of the arrival of material or equipment.

H6.2 Subcontractor Quality Control

All subcontractors performing work for a project are responsible for compliance to the requirements of their respective subcontracts. Subcontractors include organizations supplying quality-related items or services to the project. The overall responsibility for conformance to the quality requirements for the subcontracted items and services is retained by APTIM.

The requirements for personnel qualifications, technical performance levels, QC procedures, acceptability levels, and documentation will be included as part of the subcontract documents. The PM or designee will review the subcontract procurement documents to verify that QC requirements are passed on to the subcontractor.

The QCSM is responsible for the implementation of inspections, surveillance, document review, audits, and other QC activities for monitoring the subcontractor to verify compliance with the

contract and subcontract requirements. These activities will be documented on inspection reports, audit reports, field logs, or other forms appropriate to the function performed.

For field operations, the field QA/QC personnel will provide QC checks before, during, and at the completion of the subcontractor's activities to determine that the subcontractor is in compliance with the QC measures set forth by the contract, the applicable subcontract documents, and the subcontractor's approved QC plan, including the following:

- Meeting quality requirements
- Generating, controlling, and maintaining required documentation
- Performing and documenting required inspections and tests
- Identifying, reporting, and correcting nonconforming conditions
- Turnover to APTIM.

H6.3 Analytical Laboratory Services

Analytical testing to ensure that the cleanup objectives are achieved will be performed using analytical laboratories off the project site as specified by the contract documents. The analytical testing requirements and related activities are described in Section 4.6 of the CMI work plan.

H6.3.1 Other Subcontractors

Subcontractors performing work other than laboratory-related activities will be monitored by the QCSM or field QA/QC personnel to verify conformance to the contract and subcontract quality requirements. The monitoring activities will include audits, surveillances, witnessing of inspections and tests, document reviews, and interfacing with the subcontractor's QC or project management. All monitoring activities will be documented on the appropriate form or included in the daily construction log.

H6.3.2 Subcontractor Noncompliance

Work performed by subcontractors that does not comply with the specified requirements will be identified, reported, controlled, tracked, and corrected.

H7.0 Audits

Audits may be performed to verify compliance with aspects of the project documents. Audits will be performed with checklists and include a review of documents and records to determine if the CQAP and supporting procedures are being implemented. A site-specific assessment checklist for RSA-014S is provided as Attachment H-1 of this CQAP. The individual elements of the checklist are based on the site-specific requirements presented in Section 4.0 of the CMI work plan.

An audit will note findings and observations. A finding will be a documented statement of fact concerning a noncompliance or deviation from established requirements. An observation will be a statement of fact regarding the potential for a noncompliance.

Audits will be performed by qualified personnel and include individuals that are technically knowledgeable in the areas to be assessed. Audit results will be documented and sent to the appropriate management.

H7.1 Scheduling and Planning

Audits typically will be performed early in the life of the activity as practical and continue until completion of the activity. The Auditor will provide written notification to the organization to be audited informing them of the scheduled audit date.

Audit schedules may be prioritized based on the importance of the activity, previously identified deficiencies of the activity, and the size or complexity of the activity. The QCSM will develop a schedule for the performance of audits. The audit schedule will be posted and distributed to project staff and managers. Unscheduled audits may be used to supplement scheduled audits when conditions warrant.

H7.2 Internal Performance Audits

Performance audits are conducted on site by an auditor who directly observes specific project activities to determine if these activities are being conducted in accordance with the contract requirements. The Auditor will be technically competent in the activities to be audited and independent of the subject work. The audit of project deliverables will be for the purpose of determining compliance with the procedures set forth in this plan (i.e., technical reviews, documentation of reviews, document control, and other procedures). Checklist items to be examined may include the following:

- Availability and implementation of approved work instructions
- Field documentation and checking
- Subcontractor performance
- Review of personnel training and qualification records
- Review of process controls and associated records to determine compliance with CMI work plan or plans
- Review of work areas for evidence of implementation of procedures and instructions
- Review of documentation indicating compliance with plan, document and design preparation, review, and approval procedures
- Change and nonconformance documentation and disposition.

H7.3 Execution of Audits

Audits will normally be conducted as described below.

H7.3.1 Pre-Audit Meeting

The Auditor will conduct a brief pre-audit meeting with management or supervisory personnel of the organization to be audited to confirm the audit scope, discuss the audit sequence, establish a tentative time for the post-audit meeting, and establish channels of communication.

H7.3.2 Audit

The Auditor will follow checklists, developed prior to the audit, to evaluate existing project records provided by designated project staff and may observe work in progress. If noncompliances are observed or uncovered during the audit, the Auditor will discuss these potential findings with the individuals being audited so that findings are accurate and understood. In addition to identifying noncompliances, the audit results may include observations of notable areas of strength.

H7.3.3 Exit Meeting

Upon completion of the audit, the Auditor will discuss observations and findings with the group or organizations audited and, whenever possible, agree on corrective actions. Minor administrative findings that can be resolved to the satisfaction of the audit team during the audit are not required to be documented as items requiring corrective actions. All findings that are not resolved during the course of the audit and findings affecting quality will be noted on the audit checklists.

H7.3.4 Audit Report

The Auditor will prepare and issue an audit report, which provides the following information at a minimum:

- Unique audit number
- Description of the audit scope
- Audited organization and location
- Persons contacted during the audit activities
- Audit dates
- Summary of audit results, including a statement on the effectiveness of the quality management elements that were audited
- Suggested opportunities for improvement in the form of observations and comments
- Description of each reported audit finding in sufficient detail to enable corrective action to be performed
- Due date for completion of corrective actions and/or audit response (typically 30 days).

Audit results will include findings and observations. Findings are items that require corrective action. Findings will be documented on an audit finding report or equivalent. Observations are nonmandatory recommendations to improve project quality. The Auditor may make recommendations for corrective actions; however, the ultimate responsibility for taking corrective action lies with the auditee. The report will be signed by the Auditor. Checklists do not need to be included with the audit report but should be maintained as records in the project files.

The Auditor will prepare an audit report cover letter or memorandum for signature and issuance by the PM. The audit report will be issued to the management of the audited organization.

H7.4 Response

The response prepared by the auditee will clearly state for each finding the corrective action taken or planned, the cause of the deficiency, and the action to prevent recurrence. For each observation, the response will indicate actions taken or planned for quality improvement. The response will, at a minimum, be sent to the PM and the Auditor.

H7.5 Follow-Up

The QCSM or designee will track all audit findings to assure that all findings are appropriately addressed and to trend audit findings for significant conditions adverse to quality. The QCSM or designee will maintain the status of audit findings for active audits and prepare correspondence relating to overdue audit responses. When responses are overdue, the QCSM or designee notifies the responsible organization by telephone that responses are overdue and prepares a memorandum or letter indicating a new response due date. If a request for extension of response is received, an evaluation will be made and a formal response submitted to the requesting organization.

The PM or designee, upon receipt of responses to audit findings, will coordinate with the Auditor for the evaluation of responses. The responsible evaluator will document the results of the evaluation. Unacceptable responses will be noted together with the specific reason for rejection. The PM or designee will prepare transmittal correspondence to the responsible organization to inform them of a new response due date.

Follow-up actions, possibly including re-audit of deficient areas, will be taken to verify whether corrective action is accomplished as scheduled. The QCSM or designee will assure that verifications of corrective action implementation are accomplished and document the results of verification.

Following acceptance and verification of all corrective actions, an audit closure document will be issued by the Auditor to the same distribution as the audit report. The closure document will indicate that corrective actions have been satisfactorily completed and will contain a statement that the audit is closed.

H7.6 Documentation

The following documents generated before, during, and after the audit process will be maintained in the record file system in accordance with Chapter H4.0 of this plan:

- Audit report
- Audit responses
- Audit closure letter
- Correspondence related to the audit.

H8.0 Construction Inspections

The primary function of inspections is to establish the measures required to verify the quality of work performed and compliance to the specified requirements, including the inspection of materials and workmanship before, during, and after each work element.

H8.1 Preparatory Inspections and Meetings

Along with representatives of RSA and CEHNC, the PM, the QCSM, and the Site Supervisor will conduct preparatory inspections/meetings at RSA-014S. Preparatory inspections/meetings will be performed prior to starting definable features of work. Typical definable tasks and related inspection requirements can be modified based on project requirements. When more than one work element is included in one work activity, one preparatory meeting may cover several work elements for the site. Likewise, a number of work activities, where feasible, can be combined into individual preparatory meetings. The preparatory inspection/meeting will be attended by the Army, applicable APTIM personnel and subcontractors involved with the feature of work, and responsible field QA/QC personnel. The QCSM will be notified in advance to coordinate participation in the inspection. The preparatory meeting may include but not be limited to the following:

- Review the basic elements of the work.
- Review documentation and reporting requirements.
- Review pertinent contract requirements.
- Review materials and equipment documentation for required tests, submittals, and approvals.
- Review required QC inspections and test requirements.
- Establish that the preliminary work required to begin the feature of work is complete and conforms to approved drawings and submittal data.
- Establish that the required materials and equipment for commencement of the work are on hand or available for use on the feature of work and that all equipment is properly calibrated and in proper working condition.
- Ensure the securing of utility clearances (“dig permits”).
- Address basic site health and safety considerations.
- Establish hours of operation.

Preparatory inspections will be reported on the daily QC reports. The detailed results of the preparatory inspection will be documented.

Personnel performing work activities affected by a preparatory inspection will be directed in the acceptable level of the workmanship involved for the feature of work covered by the inspection.

H8.2 Initial Inspections

The initial inspection may be conducted at the beginning of the work element. The inspection will be performed when it is determined that a sufficient portion of the work element has been accomplished to evaluate the following criteria:

- Compliance with the CMI work plan, drawings, submittals, and other contract requirements
- Acceptable levels of workmanship
- Quality of materials
- Resolution of differences (when applicable).

Initial inspections will include participation of the responsible personnel, including appropriate subcontractors and the field QA/QC personnel involved with the work element. The Army will be notified in advance of each initial inspection to coordinate participation in the inspection. The initial inspections will be reported on the daily QC reports.

H8.3 Follow-Up Inspections

Follow-up inspections will be performed throughout the course of work. The frequency of the follow-up inspections will be dependent upon the extent of work being performed on each particular work element. Follow-up inspections will be performed on all ongoing work. Follow-up inspections will also be performed on completed work phase prior to starting subsequent phases. Deficiencies identified will be corrected in a timely manner or identified on a punch list that will be used as a tracking method until the work is completed and verified and the punch list item signed off. Deficiencies that would be made inaccessible for correction by subsequent work activities will be corrected and accepted prior to starting the new work.

The follow-up inspections will be reported on the daily QC reports and copies of the inspection forms as applicable.

H8.4 Pre-Final Inspection

Near the completion of the work or increment thereof as established (e.g., completion of the erosion control structures such as silt fencing and construction entrance), the QCSM will conduct

an inspection of the work and develop a punch list of items that do not conform to the approved CMI plan. The list of deficiencies will become a part of the CQC documentation which will include the estimated date by which the deficiencies will be corrected. The QCSM will then make a second inspection to ensure that all deficiencies have been corrected. Once this is completed, APTIM will notify the QCSM that the site is ready for pre-final inspection.

The Army will perform the pre-final inspection to verify that the site work has been satisfactorily completed. A pre-final "punch list" may be developed by the QCSM as a result of this inspection. The QCSM will then make sure that all items on this list have been corrected and so notify the PM so that a final inspection with RSA and CEHNC can be scheduled. Items noted in the pre-final inspection will be completed in a timely manner. These inspections and deficiency corrections will be accomplished within the time frame slated for completion of the project.

H8.5 Final Inspection

The PM, the QCSM, the RSA Site Manager, and the CEHNC Technical Manager will be in attendance at this inspection. The RSA Site Manager or CEHNC Technical Manager will formally schedule the Final Inspection based upon completion of the results of the pre-final inspection. Notice will be given to the Army at least 14 days prior to the final inspection and must include APTIM's assurance that all the specific items previously identified as being unacceptable will be completed by the date scheduled for the final inspection.

APTIM will prepare the punch list. The punch list will identify all nonconforming or incomplete work. Upon completion of the punch list items, a second inspection will be conducted by RSA, CEHNC, and APTIM to verify all of the items conform to the requirements. The APTIM Corporate Quality Management Director will be the final authority to accept all of the punch list items as having been corrected.

H8.6 Inspection Documentation

The QCSM is responsible for the maintenance of the inspection records. Inspection records will be legible and clearly provide all information necessary to verify the items or activities inspected conform to the specified requirements or, in the case of nonconforming conditions, provide evidence that the conditions were brought into conformance or otherwise accepted by the Army.

H9.0 Analytical Testing

The installation-wide quality assurance program plan (HydrGeoLogic, Inc., 2019) establishes the measures for management and control of analytical testing activities affecting the quality of remedial actions. Primary responsibility for control of construction (through performance of analytical QC testing) resides with APTIM (including its subcontractors) and testing will be done in accordance with the CMI work plan including the site-specific QAPP (Appendix D to the CMI work plan).

Task-specific programs of field controls, consisting of inspections and verification tests, will be utilized to verify that the CMI work plan, including the site-specific QAPP, is adhered to during implementation of the corrective measures at RSA-014S, where applicable. However, the installation-wide quality assurance program plan (HydroGeoLogic, Inc., 2019) presents the overall general principles that are employed in any chemical analyses performed as part of the construction.

H10.0 References

Alabama Soil and Water Conservation Committee (ASWCC), 2018, ***Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management of Construction Sites and Urban Areas***, July.

Aptim Federal Services, LLC (APTIM), 2019, ***Quality Assurance Surveillance Plan for Corrective Measures Implementation at Multiple Sites, U.S. Army Garrison-Redstone, Madison County, Alabama***, Prepared for U.S. Army Engineering & Support Center, Huntsville, Alabama, November.

HydroGeoLogic, Inc., 2019, ***Final Revision 4 Installation-Wide Quality Assurance Program Plan, U.S. Army Garrison – Redstone, Madison County, Alabama***, December.

TABLES

Table H4-1

Typical Daily Construction Log
Redstone Arsenal, Madison County, Alabama

Date: _____

Contractor: _____ Project No.: _____

Contract Title: _____ Report No.: _____

Area: _____ Unit: _____ Work: Contract (✓) _____ WO # _____

Shift: _____ Hrs. Wkd: From _____ To _____ Weather _____
Temp. L H

Manpower	No.	Total Hrs.	Major Equipment	No.	Total Hrs.

Description of Work Performed Today:

Remarks by Contractor: (Delays, interruptions, deviations, extra work activities, unusual occurrences, etc., relevant to today's work.)

For Contractor: Title: Date:

USACE Comments and/or Exceptions:

For USACE: Title: Date:

Table H5-1

Nonconformance Report
Redstone Arsenal, Madison County, Alabama

Linked w/Variance No: Page __of __

Project Name:	Project Number:
Date of Issue:	Report Number:
-- Nonconformance Report --	
I. Description of the Nonconformance, include requirement violated: (by the person identifying the nonconformance) Identified by: Date:	
Root Cause of nonconformance:	
II. Recommended Corrective Action: (by the person identifying the nonconformance and the review committee)	
To Be Performed by:	Date:
To Be Verified by:	Date:
III. Corrective Action Implementation: (by those implementing the corrective action)	
Was Performed by:	Date:
Was Verified by:	Date:
How was the Corrective Action Verified?	
IV. Nonconformance Resolution, include action taken to preclude recurrance: (by the review committee)	
Affected Organization:	**-- Signatures --**
<u>Distribution List:</u>	Requested by: _____ Date: _____ (printed name and date) Signature:
	QC Approved by: _____ Date: _____ (printed name and date) Signature:
	Proj. Mgr. Approval:_____ Date: _____ (printed name and date) Signature:
	Client QA Approval: _____ Date: _____ (printed name and date) Signature:

Table H5-2

Nonconformance Report Tracking Register
Redstone Arsenal, Madison County, Alabama

PROJECT NO.
CONTRACT NO.

NONCONFORMANCE REPORT TRACKING REGISTER

NCR NO.	DESCRIPTION OF NONCONFORMANCE	DATE ISSUED	DATE CLOSED	COMMENTS

Table H5-3

Stop Work Notice
Redstone Arsenal, Madison County, Alabama

Project Name/Location: _____ Project No. _____ D.O. No. _____

S.W.O. No. _____ Date: _____ Page 1 of ___

1. Written Notice Issued to:
   Name: _____
   Title: _____
   Org.: _____

2. P.O. # or Activity: _____

3. Location: _____

4. Issued by (name): _____
   Issued by (title): _____

5. Verbal Notice Issued to:
   Name: _____ Date: _____ Time: _____
   Title: _____

6. Associated NCR No.: _____

7. Associated CAR No.: _____

8. Stop Work Order Condition Description: Attachment _____

9. Remedial Action Required: Attachment _____
   By Whom: _____ By When: _____
   Required Remedial Action Determined by:
   Project Manager: _____ Date: _____
   CQA Director/Field CQA Coordinator: _____ Date: _____

10. Follow-up of Remedial Action Taken: Attachment _____
    Verbal Notice to Resume Operations Given to:
    Name: _____ Date: _____ Time: _____
    Title: _____
    Stop Work Order Cancellation Authorized by:
    CQA Director/Field CQA Coordinator: _____ Date: _____

Table H5-4

Stop Work Notice Log
Redstone Arsenal, Madison County, Alabama

SWO No.	Action Party/Organization	Subject	Date Issued	Date Closed

ATTACHMENT H-1

FIELD INSPECTION CHECKLIST

	Contract No: W912DY-17-D-0004 **EPA ID No.** AL7 210 020 742	**Controlling Document:** **Corrective Measures Implementation (CMI) Plan**
Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan	**Inspection Date:**	

Descriptor / Requirements	Comments	Results
4.0 Corrective Measures Implementation		
This section provides an overview of the planned activities to complete corrective measures at RSA-014S. Work presented in this section will be completed in accordance with the procedures described in the CMI Work Plan and other approved documentation as appropriate. RSA-014S CMI Work Plan Chapter 4.0		
4.1 General Scope		
The general scope of work to be conducted with UXO escort and/or UXO support for surface clearance and subsurface removal as necessary includes the following: • Mobilization/demobilization • Surface clearance activities (select areas) • Utility clearance and marking • Installation of surface water and erosion controls • Vegetation clearance • Surveying and marking the proposed excavation areas • Protection of existing monitoring wells located within the vicinity of excavation areas • Surface clearance and subsurface removal at planned excavation areas • Excavation of contaminated soil and confirmation sampling and analysis • Waste characterization sampling • Transport and disposal of excavated soils as nonhazardous waste (Subtitle D landfill) • MEC and MD disposal, if necessary • Posting of signage and conduct initial fencing inspection using UXO escort if entry within site boundary is required • Site restoration, including application of backfill and topsoil, and revegetation with approved grass mixture. • Annual routine LUC inspections, sign/fence repairs, and reporting RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
The general scope of work not requiring UXO escort includes the following tasks: • Establish LUC boundary • Outline land use restrictions for this site in the RSA Property Master Plan • Comply with requirements in AAC r. 335-5-1-.02(3)(a). RSA-014S CMI Work Plan Chapter 4.0		
4.1.1 Procurement and Subcontracting		
Subcontracted services and imported materials required for the completion of the project may include the following: • Vegetation clearance • Protection of existing monitoring wells • Storm water erosion and sediment controls • Surveying • Excavation and site restoration • Transportation of common fill and topsoil • Analytical laboratory • Transportation and disposal of contaminated soil • Aggregate (crusher-run, riprap, and drainage stone) • Erosion controls • Seed, fertilizer, and mulch • Heavy-duty plastic sheeting. RSA-014S CMI Work Plan Chapter 4.0		
The following equipment may be utilized to complete field remediation activities: • Excavator to excavate contaminated soil • Front-end loader to consolidate soil and move fill material • Steel-wheeled compactor to compact fill material. • Large capacity water truck (or equivalent) for site dust control and hydration of imported material for compaction • Portable fuel tank (mounted on pickup truck) • Miscellaneous support equipment (e.g., portable storage, computers, copier, fax machine, radios, relief station, eyewash, etc.). Support equipment and materials will be procured through equipment vendors and scientific supply vendors and shipped directly to the site. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
4.1.2 Field Personnel		
Field personnel required to complete the field activities may include the following: • Field construction quality control site manager • Equipment operators • Laborers • UXO personnel (e.g., SUXOS, UXOSO/UXOQCS, and technicians). The number and schedule of personnel will be developed during the project as required. RSA-014S CMI Work Plan Chapter 4.0		
4.1.3 Quality Control Inspections for Field Activities		
Inspections may be performed and verified through visual observation, measurement of materials or equipment, examination of documentation/certification, evaluation of performance, or testing. RSA-014S CMI Work Plan Chapter 4.0		
Inspections will be performed using a three-phase inspection method: 1) Preparatory inspection(s) are performed prior to start-up and will examine training, procedures, equipment and materials, work plans and documents, and overall readiness to perform work; 2) Initial inspection(s) are performed when work begins on a particular feature of work and include an examination of the quality of workmanship and a review of control testing for compliance with work plan requirements. Follow-up inspection(s) are then performed to verify compliance with procedures; and 3) Follow-up inspections will ensure a continuation of quality and safety standards established during preparatory and initial inspections until completion of the definable work feature. Final follow-up inspection(s) will be conducted at the completion of the activity. RSA-014S CMI Work Plan Chapter 4.0		
4.1.4 Daily Reports		
Daily reports (including daily construction logs, etc.) will be provided to the APTIM Project Manager or their designee during CMI activities. These reports will be submitted weekly to RSA. The report will include a running inventory of excavated material. RSA-014S CMI Work Plan Chapter 4.0		
4.1.5 Health and Safety Requirements		
All personnel involved in the corrective measures will follow this CMI work plan and abide by the health and safety requirements presented in the site-specific safety and health plan (SSHP). RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama

Inspection Type: Field Inspection Checklist
Subject: RSA-014S CMI Work Plan

Descriptor / Requirements	Comments	Results
4.2 Preliminary Activities		
Preliminary activities include mobilization, surface clearance activities (select areas), fulfilling requirements for base access, surveying, utility marking and obtaining dig permits, establishing site control as needed, installation of storm water erosion and sediment controls, vegetation clearing, protection of existing monitoring wells, and establishment of soil stockpiles. In accordance with 40 CFR 112, a Spill Prevention, Control, and Countermeasures plan will be prepared if fuel storage is required on site and the aboveground storage capacity of a single container is in excess of 660 gallons or the aggregate aboveground storage capacity is greater than 1,320 gallons. All field personnel will follow this work plan including the attached QAPP, APP with SSHP, Explosives Management Plan, and Explosives Safety Submission including updates to these attached plans prepared by APTIM as required. All field activities will be conducted using on-site UXO support. RSA-014S CMI Work Plan Chapter 4.0		
4.2.1 Mobilization		
Mobilization will include deployment of personnel, equipment, subcontractors, and materials necessary to commence CMI activities. RSA-014S CMI Work Plan Chapter 4.0		
All APTIM and subcontractor personnel have completed required training and health and safety requirements. This includes: • OSHA 40-hour HAZWOPER and 8-hour updates • Reviewed and signed site-specific health and safety plan • Any additional site or contract specific training or health and safety requirements RSA-014S CMI Work Plan Chapter 4.0		
4.2.2 Surface Clearance Activities		
Prior to commencement of preliminary corrective measures activities, UXO-qualified personnel conducted an instrument-aided surface clearance of the planned areas for utilization (e.g., ingress/egress, laydown areas, soil stockpile, etc.) in accordance with the Surface Clearance Checklist in Attachment H-2. MEC items have been flagged for avoidance and disposition. MD has been removed and staged for disposition. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
4.2.3 Access to Redstone Arsenal		
New personnel and subcontractor personnel will register at the Redstone Arsenal Visitors Center at either Gate 1 (Martin Road East) or Gate 9. Personnel with prior approval from a host RSA organization will be issued a personnel badge upon presentation of proper identification. RSA-014S CMI Work Plan Chapter 4.0		
Personnel may access the RSA via any active gate but should note that gate access hours vary. Commercial trucks must pass through the inspection facilities at either Gate 1 or Gate 9 each time they enter RSA. RSA-014S CMI Work Plan Chapter 4.0		
4.2.4 Location, Marking, and Surveying of Excavation		
A licensed land surveyor will be subcontracted to delineate the project work boundary and mark the excavation areas. The surveyor will locate these areas based on coordinates provided by APTIM and mark items in the field with highly visible wooden stakes, tape, or pin flags. The proposed excavation areas are shown on Figure 4-1 in the CMI Work Plan.. RSA-014S CMI Work Plan Chapter 4.0		
4.2.5 Digging Permit and Utility Marking		
APTIM will coordinate with the appropriate RSA personnel within 14 days of intrusive activities requesting a work order for a digging permit to ensure that any underground utilities in the proposed excavation are properly marked and protected. The procedure requires notification by telephone ([256] 876-9881). No utilities are expected to be identified in the RSA014S excavation areas based on previous intrusive activities. The digging permit must be renewed every 30 days. To avoid temporary shutdown, APTIM will make a request for permit extension at least 1½ weeks prior to digging permit expiration for the extension to be granted. RSA-014S CMI Work Plan Chapter 4.0		
4.2.6 Site Control		
APTIM using temporary construction fencing materials, barricades, and warning tape, as necessary, to delineate the site exclusion zone, contamination reduction zone, and site support zone in compliance with the site-specific safety and health plan. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
4.2.7 Storm Water Erosion and Sediment Controls		
BMPs have been installed to manage site stormwater in accordance with the BMP layout included in the CMI Work Plan (Figure 4-2 in the CMI work plan) or an updated figure prepared by APTIM. RSA-014S CMI Work Plan Chapter 4.0		
Documented inspections of erosion control devices occur at least weekly and also within 72 hours of any qualifying precipitation event. RSA-014S CMI Work Plan Chapter 4.0		
Maintenance of BMPs is being performed in accordance with the specifications included in the CMI Work Plan and its attachments and being documented in the daily reports. RSA-014S CMI Work Plan Chapter 4.0		
4.2.8 Vegetation Clearing		
Vegetation clearance is being performed in accordance with the CMI Work Plan, and in coordination with RSA forester for removal of any commercial quality trees. The remaining trees and brush will be cleared using manual and mechanical means (e.g., chainsaw, line trimmer, or heavy equipment). RSA-014S CMI Work Plan Chapter 4.0		
The cleared materials will be mulched and stockpiled for use during site restoration (if deemed practical). Materials not used for site restoration will be disposed at the RSA construction and demolition landfill. Material in contact with site soils (e.g., root wads) will be disposed in the same manner as the surrounding soil. RSA-014S CMI Work Plan Chapter 4.0		
4.2.9 Existing Monitoring Well Protection		
Monitoring wells (e.g., P14-RS819) within close proximity of the work zones have been conspicuously marked for protection during excavation activities. RSA-014S CMI Work Plan Chapter 4.0		
If needed, monitoring wells are closed in accordance with the AEIRG and Army approved SOPs. No well closures are planned. RSA-014S CMI Work Plan Chapter 4.0		
If needed, replacement monitoring wells are installed in accordance with the AEIRG and Army approved SOPs. No replacement wells are planned. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama

Inspection Type: Field Inspection Checklist
Subject: RSA-014S CMI Work Plan

Descriptor / Requirements	Comments	Results
4.2.10 Stockpile Work Area		
Soil stockpile area(s) are properly lined and constructed per the requirements of the CMI Work Plan, or updated figure provided by APTIM. RSA-014S CMI Work Plan Chapter 4.0		
4.3 Subsurface Removal in Support of Excavation Activities		
Following surveying and staking of the proposed excavation area limits and completion of a surface clearance, a subsurface removal was conducted in accordance with the Single Point Anomaly Excavation Checklist in Attachment H-2. RSA-014S CMI Work Plan Chapter 4.0		
4.4 MEC/MD Disposal		
In accordance with the Explosives Safety Submission (Appendix K) and the Explosives Management Plan (Appendix L), MEC and MD discovered during the corrective measures have been dispositioned. RSA-014S CMI Work Plan Chapter 4.0		
4.5 MEC/MD Records Management		
A detailed accounting of all MEC and MD discovered during the corrective measures has been completed. RSA-014S CMI Work Plan Chapter 4.0		
4.6 Excavation of Contaminated Soil and Confirmation Sampling and Analysis		
UXO team provided continuous observation of the soil as it was excavated to ensure that no items are encountered that could be MEC or MD. Should UXO personnel determine that an item is potentially MEC, all work was stopped and non-UXO personnel cleared from the site while an assessment and determination for its disposal action was made. Once the MEC item was properly removed and/or disposed, the excavation continued. RSA-014S CMI Work Plan Chapter 4.0		
Excavation areas as shown on Figure 4-1 in the CMI work plan extend to the proposed depths of 2 feet bgs as presented in the CMI Work Plan or as required based on soil confirmation samples. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
Excavations over 4 feet in depth are shored, sloped, or benched in accordance with OSHA regulations for excavations (29 CFR Part 1926 Subpart P) prior to any personnel entering the excavation. No benching or sloping is expected due to initial depth of excavation (2 feet). RSA-014S CMI Work Plan Chapter 4.0		
Unless preapproved for direct load prior to disposal at a properly licensed landfill, the excavated material is stockpiled or staged prior to waste characterization sampling and off-site disposal. The excavated material will be staged on impervious material such plastic sheeting and covered with waterproof material (i.e., tarpaulin or 10-mil plastic sheeting). RSA-014S CMI Work Plan Chapter 4.0		
Water will be used during excavation and hauling activities to control fugitive dust, if necessary. RSA-014S CMI Plan Chapter 4.0		
Particulate meters are being used to monitor dust/particulate levels per the CMI Work Plan requirements. RSA-014S CMI Plan Chapter 4.0		
Confirmation samples are collected from each sidewall at a maximum spacing of 50 feet between samples with a minimum of one sample per 50 square feet of sidewall area. For excavations to a depth of 2 feet bgs, five Terra Core samples will be collected from each sidewall and composited in the field (Figure 4-4 in the CMI work plan). If the sidewall length is greater than 50 linear feet, then one composited sample will be collected for every 50 linear feet of sidewall. RSA-014S CMI Plan Chapter 4.0		
Confirmation samples are collected from the floor of the excavation with a minimum of one sample per 2,500 square feet of floor area (maximum floor areas equal to 50- by 50-foot sections). The floor confirmation sample will be a composite of five Terra Core samples (Figure 4-5 in the CMI work plan). RSA-014S CMI Plan Chapter 4.0		
Confirmation samples are collected and submitted for laboratory analysis in accordance with the QAPP provided as Appendix D of the CMI Work Plan or as updated by APTIM. RSA-014S CMI Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
4.7 Waste Characterization		
Stockpile samples represent a maximum of 200 cubic yards of stockpiled soil. RSA-014S CMI Plan Chapter 4.0		
Stockpile samples are collected and submitted for laboratory analysis in accordance with the QAPP provided as Appendix D of the CMI Work Plan or as updated by APTIM. RSA-014S CMI Plan Chapter 4.0		
4.8 RDW/IDW Management		
Remediation-derived waste (RDW)/investigative derived waste (IDW) generated during the CMI activities at RSA-014S is expected to include decontamination fluids and solid materials such as disposable personal protective equipment (PPE). RSA-014S CMI Plan Chapter 4.0		
APTIM personnel are managing waste in accordance with the CMI Work Plan and the site-specific generator knowledge. RSA-014S CMI Plan Chapter 4.0		
IDW is containerized, labeled, and stored in accordance with AAC 335-14 as applicable and as described in the Alabama Environmental Investigation and Remediation Guidance (ADEM, 2017). IDW PPE will be disposed as normal household trash. Other types of IDW, if generated, will be managed in accordance with Table 2 of Appendix G of ADEM (2017). RSA-014S CMI Plan Chapter 4.0		
4.9 Waste Soil Transportation and Disposal		
All soil is transported by a licensed transportation subcontractor. RSA-014S CMI Work Plan Chapter 4.0		
APTIM is documenting the quantities of waste loaded onto the dump trucks and facilitate the Bill of Lading or shipping paper documentation for the non-hazardous waste shipments. Any hazardous waste sent offsite for disposal is on a hazardous waste manifest and has a Land Disposal Restriction notification. Transportation complies with all U.S. Department of Transportation regulations. RSA-014S CMI Work Plan Chapter 4.0		
4.10 Posting of Signage and Initial Inspection of Fencing		
Signs have been posted on the fencing around the site. Fencing and gate locks have been inspected. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
4.11 Site Restoration and Demobilization		
4.11.1 Backfilling and Site Restoration		
Fill material comes from an RSA borrow area or an approved off-site borrow source. Prior to bringing any fill material on-site, APTIM provided analytical data from samples collected from the proposed source to confirm it is acceptable for use as backfill at the sites. This includes at least one 5-point composite samples analyzed for TCL SVOCs, TCL pesticides/PCBs, and TAL metals and one sample analyzed for TCL VOCs from each borrow source, with additional samples being submitted based on changes in material. RSA-014S CMI Work Plan Chapter 4.0		
Fill material is placed and spread in maximum 12-inch loose lifts and compacted prior to placement of the next lift. RSA-014S CMI Work Plan Chapter 4.0		
Topsoil is placed over the affected areas and seeded and mulched to stimulate revegetation per the BMP handbook from the ASWCC (included as Appendix G of the CMI Work Plan). RSA-014S CMI Work Plan Chapter 4.0		
4.11.2 Equipment Decontamination		
An area is designated within the boundary of the work areas at RSA-014S, adjacent to vehicular ingress and egress areas, for equipment decontamination as shown on Figure 4-2 in the CMI work plan. A decontamination pad is constructed consisting of a soil-bermed area covered with multiple layers of plastic sheeting where gross contamination was removed from equipment. The decontamination pad contains a sump area or low area where wash water from pressure washing was pumped into a portable holding tank. Decontamination fluids are sampled for VOCs, perchlorate and explosives. Decontamination fluids are managed as discussed in Section 4.8 of the CMI work plan. Settled soil within the sump is disposed of with the excavated materials. RSA-014S CMI Work Plan Chapter 4.0		
Nondisposable sampling equipment is decontaminated prior to beginning work at the site and prior to the collection of individual samples to prevent cross contamination and maintain the integrity of the environmental samples collected. All sampling equipment and injection equipment will be decontaminated in accordance with procedures specified in the RSA installation-wide quality assurance program plan (HGL, 2019), which was prepared in accordance with Appendix E of the AEIRG (ADEM, 2017). RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama

Inspection Type: Field Inspection Checklist
Subject: RSA-014S CMI Work Plan

Descriptor / Requirements	Comments	Results
4.11.3 Temporary Storm Water, Erosion Control, and Sediment Control Removal		
After vegetation is established, temporary erosion and sediment controls were removed and disposed of off site at the RSA construction debris landfill or with the RDW from the excavation. The silt fence will remain in place until after the vegetation is established. RSA-014S CMI Work Plan Chapter 4.0		
4.11.4 Demobilization		
Personnel, equipment, and subcontractors were demobilized from the project site after completion of remedial activities. RSA-014S CMI Work Plan Chapter 4.0		
4.12 Corrective Measure Implementation Reporting		
Upon completion of the approved CMI, a final report will be prepared and submitted to ADEM in accordance with Section VIII.D of the Permit and AEIRG (ADEM, 2017). The CMI report will include the following: a) A description of activities completed b) As-built construction drawings presenting the final limits of soil excavations at each site and the locations of confirmation samples c) Waste manifests indicating the handling of the excavated material that has been shipped off site to a certified disposal facility d) Monitoring data (soil, air, dust, and water) collected for any reason during the construction period for the purposes of monitoring potential for human and ecological exposure e) Certification, prepared in accordance with AAC 335-13-8-02 (2)(d) by RSA and a registered professional engineer (State of Alabama), that the corrective measures required by the Permit are complete f) Appendices consisting of site photographs, analytical reports, data validation documentation, and waste manifests RSA-014S CMI Work Plan Chapter 4.0		
If completion of the CMI requires more than 180 days, the Army will submit quarterly CMI progress reports in accordance with Section VIII.D.1 of the Permit. RSA-014S CMI Work Plan Chapter 4.0		

Location: Redstone Arsenal, Madison County, Alabama		
Inspection Type: Field Inspection Checklist **Subject:** RSA-014S CMI Work Plan		
Descriptor / Requirements	**Comments**	**Results**
4.13 Land-Use Controls		
Upon completion of the corrective measures at RSA-014S, a draft NEUR will be prepared and included in the CMI report for ADEM review and comment or approval. RSA-014S CMI Work Plan Chapter 4.0		
4.14 Implementation of Land-Use Controls and 4.15 Ongoing Obligations and Responsibilities		
Army will obtain a survey plat for the LUC boundary and follow up with annual sign and fence inspections and reporting in accordance with the NEUR. RSA-014S CMI Work Plan Chapter 4.0		

Results:
S = Satisfactory
I = Incomplete at the time of audit or surveillance. To be verified at a later date
O = Observation
F = Finding
NA = Not Applicable

Comments:_____

QA Manager:_____ **Date:**_____

ATTACHMENT H-2

SURFACE CLEARANCE AND SINGLE POINT ANOMALY EXCAVATION CHECKLISTS

Surface Clearance Checklist

	Contract No: W912DY-17-D-0004 **EPA No.:** **Site** _____ **Work Phase** _____	**Reference Documents:** 1) Corrective Measures Implementation Plan for RSA-014S 2) Installation-Wide Quality Assurance Program Plan (IW QAPP) 3) DDESB TP-18 4) Equipment Operations Manuals
Installation: Redstone Arsenal, Madison County, AL **Subcontractor:** _____		**Reference No.(s):** _____
Inspection Type (Circle one): Preparatory/Initial/Follow Up **Definable Feature of Work (DFOW):** Surface Clearance		**Inspection Date:** _____ **Location:** _____

Quality Control Inspection Checklist

This checklist provides a method whereby the inspector can evaluate the performance of contractor or subcontractor personnel as they perform the specified Definable Feature of Work (DFOW). The inspector should refer to the controlling documents as well as documentation provided by the contractor or subcontractor personnel.	**Pass**	**Fail**	**N/A**	**Comments**
Are the required minimum personnel and equipment present?				
Are there no more than the maximum permitted personnel present?				
Are the required personnel familiar with their required duties?				
Do the required personnel meet the minimum qualifications?				
Is the survey equipment suitable for the planned task, and has it been subjected to the specified operational checks?				
Is the required documentation present in the specified location?				

Surface Clearance Checklist

Surface Clearance Coverage: Surface clearance covers correct location. Daily Logs indicate that 100% of the accessible portion of the area specified within the work plan has been subjected to the survey.				
Surface Clearance Non-MEC Metal Removal: No surface metal exceeding 4-inch by 4-inch is left behind.				
Surface Clearance Marking: Although not expected, any MEC are marked appropriately.				
Surface Clearance MEC Records: Although not expected, any MEC encountered has been recorded in accordance with the instructions in the work plan.				
Surface Clearance Line Spacing: For full-coverage, persons conducting the survey should be spaced no more than 5 feet laterally in sweep lanes.				
Surface Clearance Area Verification: The surface clearance team will first identify and confirm they are in the specific pre- assigned area. One boundary will be marked with flagging or nonmetallic pin flags to guide the survey line as surface clearance personnel traverse the grid.				
Surface Clearance Geophysical Noise Minimization: All personnel performing data collection are free of any items which could interfere with data collection (keys, steel-toed safety shoes, etc.). All items which could affect data collection or quality have been documented and mitigated as much as possible (physical obstacles, man-made features with interference potential, dynamic events [weather, solar flares, etc.]).				
Surface Clearance Site Preparation: Appropriate transects and or grids have been established and documented at all areas to be surveyed.				
Surface Clearance Quality Verification: No less than 10% of the area subjected to the surface clearance per day will be resurveyed by the UXOQCS. If any failure-size metal, MEC, or MD is discovered, the entire grid subjected to the survey must be resurveyed and re inspected. Results of the 10% inspections are recorded in the site logs.				

Surface Clearance Checklist

All required 4-inch by 4-inch steel plates are located by surface clearance teams and returned to the responsible individual.				

Inspection Results: ☐ **Pass** ☐ **Fail** ☐ **Pending (Explain Below)**

Note: A failure in any portion of this inspection that cannot be corrected on the spot or that may require a portion of the work to be performed again will result in a failing mark for the entire inspection.

Comments:_____

_____

_____

Inspector Signature: _____ **Date:** _____

UXOQCS Signature: _____ **Date:** _____

Attachments:

Single Point Anomaly Excavation Checklist

Contract No: W912DY-17-D-000**4** **EPA No.:** **Site** _____ **Work Phase** _____	**Reference Documents:** 1) Corrective Measures Implementation Plan for RSA-014S 2) Installation-Wide Quality Assurance Program Plan (IW QAPP) 3) DDESB TP-18 4) Equipment Operations Manuals
Installation: Redstone Arsenal, Madison County, AL **Subcontractor:** _____	**Reference No.(s):** _____
Inspection Type (Circle one): Preparatory/Initial/Follow Up **Definable Feature of Work (DFOW):** Single Point Anomaly Excavation	**Inspection Date:** _____ **Location:** _____

Quality Control Inspection Checklist

This checklist provides a method whereby the inspector can evaluate the performance of contractor or subcontractor personnel as they perform the specified Definable Feature of Work (DFOW). The inspector should refer to the controlling documents as well as documentation provided by the contractor or subcontractor personnel.	**Pass**	**Fail**	**N/A**	**Comments**
Are the required minimum personnel and equipment present?				
Are there no more than the maximum permitted personnel present?				
Are the required personnel familiar with their required duties?				
Do the required personnel meet the minimum qualifications?				
Is the equipment suitable for the planned task, and has it been subjected to the specified operational checks?				
Is the required documentation present in the specified location?				

Single Point Anomaly Excavation Checklist

Single Point Anomaly Excavation Locations: The interpreted locations must be marked by an Alabama PLS or an experienced GPS operator.				
Single Point Anomaly Excavation Reacquisition: Reacquire EM61-MK2 value reasonably close in value to dig list. Typically reacquire is higher than dig list, however small deviations lower is also acceptable.				
Single Point Anomaly Excavation: 100% of all anomalies have been excavated.				
Single Point Anomaly Excavation Source Removal: 100% of all anomalies have anomaly source item excavated (post-excavation check indicates signal is less than that agreed to in the Instrument Verification Strip Report).				
Single Point Anomaly Excavation Documentation: The anomaly excavation must be documented per the data logger requirements.				
Single Point Anomaly Excavation Discreate Soil Sampling: One discrete soil sample is taken from the soil immediately below all anomalies identified as MEC or unknown liquid filled.				
Single Point Anomaly Excavation Backfill: Excavations must be backfilled to grade with either excavated soil (if it is not contaminated with CA) or known clean fill. If excavation site was previously vegetated, backfill will have excavated sod replaced or be seeded with grass				

Inspection Results: ☐ **Pass** ☐ **Fail** ☐ **Pending (Explain Below)**

Note: A failure in any portion of this inspection that cannot be corrected on the spot or that may require a portion of the work to be performed again will result in a failing mark for the entire inspection.

Single Point Anomaly Excavation Checklist

Comments:_____

_____

_____

Inspector Signature: _____ **Date:** _____

UXOQCS Signature: _____ **Date:** _____

Attachments:

APPENDIX I

LAND-USE CONTROLS

Appendix I

Land-Use Controls
RSA-014S, Unlined Inactive Burn Trenches, Unit #2
Operable Unit 14
U.S. Army Garrison-Redstone
Madison County, Alabama
EPA ID No. AL7 210 020 742

Prepared for:

U.S. Army Engineering & Support Center, Huntsville
5021 Bradford Drive East
Huntsville, Alabama 35805

Prepared by:

Aptim Federal Services, LLC
11400 Parkside Drive, Suite 400
Knoxville, TN 37934

Contract No. W912DY-17-D-0003
Delivery Order No. W912DY19F1116
APTIM Project No. 501388

March 2022

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I1.0 Introduction

The U.S. Army Garrison–Redstone is completing studies of the environmental impact of known or suspected waste sites at Redstone Arsenal (RSA), Madison County, Alabama, under the management of the U.S. Army Environmental Command. Land-use controls (LUC) are required for RSA-014S, Unlined Inactive Burn Trenches, Unit #2, Operable Unit 14 since the site will not be returned to unrestricted use following implementation of the corrective measures. A Notice of Environmental Use Restriction (NEUR) will be prepared for RSA-014S in accordance with Alabama Administrative Code (AAC) r. 335-5-1 and RSA's Alabama Hazardous Wastes Management and Minimization Act Permit (Alabama Department of Environmental Management [ADEM], 2021). The draft NEUR will be provided in the RSA-014S corrective measures implementation (CMI) completion report and finalized based on comments provided by ADEM. Upon ADEM approval of the CMI completion report, the NEUR will be filed with ADEM, incorporated in the RSA Installation Master Plan, and recorded into applicable land records with Madison County as required by AAC r. 335-5-1.02(3)(a)(1)(iv) (ADEM, 2019). If the property is transferred to an owner that is not the federal government, an Environmental Covenant will be executed and filed in accordance with AAC r. 335-5-1-.02(3)(a)(1)(i) and (iii) (ADEM, 2019).

The remainder of this document provides descriptions of site background; the need for and nature of corrective measures; the need for an NEUR; the use restrictions; and ongoing obligations and responsibility for inspections, repairs, monitoring, and notices.

I2.0 Site Background

I2.1 Site History and Conditions

RSA-014S is located in the southwestern portion of RSA and overlies the RSA-151 groundwater unit (Figure 1-1 in the CMI work plan). The site is located east of Blueberry Road, southwest of an embayment of the Tennessee River, and just east of the active open burn (OB)/open detonation (OD) area (Figure 1-1 in the CMI work plan).

The RSA-014S parcel consists of two former burn trenches (Figure 1-3 in the CMI work plan)., The unlined trenches were approximately 150 to 200 feet long, 35 feet wide, and 6 to 12 feet deep. During their use from the mid-1950s to 1991, the packaging and pallets used to ship munitions and contaminated metals were burned and disposed in the two trenches (the metals reportedly were recovered for recycling). Some of the ash, residue, and metal debris from the burn pads at the nearby RSA-013 site were disposed at the RSA-014S trenches. Additionally, unsanctioned burning and disposal of propellant-contaminated solvents and explosives from

Thiokol Corporation's manufacturing and production areas occurred in the trenches until 1984. All burning and disposal activities ceased after 1991, and the trenches were filled and covered with clean fill.

The northeastern portion of RSA-014S lies within the 100-year floodplain, but no water bodies or wetlands are located within the parcel. RSA-014S is approximately 60 percent mixed deciduous/coniferous forest and 40 percent open grassland, with the grasslands located mostly in the central and western portions of the site. No buildings are present within the site boundary.

I2.2 Summary of Need for Action

The RSA-014 Resource Conservation and Recovery Act facility investigation (RFI) defined the nature and extent of contamination and evaluated potential risks to current and future receptors and concluded that corrective measures are required to attain site closure as follows:

- Exposure to soil alone within three areas at RSA-014S poses unacceptable risks to potential current and future construction workers due to ingestion of soil and potential inhalation of trichloroethene concentrations in ambient air volatilized from soil in a future construction area.
- Numerous chemicals of concern present in groundwater as commingled plumes under the site pose unacceptable risks and will be addressed separately by the RSA-151 corrective measures.
- RSA-014S has a Moderate/High unexploded ordnance (UXO) probability due to the potential for munitions and explosives of concern (MEC). A MEC investigation has not been conducted at this site, and anomaly avoidance was performed for all intrusive activities during the RFI. Action is needed to protect current and future site receptors from risks with potential MEC.

I2.3 Corrective Measures Activities

The CMI Work Plan for RSA-014S describes the correct measures necessary to support the removal of contaminated soil that pose unacceptable risk to the construction worker and LUCs for potential MEC at the site.

I2.4 Reason for the Land-Use Controls

The corrective measures planned for trichloroethene-contaminated soil at RSA-014S will restore the surface media to conditions suitable for unrestricted construction activities and thus, no hazardous or toxic waste would prevent unrestricted use by all current and future receptors. However, the potential for MEC due to the Moderate/High UXO probability will not allow the site to meet unrestricted access conditions in accordance with AAC r. 335-5 (ADEM, 2019). Therefore, LUCs will be implemented for the potential presence of MEC. Figure 4-6 of the CMI

work plan shows the proposed LUC boundary and signs around the existing site fence for RSA-014S.

Following the soil excavation at RSA-014S, one site hazard remains: residual risks from the potential presence of MEC. The NEUR will require site controls for on-site UXO construction support for potential MEC that may be present within the two site trenches, trench kickout during former burning and disposal operations, or ejection during OB/OD activities since a portion of the site resides within the OB/OD safety arc.

Survey plats indicating the locations and dimensions of the LUC area at RSA-014S will be prepared in accordance with AAC r. 335-5. The survey plats will be prepared and certified by a licensed surveyor in the state of Alabama and included with the NEUR. The survey plat will be submitted to the local authority with jurisdiction over local land use and to ADEM as part of the final NEUR. The survey plat will be maintained until such time that the Army can demonstrate with ADEM's approval that levels of hazardous constituents within the contaminated media are within appropriate limits for unrestricted use.

I3.0 Use Restrictions

The LUCs for RSA-014S are as follows:

- Site restrictions include a requirement for on-site UXO construction support for all site access and intrusive activities within the LUC boundary shown on Figure 4-6 in the CMI work plan and site use must remain industrial.
- Annual inspections to ensure 1) the signs remain present and legible, 2) fencing remains in good repair, 3) access and intrusive activities within the site are conducted with appropriate approvals and safety controls (e.g., on-site UXO construction support), and 4) undocumented activities inconsistent with the LUCs are not occurring at the site.

I4.0 Ongoing Obligations and Responsibilities

I4.1 Inspections and Repairs

The following inspections will continue to be conducted on an annual basis:

- Inspection of the warning signs and fencing surrounding the LUC boundary will ensure that the signs are still present and legible and that the fencing is still in tact around the site. If repairs or replacements are needed, they must be initiated within 10 days of identifying the need for repair/replacement.
- Inspections to identify undocumented activities inconsistent with the LUCs are not occurring at the site.

- Inspection for any changes in use or construction inconsistent with the restrictions included in Section I3.0. If inconsistent use or construction activities have been identified, ADEM shall be notified within 10 days.

If uses inconsistent with the required LUCs for RSA-014S are identified, ADEM will be notified within 10 days after such uses are identified.

I4.2 Reporting

An annual monitoring report will be submitted to ADEM, either as a separate report or as part of another report for the site or combined with other site annual monitoring reports submitted to ADEM. This report documents the inspections and maintenance of signage and site conditions and use changes. It also provides a discussion of any maintenance activities conducted, verifies the status of the LUCs, and documents how any deficiencies or inconsistent uses have been addressed. The annual evaluation addresses whether the use restrictions and controls referenced previously were communicated in the deed(s), the owners and state and local agencies were notified of the use restrictions and controls affecting the property, and use of the property has conformed with such restrictions and controls. The report includes copies of the inspection forms, any violations noted and procedures followed to address the violations, and recommendations for any changes to the LUCs identified in the NEUR.

I4.3 Notices

Notice regarding any observed changes in use, identified proposed changes in use, applications for building permits, or proposals for any site work inconsistent with the NEUR will be provided to ADEM as part of the annual monitoring report. RSA shall notify ADEM in advance of the proposed closing on any sale or other conveyance of any interest in any or all of the Property, in accordance with Alabama Administrative Code Rule 335-5-1-.02(3) (ADEM, 2019).

I5.0 References

Alabama Department of Environmental Management (ADEM), 2021, ***Redstone Arsenal's Alabama Hazardous Wastes Management and Minimization Act Hazardous Waste Storage Facility, Thermal Treatment, Solid Waste Management Unit Corrective Action Permit,*** July 19.

Alabama Department of Environmental Management (ADEM), 2019, ***Alabama Department of Environmental Management Land Divisions - Uniform Environmental Covenants Program Administrative Code, Chapter 335-5-1***, Amended August 20, 2019, effective October 4, 2019.

APPENDIX J

MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL TABLES

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J1.0 Munitions Response Site Prioritization Protocol Summary

The Munitions Response Site Prioritization Protocol (MRSPP) (32 *Code of Federal Regulations* 179) is a methodology developed by the U.S. Department of Defense (DoD) to assess the relative risks and assign a relative priority to Munitions Response Sites (DoD, 2007). The MRSPP uses three modules to evaluate hazards associated with the site:

1. The Explosive Hazard Evaluation (EHE) module – This module evaluates the hazards associated with munitions and explosives of concern (MEC) (including unexploded ordnance, discarded military munitions, and munitions constituents [MC] at high enough concentrations to pose an explosive hazard).

2. The Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE) module – This module addresses CWM and associated hazards.

3. Health Hazard Evaluation (HHE) module – This module examines risks associated with human and ecological exposures to MC and other contaminants that may be present at the site.

Sections J1.1 through J1.3 explain each module as it relates to RSA-014S, including assumptions used to complete the protocol. Section J1.4 presents the overall MRS priority assigned to RSA-014S. The completed MRSPP tables for the RSA-014S Corrective Measures Implementation (CMI) Work Plan are provided in Attachment J-1.

J1.1 Explosive Hazard Evaluation Module Results

The EHE module consists of a series of nine tables that are scored for various elements related to the type of site, presence and location of MEC, accessibility and ownership of the site, local population, land use, and ecological and cultural resources. The tenth table presents the overall EHE module rating. Each rating is given as a letter, with "A" being the highest rating (highest priority) and "G" being the lowest rating (lowest priority). An alternative module rating may be assigned when a module letter rating is inappropriate. Alternative module ratings include Evaluation Pending, No Longer Required, or No Known or Suspected Explosive Hazard.

Based on the potential for MEC at the MRS with its location on two ranges, the site's location within the safety arc for the OB/OD unit, presence of two disposal trenches, and UXO probability rating of "Moderate/High," the EHE module rating was determined to be "E."

J1.2 Chemical Warfare Materiel Hazard Evaluation Module Results

The CHE module is very similar to the EHE module and also consists of a series of nine tables that are scored for various elements related to the type of site, presence and location of CWM, accessibility and ownership of the site, local population, land use, and ecological and cultural resources. The tenth table presents the overall CHE module rating. Each rating is given a letter, with "A" being the highest rating (highest priority) and "G" being the lowest rating (lowest priority). An alternative module rating may be assigned when a module letter rating is inappropriate. Alternative module ratings include Evaluation Pending, No Longer Required, or No Known or Suspected CWM Hazard.

There is suspected historical evidence of CWM at the site, and the site characterization results found low concentrations of short half-life mustard breakdown products in groundwater. The site has an assigned "Seldom" CWM probability. The CHE module rating was "F."

J1.3 Health Hazard Evaluation Module Results

The HHE module evaluates the hazards, accessibility, and receptors at the site. Unlike the EHE and CHE, the HHE addresses site media individually (e.g., soil, surface water, and sediment) whereby a high (H), medium (M), or low (L) value can be assigned for each factor in each medium. This process results in a three-letter code for each site media evaluated. The "highest" combination of letters is reported in Table 28 of the MRSPP package (Attachment J-1) of the protocol providing an overall module rating for the HHE. An alternative module rating may be assigned when a module letter rating is inappropriate. Alternative module ratings include Evaluation Pending, No Longer Required, or No Known or Suspected MC Hazard.

Based upon the presence of numerous chemicals in groundwater at concentrations exceeding the Army's human health risk criteria, the contaminant hazard factor recorded on Table 21 of the MRSPP package (Attachment J-1) was "High." The contaminant hazard factor for surface soil recorded on Table 26 was "Medium." Combined with a potential for pathway migration and potential receptors to the contaminants, the media rating for groundwater and surface soil was "B" and "D," respectively. The HHE module rating was "B."

J1.4 Overall Munitions Response Site Prioritization Protocol Priority

The overall MRS priority is determined by comparing the module ratings from Tables 10, 20, and 28, on Table 29 of the MRSPP package (Attachment J-1). The overall MRS priority is the single highest rating of the three modules, with the highest priority equal to 1 and the lowest priority equal to 8. For RSA-014S, the overall MRS priority assigned through the protocol is "3." The ratings for each module and the overall priority rating for RSA-014S are summarized as follows:

- EHE Module Rating: E
- CHE Module Rating: F
- HHE Module Rating: B
- MRS Priority: 3

J2.0 References

U.S. Department of Defense (DoD), 2007, ***Munitions Response Site Prioritization Protocol Primer***, April.

ATTACHMENT J-1

MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL TABLES

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: MRS – RSA-014S

Component: Army

Installation/Property Name: Redstone Arsenal

Location (City, County, State): Redstone Arsenal, Madison, AL

Site Name/Project Name (Project No.): RSA-014, Unlined Inactive Burn Trenches, Unit #2

Date Information Entered/Updated: 08/12/2020

Point of Contact (Name/Phone): Robert Gorman, (256) 348-1812

Project Phase (check only one):

❑ PA	❑ SI	❑ RI	❑ FS	✓ CMI
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

✓Groundwater	❑ Sediment (human receptor)
✓Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

RSA-014S, occupies approximately 9.8 acres in the southern portion of Redstone Arsenal. Disposal and burning operations at the two trenches at RSA-014S occurred from the mid-1950s until 1991. Known materials/wastes disposed in the trenches included packaging and pallets used to ship munitions, contaminated metals, ash and debris from the adjacent RSA-013 burn pads, and propellant-contaminated solvents and explosives from Thiokol's rocket motor research and development operations. Based on the historical use of the onsite trenches and that munitions debris (MD) have been found within the site (e.g., practice training grenades in the eastern part of the site and a 4.2" mortar next to the road in the NW corner of the site) it is suspected that MEC may be present within the trench areas of RSA-014S. However, a MEC investigation/clearance has not been performed at this site (in the trenches or within the site boundary), The trenches are adjacent to sites where munitions were stored or disposed (RSA-066 and RSA-110). In addition, RSA-014S lies within two ranges R0701 Light Maneuver Area and R0702 OB/OD and the OB/OD safety arc. RSA-014S has an assigned Moderate/High UXO probability.

RSA-014S lies within the former boundary of the Gulf Chemical Warfare Depot (GCWD) which operated in the 1940s to 1950s. Bulk drums of chemical agent were stored at toxic gas yards northeast of RSA-014 (RSA-065, RSA-067, RSA-069). It is unknown if RSA-014S may have staged drums of agent as they were brought to the loading dock for shipment off post. Historical aerial photographs from the 1940s to early 1950s show cleared areas and roads through the site. Mustard, lewisite, and agent breakdown products (ABPs) have not been detected in RSA-014S soil, but ABPs

have been detected in groundwater under the site near the trenches and in the northern portion of RSA-014S. RSA-014S has an assigned CWM probability of Seldom.

Description of Pathways for Human and Ecological Receptors:

A potentially complete exposure pathway exists for MEC in the RSA-014S trenches. Potentially complete pathways for site workers and hypothetical future residential exposures to groundwater also exist. All other MC pathways are incomplete.

Summary information obtained from RSA-014 RFI (CB&I, 2017). Human and ecological receptor information obtained from Appendices D & E of the RFI.

Description of Receptors (Human and Ecological):

Human receptors include site workers, recreational users, and hypothetical future residents. Ecological receptors (mainly terrestrial) are potentially present.

Summary information obtained from RSA-014 RFI (CB&I, 2017). Human and ecological receptor information obtained from RSA-014 RFI Appendices D & E (CB&I, 2017).

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	• UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). • Hand grenades containing energetic filler. • Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	• UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." • DMM containing a high-explosive filler that have: ▮ Been damaged by burning or detonation ▮ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	• UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). • DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▮ Been damaged by burning or detonation ▮ Deteriorated to the point of instability.	20
High explosive (unused)	• DMM containing a high-explosive filler that: ▮ Have not been damaged by burning or detonation ▮ Are not deteriorated to the point of instability.	15
Propellant	• UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). • DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▮ Damaged by burning or detonation ▮ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	• DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). • DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	• DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▮ Have not been damaged by burning or detonation ▮ Are not deteriorated to the point of instability.	10
Practice	• UXO that are practice munitions that are not associated with a sensitive fuze. • DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▮ Been damaged by burning or detonation ▮ Deteriorated to the point of instability.	5
Riot control	• UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	• Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	• Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	15

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

RSA-014S lies within two ranges R0701 Light Maneuver Area and R0702 OB/OD and the OB/OD safety arc. Two trenches were used to burn and dispose of packaging and pallets used to ship munitions, contaminated metals, ash and debris from the adjacent RSA-013 burn pads, and propellant-contaminated solvents and explosives from Thiokol's rocket motor research and development operations. The site also lies within the boundary of the former Gulf Chemical Warfare Depot and is located southwest of former toxic gas yards (e.g., RSA-065, RSA-067, RSA-069) for bulk storage of chemical agents and west of RSA-110 used to stage ordnance (e.g., Dragon rocket motors) in the 1940s to 1950s. It is suspected that MEC may potentially be present at RSA-014S based on historical information range information and adjacent historical activities; however, a MEC investigation has not been conducted within the trenches or elsewhere with the site boundary.

Sources: RSA-014 RFI Report (CB&I, 2017) and RSA-014S CMIP (APTIM, 2022)

Table 2
EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.
Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	• The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	• The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	• The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	• The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	• The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	• The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	• The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	• The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	• The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	• The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	• Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	10

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

RSA-014S lies within two ranges R0701 Light Maneuver Area and R0702 OB/OD and the OB/OD safety arc. Two trenches were used to burn and dispose of packaging and pallets used to ship munitions, contaminated metals, ash and debris from the adjacent RSA-013 burn pads, and propellant-contaminated solvents and explosives from Thiokol's rocket motor research and development operations.

Sources: RSA-014 RFI Report (CB&I, 2017) and RSA-014S CMIP (APTIM, 2022)

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	• Physical evidence indicates that there are UXO or DMM on the surface of the MRS. • Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	• Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. • Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	• Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. • Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	• There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	• There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	• There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	• The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	• Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	10

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

It is suspected that MEC may potentially be present at RSA-014S based on historical and physical information. Several munition debris items were found at the site during the RFI (e.g., practice training grenades in the eastern portion of the site, 4.2" mortar next to the road in the northwest portion of the site). However, a MEC investigation has not been conducted within the trenches or elsewhere with the site boundary. The trenches are adjacent to sites where munitions were stored or disposed (RSA-066 and RSA-110). In addition, RSA-014S lies within two ranges R0701 Light Maneuver Area and R0702 OB/OD and the OB/OD safety arc. RSA-014S has an assigned Moderate/High UXO probability.

Sources: RSA-014 RFI Report (CB&I, 2017) and RSA-014S CMIP (APTIM, 2022)

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	5

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

RSA-014S is located on RSA and is therefore surrounded by the installation fence. In addition, the RSA-014S site boundary is fenced with 6-foot-high chain-link fencing with three-strand barbed wire along the top and two lockable access gates (RSA-014S CMIP [APTIM, 2022]). At RSA, unmanaged exposure to Installation Restoration Program sites is prevented by RSA's Site Access Control Program (U.S. Army Garrison-Redstone, 2012).

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	5
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **<u>the single highest score</u>** from above in the box to the right (maximum score = 5).	0

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

RSA is an active DoD-controlled Army installation.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	5
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	1

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

Density per square mile for a two-mile radius is 14.5 people per square mile.
Source: Table D-18 in RSA's permit renewal application using U.S. Department of Commerce (2010 Census).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundaryof the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	5

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

RSA-014S is located in the southern portion of RSA. Many occupied buildings and support facilities are located west of RSA-014S. See Figure D-17 in RSA's permit renewal application that illustrates the wide range of activities/structures within two miles of RSA-014S.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	• There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	5

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

According to the Installation Master Plan, land use surrounding RSA-014 is designated as Industrial Zone. RSA-014 is located in a Land Use District which is classified as the Buxton Road (S/W of Patton Road) in the southern portion of RSA. The primary missions include explosive operations and storage, range operations, and test areas (Army, 2013). See Figure D-17 in RSA's permit renewal application that illustrates the wide range of activities/structures within two miles of RSA-014S.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	3

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

Ecological resources- See Appendix E of RSA-014 RFI report (CB&I, 2017)

Cultural resources - See Table 3-1 of 2017 CMS report (APTIM, 2017, ***Final Focused Corrective Measures Study Report, RSA-014, Unlined Inactive Burn Trenches Unit #2, Operable Unit 14, U.S. Army Garrison-Redstone, Madison County***, Alabama, November)

Table 10
Determining the EHE Module Rating

DIRECTIONS:

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

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

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	15	25
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	10	15
Ease of Access	Table 4	5	
Status of Property	Table 5	0	
Receptor Factor Data Elements			
Population Density	Table 6	1	14
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	3	
EHE MODULE TOTAL			54

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

Table 11
CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.
Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: • CWM that are UXO (i.e., CWM/UXO) • Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	• The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	• The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: • Nonexplosively configured CWM/DMM either damaged or undamaged • Bulk CWM (e.g., ton container).	15
CAIS K941 and CAIS K942	• The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	• CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	• Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	15

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

RSA-014S lies within the boundary of the former Gulf Chemical Warfare Depot and lies southwest of former toxic gas yards (e.g., RSA-065, RSA-067, RSA-069) for bulk storage of chemical agents and west of RSA-110 used to stage ordnance (e.g., Dragon rocket motors) in the 1940s to 1950s. Staging of bulk CWM or disposal of ton containers with residual CWM have not been documented at this site but aerial photographs from the 1940s-1950s show cleared areas and roads through the site and short-half-life mustard breakdown products have been detected in groundwater from monitoring wells located near the trenches and on the north side of the site. The site has a "Seldom" CWM probability rating. CWM and agent breakdown products have not been detected in soil samples collected at the site.

Sources: RSA-014 RFI Report (CB&I, 2017) and RSA-014S CMIP (APTIM, 2022)

Table 12
CHE Module: Sources of CWM Data Element Table

DIRECTIONS: Below are 11 sources of CWM hazards and their descriptions. Review these classifications and circle the scores that correspond with **all** the sources of CWM hazards known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, CAIS/DMM, surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Live-fire involving CWM	• The MRS is a former military range that supported live-fire of explosively configured CWM and the CWM/UXO are known or suspected of being present on the surface or in the subsurface. • The MRS is a former military range that supported live-fire with conventional munitions, and CWM/DMM are on the surface or in the subsurface commingled with conventional munitions that are UXO.	10
Damaged CWM/DMM surface or subsurface	• There are damaged CWM/DMM on the surface or in the subsurface at the MRS.	10
Undamaged CWM/DMM surface	• There are undamaged CWM/DMM on the surface at the MRS.	10
CAIS/DMM surface	• There are CAIS/DMM on the surface.	10
Undamaged CWM/DMM, subsurface	• There are undamaged CWM/DMM in the subsurface at the MRS.	5
CAIS/DMM subsurface	• There are CAIS/DMM in the subsurface at the MRS.	5
Former CA or CWM Production Facilities	• The MRS is a facility that formerly engaged in production of CA or CWM, and CWM/DMM is suspected of being present on the surface or in the subsurface.	3
Former Research, Development, Testing, and Evaluation (RDT&E) facility using CWM	• The MRS is at a facility that formerly was involved in non-live-fire RDT&E activities (including static testing) involving CWM, and there are CWM/DMM suspected of being present on the surface or in the subsurface.	3
Former Training Facility using CWM or CAIS	• The MRS is a location that formerly was involved in training activities involving CWM and/or CAIS (e.g., training in recognition of CWM, decontamination training) and CWM/DMM or CAIS/DMM are suspected of being present on the surface or in the subsurface.	2
Former Storage or Transfer points of CWM	• The MRS is a former storage facility or transfer point (e.g., intermodal transfer) for CWM.	1
Evidence of no CWM	• Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	0
SOURCES OF CWM	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	1

DIRECTIONS: Document any MRS-specific data used in selecting the ***Sources of CWM*** classifications in the space provided.

RSA-014S lies within the boundary of the former Gulf Chemical Warfare Depot and lies southwest of former toxic gas yards (e.g., RSA-065, RSA-067, RSA-069) for bulk storage of chemical agents and west of RSA-110 used to stage ordnance (e.g., Dragon rocket motors) in the 1940s to 1950s. Staging of bulk CWM or disposal of ton containers with residual CWM has not been documented at this site but aerial photographs from the 1940s-1950s show cleared areas and roads through the site and short-half-life mustard breakdown products have been detected in groundwater from monitoring wells located near the trenches and on the north side of the site. The site has a “Seldom” CWM probability rating. CWM and agent breakdown products have not been detected in soil samples collected at the site.

Sources: RSA-014 RFI Report (CB&I, 2017) and RSA-014S CMIP (APTIM, 2022)

Table 13

CHE Module: Location of CWM Data Element Table

DIRECTIONS: Below are seven classifications of CWM locations and their descriptions. Review these locations and circle the scores that correspond with **all** the locations where CWM are known or suspected of being found at the MRS.

Note: The terms *confirmed, surface, subsurface, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	• Physical evidence indicates that there are CWM on the surface of the MRS. • Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report, that an incident or accident that involved CWM, regardless of configuration, occurred) indicates there are CWM on the surface of the MRS.	25
Confirmed subsurface, active	• Physical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are likely to cause CWM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose CWM. • Historical evidence indicates that CWM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause CWM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose CWM.	20
Confirmed subsurface, stable	• Physical evidence indicates the presence of CWM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause CWM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause CWM to be exposed. • Historical evidence indicates that CWM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause CWM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause CWM to be exposed.	15
Suspected (physical evidence)	• There is physical evidence, other than the documented presence of CWM, indicating that CWM may be present at the MRS.	10
Suspected (historical evidence)	• There is historical evidence indicating that CWM may be present at the MRS.	5
Subsurface, physical constraint	• There is physical or historical evidence indicating that CWM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the CWM.	2
Evidence of no CWM	• Following investigation of the MRS, there is physical evidence that there is no CWM present or there is historical evidence indicating that no CWM are present.	0
LOCATION OF CWM	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	10

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of CWM*** classifications in the space provided.

RSA-014S lies within the boundary of the former Gulf Chemical Warfare Depot and lies southwest of former toxic gas yards (e.g., RSA-065, RSA-067, RSA-069) for bulk storage of chemical agents and west of RSA-110 used to stage ordnance (e.g., Dragon rocket motors) in the 1940s to 1950s. Staging of bulk CWM or disposal of ton containers with residual CWM has not been documented at this site but aerial photographs from the 1940s-1950s show cleared areas and roads through the site and short-half-life mustard breakdown products have been detected in groundwater from monitoring wells located near the trenches and on the north side of the site. The site has a "Seldom" CWM probability rating. CWM and agent breakdown products have not been detected in soil samples collected at the site.

Sources: RSA-014 RFI Report (CB&I, 2017) and RSA-014S CMIP (APTIM, 2022)

Table 14
CHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.
Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	5

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

RSA-014S is located on RSA and is therefore surrounded by the installation fence. In addition, the RSA-014S site boundary is fenced with 6-foot-high chain-link fencing with three-strand barbed wire along the top and two lockable access gates (RSA-014S CMIP [APTIM, 2022]). At RSA, unmanaged exposure to Installation Restoration Program sites is prevented by RSA's Site Access Control Program (U.S. Army Garrison-Redstone, 2012).

Table 15

CHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	5
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD controls access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	0

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

RSA is an active DoD-controlled Army installation.

Table 16
CHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	5
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	1

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

Density per square mile for a two-mile radius is 14.5 people per square mile.
Source: Table D-18 in RSA's permit renewal application using U.S. Department of Commerce (2010 Census).

Table 17

CHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	5
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	5

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

RSA-014S is located in the southern portion of RSA. Many occupied buildings and support facilities are located west of RSA-014S. See Figure D-17 in RSA's permit renewal application that illustrates the wide range of activities/structures within two miles of RSA-014S.

Table 18

CHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structures classifications at the MRS.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	5
Parks and recreational areas	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	4
Agricultural, forestry	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	• Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	• There are no known of recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	5

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

According to the Installation Master Plan, land use surrounding RSA-014 is designated as Industrial Zone. RSA-014 is located in a Land Use District which is classified as the Buxton Road (S/W of Patton Road) in the southern portion of RSA. The primary missions include explosive operations and storage, range operations, and test areas (Army, 2013). See Figure D-17 in RSA's permit renewal application that illustrates the wide range of activities/structures within two miles of RSA-014S.

Table 19

CHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	3

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

Ecological resources- See Appendix E of RSA-014 RFI report (CB&I, 2017)

Cultural resources - See Table 3-1 of 2017 CMS report (APTIM, 2017, ***Final Focused Corrective Measures Study Report, RSA-014, Unlined Inactive Burn Trenches Unit #2, Operable Unit 14, U.S. Army Garrison-Redstone, Madison County***, Alabama, November)

Table 20
Determining the CHE Module Rating

DIRECTIONS:

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

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

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	15	16
Sources of CWM	Table 12	1	
Accessibility Factor Data Elements			
Location of CWM	Table 13	10	15
Ease of Access	Table 14	5	
Status of Property	Table 15	0	
Receptor Factor Data Elements			
Population Density	Table 16	1	14
Population Near Hazard	Table 17	5	
Types of Activities/Structures	Table 18	5	
Ecological and/or Cultural Resources	Table 19	3	
CHE MODULE TOTAL			45

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

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
See Table 21 Worksheet on the following pages.			
CHF Scale	**CHF Value**	**Sum The Ratios**	2760
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		H

Migratory Pathway Factor

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

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

Receptor Factor

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

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

No Known or Suspected Groundwater MC Hazard ☐

Table 21 Worksheet
HHE Module: Groundwater Data Element Table
Contaminant Hazard Factor (CHF)

Analyte	Note	CAS Number	Maximum Concentration (µg/L)	Water (ug/L)	Qualifier	Ratio
Trichloroethene (TCE)	j	79-01-6	221000	1.40E+02	ca	1.58E+03
Tetrachloroethylene (PCE)		127-18-4	8090	1.00E+01	ca	8.09E+02
Vinyl chloride (child/adult)	l	75-01-4	260	1.50E+00	ca	1.73E+02
1,2-Dichloroethylene (cis)		156-59-2	6710	6.10E+01	nc	1.10E+02
Perchlorate	e	7601-90-3	692	2.50E+01	nc	2.77E+01
1,1,2,2-Tetrachloroethane		79-34-5	135	5.50E+00	ca	2.45E+01
1,1,1-Trichloroethane		71-55-6	19000	3.20E+03	nc	5.94E+00
1,1-Dichloroethylene		75-35-4	1960	3.40E+02	nc	5.76E+00
Chlorobenzene		108-90-7	330	9.10E+01	nc	3.63E+00
1,2-Dichloroethane (EDC)		107-06-2	36	1.00E+01	nc	3.60E+00
Naphthalene		91-20-3	20.7	6.20E+00	nc	3.34E+00
Benzene		71-43-2	77	3.50E+01	ca	2.20E+00
Methylene chloride		75-09-2	720	4.20E+02	ca	1.71E+00
Manganese and compounds		7439-96-5	2790	1.70E+03	nc	1.64E+00
1,1,2-Trichloroethane		79-00-5	26	2.00E+01	ca	1.30E+00
Chloroform		67-66-3	19	1.70E+01	ca	1.12E+00
Toluene		108-88-3	1690	2.30E+03	nc	7.35E-01
1,2-Dichloroethylene (trans)		156-60-5	66	1.20E+02	nc	5.50E-01
1,2-Dichloroethene (total)		540-59-0	180	3.30E+02	nc	5.45E-01
1,1-Dichloroethane		75-34-3	409	9.10E+02	nc	4.49E-01
Lead	h, l	7439-92-1	4.7	1.50E+01	NA	3.13E-01
1,3-Dinitrobenzene		99-65-0	0.59	3.60E+00	nc	1.64E-01
Aminodinitrotoluene		1321-12-6	6.07	7.30E+01	nc	8.32E-02
2-Methylnaphthalene		91-57-6	12.1	1.50E+02	nc	8.07E-02
Cadmium and compounds		7440-43-9	1.4	1.80E+01	nc	7.78E-02
Carbon disulfide		75-15-0	73.8	1.00E+03	nc	7.38E-02
Nitrobenzene	f	98-95-3	0.23	3.40E+00	nc	6.76E-02
2,4,6-Trinitrotoluene (TNT)		118-96-7	1.18	1.80E+01	nc**	6.56E-02
Dibenz[ah]anthracene		53-70-3	0.0431	9.20E-01	ca	4.68E-02
2,6-Dinitrotoluene	f	606-20-2	1.39	3.60E+01	nc	3.86E-02
p-Nitrotoluene	f	99-99-0	1.65	6.10E+01	nc*	2.70E-02
RDX (Cyclonite)	f	121-82-4	1.5	6.10E+01	ca	2.46E-02
Cobalt	h	7440-48-4	17.7	7.30E+02	nc	2.42E-02
Dibenzofuran		132-64-9	0.248	1.20E+01	nc	2.07E-02
Iron	i	7439-89-6	224	1.10E+04	nc	2.04E-02
Barium and compounds		7440-39-3	136	7.30E+03	nc	1.86E-02
1,4-Dithiane	j	505-29-3	5.8	3.60E+02	nc	1.61E-02
2,4-Dinitrotoluene	f	121-14-2	0.951	7.30E+01	nc	1.30E-02
Mercury and compounds		7487-94-7	0.14	1.10E+01	nc	1.27E-02
Aluminum	h	7429-90-5	295	3.60E+04	nc	8.19E-03
m-Nitrotoluene	f	99-08-1	0.943	1.20E+02	nc	7.86E-03
Nickel (soluble salts)	h, i	7440-02-0	5.1	7.30E+02	nc	6.99E-03
Benz[a]anthracene		56-55-3	0.0407	9.20E+00	ca	4.42E-03
Indeno[1,2,3-cd]pyrene		193-39-5	0.0377	9.20E+00	ca	4.10E-03
Zinc	i	7440-66-6	43.9	1.10E+04	nc	3.99E-03
Benzo[b]fluoranthene		205-99-2	0.0367	9.20E+00	ca	3.99E-03
Chloromethane (methyl chloride)		74-87-3	0.531	1.60E+02	nc	3.32E-03
HMX	f	2691-41-0	5.3	1.80E+03	nc	2.94E-03

Analyte	Note	CAS Number	Maximum Concentration (µg/L)	Water (ug/L)	Qualifier	Ratio
Bis(2-ethylhexyl)phthalate (DEHP)		117-81-7	1.3	4.80E+02	ca	2.71E-03
1,1,2-Trichloro-1,2,2-Trifluoroethane		76-13-1	130	5.90E+04	nc	2.20E-03
1,3,5-Trinitrobenzene	f	99-35-4	1.8	1.10E+03	nc	1.64E-03
Tetryl		479-45-8	0.24	1.50E+02	nc	1.60E-03
Fluorene		86-73-7	0.249	2.40E+02	nc	1.04E-03
Dibutyl phthalate		84-74-2	2.43	3.60E+03	nc	6.75E-04
Acenaphthene		83-32-9	0.195	3.70E+02	nc	5.27E-04
Pyrene		129-00-0	0.0538	1.80E+02	nc	2.99E-04
N-Nitrosodiphenylamine		86-30-6	0.217	7.30E+02	nc*	2.97E-04
Fluoranthene		206-44-0	0.0518	1.50E+03	nc	3.45E-05
Phenol		108-95-2	0.326	1.10E+04	nc	2.96E-05
1,4-Thioxane	a	15980-15-1	0.97	2.60E+07	nc	3.73E-08
					Total	**2.76E+03**

Select values presented in scientific notation (e.g., 2.5E+02 = 2.5 x 10^2 = 250).

mg/kg - milligrams per kilogram (equivalent to parts per million).
µg/L - micrograms per Liter (equivalent to parts per billion).
nc - value based on a noncancer exposure endpoint.
ca - value based on a carcinogenic exposure endpoint.
nc* - ca comparison value would be less than nc comparison value if a target cancer risk level of 1 x 10-6 is used.
nc** - ca comparison value would be less than nc comparison value if a target cancer risk level of 1 x 10-5 is used.
sat - substance achieves point of saturation at this value.
max - set at 100,000 mg/kg for soils (nonvolatiles).
NA - no screening value available.

Notes

a CVs could not be calculated because toxicity values and/or chemical-physical parameters are no longer available for this chemical. Therefore, the original CV from the DoD Relative Risk Site Evaluation Primer, Summer 1997, is provided.
b CVs were calculated using toxicity values from the CHPPM report Chronic Toxicity Criteria for Human Health Risk Assessment, Version 3, November 6, 2006.
c CVs are based on California EPA toxicity values as per Department of the Air Force Memorandum “Toxicity Values for Use in Risk Assessment and Establishing Risk-Based Clean-up Levels”, July 14, 2006.
d Perchlorate is the anion of perchloric acid. Two salts of primary concern are the munitions constituents ammonium perchlorate and potassium perchlorate. As a result, the toxicity value for perchlorate was used as a surrogate for ammonium perchlorate and potassium perchlorate.
e Water CVs for perchlorate, ammonium perchlorate, and potassium perchlorate were established following the DoD Memorandum “Policy on DoD Required Actions Related to Perchlorate”, January 26, 2006.
f Nitrogen-based explosive, co-contaminants, and/or breakdown product.
g Chemical warfare agents and agent breakdown products.
h Metals commonly found in military munitions.
i Essential nutrient.
j Trichloroethene CV was established based on the approach outlined in the Department of the Air Force Memorandum “Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels”, July 14, 2006, which indicated that the California EPA inhalation slope factor for TCE should be used when developing risk-based screening levels.
k Mustard gas was used as a surrogate for toxicity values for this chemical.
l The screening value was calculated following an alternative approach outlined in the U.S. Environmental Protection Agency, Region 9, Users’ Guide and Background Technical Document for the Preliminary Remediation Goals, updated December 2004.
m The screening value for nickel subsulfide is based on an industrial exposure scenario as outlined in the U.S. Environmental Protection Agency, Region 9, Users’ Guide and Background Technical Document for the Preliminary Remediation Goals, updated December 2004."

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
Not applicable. No surface water present at this MRS.			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

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

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
Not applicable. No sediment present at this MRS.			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
Not applicable. No surface water present at this MRS.			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

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

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
Not applicable. No sediment present at this MRS.			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26
HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

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

.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
See Table 26 Worksheet on the following pages.			
CHF Scale	**CHF Value**	**Sum the Ratios**	4.9
CHF > 100	**H (High)**		
100 > CHF > 2	**M (Medium)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		M

Migratory Pathway Factor

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

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

Receptor Factor

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

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

No Known or Suspected Surface Soil MC Hazard ☐

Table 26 Worksheet
HHE Module: Surface Soil Data Element Table Human Endpoint
Contaminant Hazard Factor (CHF)

Analyte	Note	CAS Number	Maximum Concentration (mg/kg)	Soil (mg/kg)	Qualifier	Ratio
Thallium and compounds	h, l	7440-28-0	1.90E+00	NA	NA	NA
Iron	i	7439-89-6	3.72E+04	2.30E+04	nc	**1.6**
Arsenic	h	7440-38-2	2.27E+01	2.20E+01	nc*	1.03
Vanadium and compounds	h	7440-62-2	7.23E+01	7.80E+01	nc	0.93
Aluminum	h	7429-90-5	3.02E+04	7.60E+04	nc	0.40
Manganese and compounds		7439-96-5	7.88E+02	3.30E+03	nc	0.24
Tetrachloroethylene (PCE)		127-18-4	1.03E+01	5.50E+01	ca	0.19
Trichloroethene (TCE)	j	79-01-6	4.48E+01	2.90E+02	ca	0.15
Cadmium and compounds		7440-43-9	3.50E+00	3.90E+01	nc	0.09
Lead	h, l	7439-92-1	3.22E+01	4.00E+02	NA	0.081
Copper and compounds	h	7440-50-8	2.35E+02	3.10E+03	nc	0.076
Total Chromium (1:6 ratio Cr VI:Cr III)	l	MRSPP-01	4.23E+01	1.60E+03	nc	0.026
Cobalt	h	7440-48-4	2.20E+01	1.40E+03	nc*	0.016
1,2-Dichloroethylene (cis)		156-59-2	5.87E-01	4.30E+01	nc	0.014
Zinc	i	7440-66-6	2.62E+02	2.30E+04	nc	0.011
Mercury and compounds		7487-94-7	2.55E-01	2.30E+01	nc	0.011
Silver and compounds	h	7440-22-4	4.10E+00	3.90E+02	nc	0.011
Nickel (soluble salts)	h, i	7440-02-0	1.34E+01	1.60E+03	nc	0.0084
Barium and compounds		7440-39-3	1.15E+02	1.60E+04	nc	0.007
Perchlorate	e	7601-90-3	3.03E-01	5.50E+01	nc	0.0055
Bromomethane (Methyl bromide)		74-83-9	1.71E-02	3.90E+00	nc	0.0044
Beryllium and compounds	h	7440-41-7	5.50E-01	1.50E+02	nc	0.0037
Selenium	h	7782-49-2	9.90E-01	3.90E+02	nc	0.0025
1,2-Dichloroethylene (trans)		156-60-5	1.20E-01	6.90E+01	nc	0.0017
HMX	f	2691-41-0	3.60E+00	3.10E+03	nc	0.0012
Chloromethane (methyl chloride)		74-87-3	3.59E-02	4.70E+01	nc	0.0008
1,1,1-Trichloroethane		71-55-6	3.14E-01	1.20E+03	sat	0.0003
Methylene chloride		75-09-2	1.96E-01	9.00E+02	ca	0.00022
Benzene		71-43-2	4.96E-03	3.30E+01	nc*	0.00015
Acetone		67-64-1	3.38E-01	1.40E+04	nc	0.000024
1,1-Dichloroethane		75-34-3	1.08E-02	6.20E+02	nc	0.00002
Carbon disulfide		75-15-0	2.73E-03	3.60E+02	nc	0.000008
Toluene		108-88-3	3.33E-03	5.20E+02	sat	0.00001
Methyl ethyl ketone (2-Butanone)		78-93-3	3.26E-02	2.20E+04	nc	0.000001
					Total	**4.9**

Select values presented in scientific notation (e.g., 2.5E+02 = 2.5 x 10^2 = 250).

mg/kg - milligrams per kilogram (equivalent to parts per million).

µg/L - micrograms per Liter (equivalent to parts per billion).
nc - value based on a noncancer exposure endpoint.
ca - value based on a carcinogenic exposure endpoint.
nc* - ca comparison value would be less than nc comparison value if a target cancer risk level of 1 x 10-6 is used.
nc** - ca comparison value would be less than nc comparison value if a target cancer risk level of 1 x 10-5 is used.
sat - substance achieves point of saturation at this value.
max - set at 100,000 mg/kg for soils (nonvolatiles).
NA - no screening value available."

Notes

a CVs could not be calculated because toxicity values and/or chemical-physical parameters are no longer available for this chemical. Therefore, the original CV from the DoD Relative Risk Site Evaluation Primer, Summer 1997, is provided.
b CVs were calculated using toxicity values from the CHPPM report Chronic Toxicity Criteria for Human Health Risk Assessment, Version 3, November 6, 2006.
c CVs are based on California EPA toxicity values as per Department of the Air Force Memorandum “Toxicity Values for Use in Risk Assessment and Establishing Risk-Based Clean-up Levels”, July 14, 2006.
d Perchlorate is the anion of perchloric acid. Two salts of primary concern are the munitions constituents ammonium perchlorate and potassium perchlorate. As a result, the toxicity value for perchlorate was used as a surrogate for ammonium perchlorate and potassium perchlorate.
e Water CVs for perchlorate, ammonium perchlorate, and potassium perchlorate were established following the DoD Memorandum “Policy on DoD Required Actions Related to Perchlorate”, January 26, 2006.
f Nitrogen-based explosive, co-contaminants, and/or breakdown product.
g Chemical warfare agents and agent breakdown products.
h Metals commonly found in military munitions.
i Essential nutrient.
j Trichloroethene CV was established based on the approach outlined in the Department of the Air Force Memorandum “Toxicity Values for Use in Risk Assessments and Establishing Risk-Based Cleanup Levels”, July 14, 2006, which indicated that the California EPA inhalation slope factor for TCE should be used when developing risk-based screening levels.
k Mustard gas was used as a surrogate for toxicity values for this chemical.
l The screening value was calculated following an alternative approach outlined in the U.S. Environmental Protection Agency, Region 9, Users’ Guide and Background Technical Document for the Preliminary Remediation Goals, updated December 2004.
m The screening value for nickel subsulfide is based on an industrial exposure scenario as outlined in the U.S. Environmental Protection Agency, Region 9, Users’ Guide and Background Technical Document for the Preliminary Remediation Goals, updated December 2004.

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

<u>Contaminant Hazard Factor (CHF)</u>

DIRECTIONS: Only use this table if there are more than five contaminants in any given medium present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)	H	H	M	HHM	B
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)	M	M	M	MMM	D

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

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

HHE MODULE RATING	B

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

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

APPENDIX K

EXPLOSIVES SAFETY SUBMISSION

The Explosives Safety Submission (ESS) has been provided separately to the Army, as these submissions have a different set of prescribed reviewers from this Corrective Measures Implementation Plan (CMIP). The final ESS will be submitted to ADEM for information under separate cover when full approval by the Army is received.

APPENDIX L

EXPLOSIVES MANAGEMENT PLAN

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LIST OF ACRONYMS AND ABBREVIATIONS

AR	Army Regulation
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
CFR	Code of Federal Regulations
CMI	Corrective Measures Implementation
DoD	U.S. Department of Defense
EPA	U.S. Environmental Protection Agency
HAZMAT	hazardous materials
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
NEW	net explosive weight
OESS	Ordnance and Explosives Safety Specialist
PM	Project Manager
RSA	Redstone Arsenal
SUXOS	Senior Unexploded Ordnance Supervisor
UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer

1.0 INTRODUCTION

This Explosives Management Plan provides details for the management of explosives during the corrective measures activities at RSA-014S. This plan was developed in accordance with Federal Acquisition Regulation 52.245-2 (United States, 2012), state and local laws and regulations, Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Publication 5400.7 (ATF, 2012), U.S. Department of Defense's (DoD) Defense Explosives Safety Regulation 6055.09 (DoD, 2019), U.S. Department of Transportation regulations, and Army Regulation (AR) 190-11 (Army, 2013b).

2.0 LICENSES/PERMITS

APTIM maintains a valid Federal Explosives License issued by the ATF and complies with the appropriate portions of ATF Publication 5400.7, *Federal Explosives Law and Regulations* (ATF, 2012). APTIM's demolition team will consist of at least two unexploded ordnance (UXO) technicians qualified in accordance with Department of Defense Explosives Safety Board Technical Paper-18 for demolition services, if required. Copies of most recent permitted ATF licenses held by APTIM be maintained on site during field activities.

3.0 ACQUISITION

APTIM will acquire commercial explosives from a local vendor or vendors who will deliver the materials to the project site or explosives magazines located in the 8200 block. Explosives vendors with a valid dealer ATF license will be used. A copy of the ATF dealer license and APTIM's user permit will be maintained at the project site. It will be made available upon request by any local, state, or federal authority. The type, amount, class, and net explosive weight (NEW) of the donor explosives will not exceed 150 pounds NEW at any given time.

4.0 INITIAL RECEIPT

The explosives vendor will deliver the explosive materials to the project on an as-needed basis. An initial receipt inventory will then be conducted. Explosives in unsealed boxes containing partial lots will be opened, and the contents of the box will be counted. Any discrepancies between the actual type and quantity of explosives received and the shipping documentation will be noted on the shipping documentation with the signatures of both the delivery driver and the individual authorized to receive such explosives. A legible copy will be filed on site. The authorized individual designated by the Senior UXO Supervisor (SUXOS) receiving the explosives will immediately inform the SUXOS of any discrepancy, who will in turn notify the U.S. Army Engineering and Support Center, Huntsville Ordnance and Explosives Safety Specialist (OESS) and Project Manager (PM). A copy of the receipt documentation will be filed at the on-site office and placed in the project's permanent archive file.

5.0 STORAGE

Segregation and separation of initiators (blasting caps) from the donor charge explosives will be maintained by the use of two ATF Type II explosives magazines. One ATF Type II Magazine will

be utilized for the storage of initiators and the other ATF Type II magazine will be for storage of the donor charges. Both magazines will be housed within the 8200 block in accordance with the requirements of the *Explosive Destruction System, Assessment and Storage Complex at the Redstone Arsenal 8200 Block Site Plan* (Army, 2016b). The magazines will be grounded and certified by a Redstone Arsenal (RSA) electrician. A copy of the approved siting for this magazine will be maintained on site. All commercial donor explosives will have assigned DoD hazard division/storage compatibility groups and will be stored and secured in accordance with DoD's Defense Explosives Safety Regulation 6055.09 (DoD, 2019) and Department of the Army Pamphlet 385-64 (Army, 2013a).

5.1 INSPECTION OF MAGAZINES

The donor explosives magazines will be inspected upon entry by the UXO Quality Control Specialist (UXOQCS), or a minimum of weekly (when explosives are present), in order to determine whether there has been an unauthorized entry or attempted entry into the magazine, or unauthorized removal of the contents of the magazine. In the event the magazine doors are unsecured, a complete inventory of internal magazines will be conducted.

5.2 LOCATION OF THE MAGAZINES

The RSA magazines will be sited in a secured location in the 8200 block at RSA in accordance with the *Explosive Destruction System, Assessment and Storage Complex at the Redstone Arsenal 8200 Block Site Plan* (Army, 2016b, or current version).

5.3 PHYSICAL SECURITY OF STORAGE FACILITIES

Prior to storing explosives, the magazines will each have an Intrusion Detection System installed within an enclosed and gated chain link fence which is in accordance with AR 190-11 (Army, 2013b). The magazines will be locked with two high security padlocks which meet ATF Publication 5400.7 Section 55.208 (a) (2012). Keys to the magazines will be controlled by the SUXOS and locked in a secure safe. Key Control Officers will be designated in writing. Keys will only be issued to Key Control Officers. A key control log will be maintained. A separate lockable key box will be placed inside the safe. Keys to the separate internal lockable key box will be controlled by the UXOQCS. Keys will be returned to the safe prior to the close of business. The SUXOS is solely responsible for controlling access to the magazines. The magazines will be inspected weekly by the SUXOS or UXOQCS to ensure the integrity of the magazines. At a minimum, two qualified UXO personnel are required to access the magazines for inspection, removal of explosives, or to return explosives to the magazines.

5.4 SMOKING AND OPEN FLAMES

Smoking, matches, open flames, and spark-producing devices are not permitted within 50 feet of the magazines.

5.5 EXPLOSIVES STORAGE WITHIN A MAGAZINE

Any explosive item shall be stored so that it can be easily counted and checked upon inspection. Explosives items are not to be packed and/or repacked inside a magazine or within 50 feet of a

magazine and must not be unpacked or repacked close to other explosive materials. All containers with explosives must be closed while being stored.

5.6 HOUSEKEEPING

The explosive storage magazines will be kept clean, dry, and free of grit, paper, empty packages and containers, and rubbish. The area surrounding the magazines is to be kept clear of rubbish, brush, dry grass or trees (except live trees more than 10 feet tall, for not less than 25 feet in all directions). Volatile materials are to be kept a distance of not less than 50 feet from the magazines.

6.0 TRANSPORTATION

This section presents the vehicle requirements and on-site transportation procedures for explosives during the site characterization activities.

6.1 ON-SITE TRANSPORTATION PROCEDURES

Explosives will be delivered to the project by a licensed and permitted commercial explosives vendor. When explosives are required, vendor personnel will transport the explosives to an area designated by APTIM's UXO personnel. The explosives will either be transported directly to the 8200 block for storage or to the project site for immediate use.

The qualified driver of any explosive-laden vehicle shall have all applicable licenses and will ensure that the load is properly braced and that the initiators are separated from the main-charge explosives. Smoking will be strictly forbidden among all personnel involved in the handling or transportation of explosives.

6.2 VEHICLE REQUIREMENTS

Vehicles transporting explosives on the project site will comply with the following requirements:

- If required, the vehicle will be properly placarded per U.S. Department of Transportation requirements.
- The vehicles will be equipped with a first aid kit, 10-BC fire extinguisher(s), and a means of communication with the UXO Safety Officer (UXOSO).
- Vehicles transporting explosives will be inspected using DD Form 626 and any applicable APTIM inspection forms. The inspections will be documented on an explosives transportation vehicle safety checklist, which will be kept in the vehicle during transport.
- The engine will be off when loading and unloading explosives.
- The wheels will be chocked during loading and unloading to prevent movement.
- At no time will any bare explosives be allowed to come into contact with spark-producing metal. Vehicle cargo beds will have wooden or plastic liners, dunnage, or sandbags to protect the explosives from contacting the metal bed and fittings.

- Explosives will be placed in an ATF Type 3 magazine (day box) meeting the design specification of ATF Publication 5400.7, 27 Code of Federal Regulations (CFR) § 555.203(c) or transported in approved shipping containers.
- Initiating explosives, such as blasting caps, will remain separated from other explosives at all times. Blasting caps may be transported in the same vehicle as donor explosives as long as they are in a separate container conforming to Institute of Makers of Explosives standards and secured away from other explosive items.
- Separate containers will be used to transport blasting caps and donor explosives. The two containers will be placed in the bed of a vehicle, blocked, and braced separately using ratchet tie-down straps, bolts, or other suitable means to keep the containers from shifting.
- Compatibility requirements will always be observed.
- Only UXO-qualified personnel who have been "cleared" by the ATF will have access and authority to issue explosive materials. The receiving party will sign the receipt documents for accountability.
- When transporting 1,000 pounds or less of Compatibility Group 1.4B and 1.4S, 99 pounds or less of Compatibility Group 1.4D (detonating cord explosive content does not exceed 100 grains per linear foot), a commercial driver's license and vehicle placarding are not required. If the above are not applicable, the driver will have a commercial Class C driver's license with a hazardous materials (HAZMAT) endorsement when transporting HAZMAT on public roads.
- If the above are not applicable, the driver will have a commercial Class C driver's license with a HAZMAT endorsement when transporting HAZMAT on public roads.
- Vehicle operators will comply with posted speed limits but will not exceed a safe and reasonable speed for road/field conditions. Vehicles transporting explosives off road will not exceed 25 miles per hour.
- Personnel will not ride in the cargo compartment of a vehicle transporting explosives.
- Smoking, matches, open flames, and spark-producing devices are only permitted at areas designated by the RSA Facility Manager and not within 50 feet of the magazine(s).

7.0 RECEIPT PROCEDURES

This section describes the procedures that APTIM will use to maintain records of explosives received.

7.1 INVENTORY CONTROL AND RECORDS MANAGEMENT

Upon receipt the type, quantity, and lot number of each explosive item will be checked against the manifest and recorded on the Magazine Data Card. The original receipt documents and an inventory will be maintained on file by the SUXOS. The Magazine Data Card will remain in the magazine with the explosive items and be annotated and updated for each issue and receipt. Copies of all records will be maintained on-site by the SUXOS and be available for inspection by authorized agencies. Explosives items will be tracked by lot number until the item is expended.

The SUXOS will review all requests for explosives from the Demolition Team Leader. Only sufficient explosives for the day's operations will be requested and issued. This procedure will ensure that the issued explosives are accounted for while they are in the possession of the individual users. Entries made on the Munitions and Explosives of Concern (MEC)-Material Potentially Presenting an Explosive Hazard (MPPEH) Disposal and Donor Explosives Consumption Log and Magazine Data Cards will be verified through physical count by the Demolition Team Leader when drawing or turning in explosives and verified by the UXOQCS.

The UXOQS will be responsible for performing a weekly inventory of explosives in the magazines and results provided to the SUXOS. Entries made on the MEC-MPPEH Disposal and Donor Explosives Consumption Log and Magazine Data Cards will be verified through physical count, by the UXOQCS and authorized UXO Technician designated by the SUXOS.

7.2 AUTHORIZED INDIVIDUALS

APTIM's Federal Explosives License lists all authorized users. The SUXOS will be responsible for the proper issue of explosives to the authorized UXO personnel.

7.3 END USER CERTIFICATION

The SUXOS and UXO Technician III (acting as the demolition supervisor), as the end user of explosives, will certify in writing that the explosives were used for their intended purpose. This information is tracked on the MEC/MPPEH Disposal and Donor Explosives Consumption Log.

7.4 RECONCILING DISCREPANCIES

In the event that there is a discrepancy with any aspect of the management of explosives, the SUXOS will be immediately notified. The SUXOS, together with the UXOSO and UXOQCS, will review documentation to determine whether the discrepancy is a paperwork error or whether explosives have been lost or stolen. If it is concluded that explosives have been lost or stolen, the incident will be immediately reported as discussed in Section 9.0.

8.0 INVENTORY OF STORED EXPLOSIVES AND MEC

An accurate running inventory of all MEC stored in consolidation points will be maintained. A minimum of two copies of the inventory shall be retained. One copy will be maintained at the consolidation point, and the second copy will be maintained by the SUXOS in the field office.

An accurate running inventory of all donor explosives stored in the magazines will be maintained. A minimum of two copies of the inventory shall be retained. One copy will be maintained at the magazines, and the second copy will be maintained by the SUXOS in the field office. APTIM will provide a weekly update of the inventory to the OESS.

9.0 LOST, STOLEN, OR UNAUTHORIZED USE OF EXPLOSIVES

If explosives are discovered to be lost, stolen, or used without authorization, or if the donor explosives magazine has been determined to be breached, the incident will be immediately

reported to the SUXOS, OESS and APTIM's PM, who in turn, will inform the RSA Military Munitions Response Program PM and RSA Installation Emergency Operations Center.

As the federal licensee, APTIM is required by law (27 CFR 55.30) to report the theft or loss of explosives to the ATF within 24 hours. In the event of such an occurrence, the following procedures will be followed:

- APTIM will make the appropriate notifications in accordance with 27 CFR 55.30 (2002). These will include calling the ATF (800-461-8841 or 888-283-2662) and the local law enforcement authorities.
- APTIM will be responsible for completing and forwarding ATF Form 5400.5. This form will be completed by the SUXOS, and a copy will be provided to the RSA Military Munitions Response PM and OESS.

APPENDIX M

SUPPORT PLANS

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01 CONTRACTOR COMMUNICATIONS PLAN

CORRECTIVE MEASURES
FIELD COMMUNICATIONS PLAN
REDSTONE ARSENAL, MADISON COUNTY, ALABAMA

1.0 PURPOSE

The purpose of this Field Communication Plan is to identify the methods and processes by which APTIM will conduct operational communications during field activities on sites potentially containing munitions and explosives of concern (MEC) at sites that require corrective measures at the Redstone Arsenal (RSA), Madison County, Alabama under Contract Number W912DY-17-D-0003, Delivery Order number W912DY19F1116. Effective field communications will enable clear and timely communication of relevant information to affected stakeholders.

2.0 CATEGORIES OF COMMUNICATIONS

This communication plan identifies and defines two major categories of communication.

2.1 ESSENTIAL COMMUNICATIONS

Essential communications are identified as communications related to the initial, follow up, and final reporting of serious incidents which may occur during conduct of field operations. These serious incidents can include:

1. Injury or death of a site worker or site visitor
2. Discovery of MEC which has been compromised and poses a threat to non-essential workers on RSA
3. Severe or adverse weather that poses a potential safety risk to site workers
4. Damage to equipment or property
5. Transmission of sensitive or classified information

2.2 NONESSENTIAL COMMUNICATIONS

Non-essential communications are identified as all other communications between operational and command assets to include communication with APTIM management, U.S. Army Engineering Support Center, Huntsville management, RSA management, and coordination with RSA Installation Emergency Operations Center (IEOC). Examples of non-essential communications include:

1. Common Operating Picture reporting
2. Quality I Assurance/Quality Control reporting
3. Safety monitoring reporting
4. Field team verbal communication

5. Discovery of MEC which has not been compromised and does not pose a threat to non-essential workers on RSA
6. Requesting non-emergency information from RSA IEOC or other emergency entities

3.0 COMMUNICATION METHODS

To ensure continuity of communication, three separate methods of communication have been identified. These lines of communication are tailored based upon the type of communication as provided in the following table:

Method	Field Team	IEOC	External
Face-to-Face	Primary	"*Does not apply*"	"*Does not apply*"
Radio	Secondary	Primary 1	"*Does not apply*"
Email	"*Does not apply*"	Primary 2	Primary
Cellular Phone	Tertiary	Secondary	Secondary
Satellite Phone	"*Does not apply*"	Tertiary	Tertiary

4.0 POINTS OF CONTACT

Command Post Radio Call Sign: *Dragon 1* (for communicating with IEOC and EOC)

RSA IEOC Email: usarmy.redstone.usag.mbx.ioc@mail.mil

02 CONTRACTOR CORRECTIVE MEASURES SITE ACCESS AND VISITATION PLAN

CORRECTIVE MEASURES
SITE ACCESS AND VISITATION PLAN
REDSTONE ARSENAL, MADISON COUNTY, ALABAMA

1.0 SITE ACCESS AND VISITATION POLICY

In the following text, the term "facility" applies to the entire Redstone Arsenal (RSA) installation, the term "site" applies to locations of environmental concern as identified in Alabama Department of Environmental Management (ADEM) Hazardous Waste Facility Permit #AL7 210 020 742, and "exclusion zone" (EZ) refers to the safety zone established around a munitions and explosives of concern (MEC) related operation work area which is off limits to unauthorized entry because of elevated levels of risk. Access to these locations by site workers, essential personnel, and authorized visitors are governed by Engineer Manual (EM) 385-1-97 and other site-specific safety and health plans (SSHPs).

Site Workers consist of the personnel directly necessary to perform general site work either inside or outside an exclusion zone. Site workers include APTIM's site personnel, their designated subcontractors, and any other personnel directly necessary to perform site operations.

Essential Personnel is a term applicable to MEC sites. In accordance with EM 385-1-97, essential personnel are defined as U.S. Army Engineering Support Center, Huntsville (CEHNC) and APTIM's project personnel necessary for the safe and efficient completion of field operations conducted in an EZ. This is limited to APTIM's work team members including the Unexploded Ordnance (UXO) Safety Officer (UXOSO), UXO Quality Control Supervisor, Senior UXO Supervisor, and CEHNC Ordnance and Explosives Safety Specialist (OESS).

Authorized Visitors are defined as U.S. Department of Defense, Department of the Army, U.S. Army Corps of Engineers, or other personnel conducting project or mission-related functions, such as quality assurance representatives, safety and quality inspectors, and project management personnel authorized by the Army to visit a site (EM 385-1-97). ADEM representatives are included in this category of personnel.

2.0 FACILITY SITE ACCESS REQUIREMENTS

Site access requirements are summarized in Attachment 1. In order to be granted access to RSA, all personnel must have a valid RSA Visitor Badge or be escorted while on RSA.

3.0 GENERAL SITE ACCESS REQUIREMENTS

Prior to visiting any site under the control of the Army or APTIM, all site workers and authorized visitors must sign in at the designated project office and receive a safety briefing by the Site Safety and Health Officer (SSHO) or the UXOSO on the hazards present and any access requirements or restrictions for sites they plan to visit. Many sites contain potential surface hazards and therefore require a site safety escort. Site workers and authorized visitors are responsible for compliance with the requirements specified in applicable site-specific safety and health plans, including wearing the correct personal protective equipment.

Authorized visitors are required to provide evidence of meeting all training and medical requirements specified in the applicable site-specific plans. This includes but is not limited to Hazardous Waste Operations and Emergency Response (HAZWOPER) 40-hour training, 8-hour HAZWOPER refresher within the past 12 months if the original 40-hour HAZWOPER course was completed more than one year previously (in accordance with 29 Code of Federal Regulations [CFR] 1910.120), physical examination and participation in a medical surveillance program per 29 CFR 1910.120, and participation in APTIM's safety orientation/indoctrination training by the SSHO/UXOSO in accordance with the APP/SSHP.

4.0 ADDITIONAL EZ ACCESS REQUIREMENTS FOR MEC SITES

Any visitor to the site requesting entry to the EZ during MEC operations is required to submit and gain approval to enter the EZ as an authorized visitor. All requests for approval as an authorized visitor will be submitted to the CEHNC Project Manager for approval at least 2 working days prior to the planned site visit. All visitor authorization requests will be prepared and submitted in accordance with EM 385-1-97, Section I.2.G.02.04. Visitors will be escorted by a UXO Technician II or higher (as outlined in Department of Defense Explosives Safety Board [2004] Technical Paper 18), and/or a CEHNC OESS. All authorized visitors must follow the direction of their escort.

While MEC procedures are being conducted, only essential personnel and authorized visitors will be allowed to enter an EZ. When nonessential personnel enter the EZ, all MEC operations will cease. Tasks not necessary to the operation will be prohibited within the immediate area of the hazard produced by the MEC operation.

No more than two authorized visitors will be permitted in any MEC EZ at any given time (EM 385-1-97, Sec. I.2.G.02).

ATTACHMENT 1
ACCESS REQUIREMENTS

APPENDIX N

FORMS

General Project Forms

- 01-Daily Status Report
- 02-Safety Meeting/Training Attendance Log
- 03-Tailgate Safety Meeting Log
- 04-Visitor Log
- 05-Field Work Variance Form
- 06-Explosive Vehicle Inspection Form DD 626
- 07-Lost, Damaged, or Destroyed Form

Quality Control Forms

- 08-Site Safety Inspection Log
- 09-Explosive Security Survey Checklist
- 10-Key Control Registry Log

Field Work Forms

- 11-Demolition-Burn Notification Checklist
- 12-General Demolition Safety
- 13-RSA Demolition Brief and Plan
- 14-Demolition Shot Record
- 15-MEC_Demil_Disposal_Acct_Record
- 16-Explosive Material Disposition Record-Bill of Lading
- 17-Manufacturer of Explosive Record of Acquisition
- 18-ATF Form f_5400.5
- 19-DoD Form 1348-1A
- 20-DD Form 1911 Materiel Courier Receipt
- 21-Instrument Calibration Log

DAILY STATUS REPORT/DAILY QC REPORT CORRECTIVE MEASURES AT RSA-014S

Project Name:	**Corrective Measures Implementation at Multiple (9) Sites at the Redstone Arsenal *(RSA-312-R-01 Digital Geophysical Mapping)***	**Project Number:**	**501388**		
Contract No.:	**W912DY-17-D-0003**	**Project Location:**	**Redstone Arsenal, Madison County, AL**		
Delivery Order:	**W912DY19F1116**	**Daily Report Date:**		**No.:**	

KEY PROJECT PERSONNEL	
Project Management Personnel	
CEHNC COR/PM	Ashley Roeske
CEHNC Geophysicist	Amy Walker, Daryl Donatelli
CEHNC Ordnance & Explosives Safety Specialist (OESS)	Kenny Jones
RSA Site Manager	Bob Gorman
Contractor Program Manager	Steven Moran
Contractor PM	Don Burton
Contractor Program Quality Assurance (QA) Manager	Tricia Felt
Subcontractor Program Manager	N/A
Subcontractor PM	N/A
Subcontractor QA Manager	N/A
Subcontractor Program Geophysicist	N/A
Field Personnel	
Senior UXO Supervisor (SUXOS)	
UXO Safety Officer (UXOSO)	
UXO Quality Control Specialist (UXOQCS)	
Site Supervisor	

1.0 General Information

1.1 Weather

Temperature:		

Clear □ Fog □ Cloudy □ Rain □ Snow □ Windy □ _____ mph

1.2 Summary of Activities

Time	Description of Activities

1.3 Daily Health and Safety Briefing Conducted? (file in site office) **Yes ☐ No (supply reason in notes)**

1.4 Any safety incidents or near misses? **Yes (explain in notes) No ☐**

Notes:

1.5 Work Planned for Next Work Day

2.0 Personnel Record

2.1 Field Personnel (*excluding Site Visitors*)

Name	Organization	Position	Comments	On-site (Y/N)	Hours

2.0 Personnel Record

2.1 Field Personnel (*excluding Site Visitors*)

Name	Organization	Position	Comments	On-site (Y/N)	Hours

2.2 Site Visitors

Name	Organization	Purpose of Visit	Safety Brief (Y/N)

3.0 Equipment Onsite

3.1 Vehicles

Vehicle	Source	VIN	Assigned to:	On Site:	Off Site:

3.2 Contractor Rental Equipment On Site

Equipment Type	SS#	Vendor	On Site:	Off Site:

3.3 Subcontractor Equipment On Site

Equipment Type	SS#	Vendor	On Site:	Off Site:

4.0 List of MEC Recovered to date				
Date	**Type (mod/mark required)**	**QTY**	**Location**	**Date of Demo**

5.0 Demolition Materials Accounting			
Delivered Item	**QTY**	**QTY Used**	**QTY Stored**

6.0 Completion Status of Site Activities					
Activity	**Estimated/Total**	**Completed Today**	**Cumulative**	**Percent Complete**	**Comments**

7.0 Exposure Data				
Company	**Daily Total for Week Ending – X/X/202X**		**Cumulative**	
	Hours	**Miles**	**Hours (total)**	**Miles (total)**
APTIM				

8.0 Instructions from Government Personnel
None

9.0 Signatures		
Signed by:		
	TBD (SUXOS)	**Date**
	TBD (UXOQCS)	**Date**

Safety Meeting/Training Attendance Log

Date:		**Time:**		**Conducted by:**	
Site Name/Location:	RSA-014S, Redstone Arsenal, Madison County, AL				
Contract Number:	W912DY-17-D-0003		**Delivery/Task Order Number:**	W912DY19F1116	
Project Manager:			**Site Manager** (when applicable)**:**		
(Senior) UXO Supervisor:			**Site Safety Officer/Unexploded Ordnance Safety Health Officer:**		

Training Provided: ☐ Initial Site Hazard ☐ Daily Safety Meeting ☐ Other:
☐ Weekly Safety Training ☐ Task/Hazard Specific

Weather Conditions: ☐ Fair ☐ Poor **Temperature (Low/High):** to °F **Wind speed:** mph **Direction:** **Precipitation:** % **Humidity:** %

I. TRAINING TOPICS COVERED

☐ Planned Site Activities	☐ Heat or Cold Stress	☐ Respirator Use
☐ Demolition Operations	☐ Biological Hazards	☐ Decontamination Procedures
☐ Site Controls	☐ Chemical Hazards	☐ Emergency Procedures/Route
☐ Exclusion Zone/Personnel Limits	☐ Routes of Chemical Exposure	☐ First Aid Procedures
☐ Site Communications	☐ Chemical Exposure Symptoms	☐ Buddy Team Procedures
☐ Physical Hazards	☐ Level/Type of PPE	☐ Other (describe topic(s) below)

Explain: _____

_____ .

Hospital/Clinic:	**Address:**	**Phone:**

II. SITE PERSONNEL / TRAINING ATTENDEES (Continued on 2nd page)

	Name	Signature	Company
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

III. SAFETY BRIEF / TRAINING VERIFICATION

I certify that the personnel listed on this roster have received the safety and health training described above.

_____ _____

Site Manager or Senior UXO Supervisor | Site Safety and Health Officer or UXO Safety Officer

HGL MR Form 15.18

Safety Meeting and Training Attendance Log

II. SITE PERSONNEL / TRAINING ATTENDEES (continued from 1st page)			
	Name	**Signature**	**Company**
11.			
12.			
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49.			
50.			

TAILGATE SAFETY MEETING LOG

DATE		**TIME**	
SITE NAME/LOCATION	**RSA-014S** **Redstone Arsenal, Madison County, AL**		

1. Safety Topics Discussed:

	Site Description		Environmental Concerns/Hazards
	Site Controls		Emergency Procedures/Route
	Personal Protective Equipment		First Aid Procedures
	Emergency Procedures/Equipment		Injury Reporting
	Site Evacuation		Safe Work Practices
	Physical/Biological Hazards		Other:
	Heat or Cold Stress		Other:
	Communication/Radio Procedure		Other:

2. Task Operation and Remarks:

3. Attendees:

	Print Name	Signature	Company
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Meeting Conducted by:	**Signature:**

Site Visitor Log

Project Name:	Corrective Measures Implementation at Multiple (9) Sites at the Redstone Arsenal	**Project Number:**	501388	**Delivery/Task Order:**	W912DY19F1116
Site Name:	RSA-014S	**Location:**	Redstone Arsenal, Madison County, AL		

This form shall be used to track entry into and departure from the ***EXCLUSION ZONE, CONTAMINATION REDUCTION ZONES, OR OTHER WORK ZONES*** on all HydroGeoLogic, Inc. sites. All Personnel shall sign in and out on the form by printing their name, initializing the form and noting the time in/out.

Date	Name	Representing	Purpose of visit	Escort Required		Equipment/ PPE Level	Time	
				Yes	No		In	Out

Page _____ of _____.

Site Visitor Log

Date	Name	Representing	Purpose of visit	Escort		Equipment/ PPE Level	Time	
				Yes	No		In	Out

FIELD WORK VARIANCE

PROJECT NO.: AP5001 DATE: VARIANCE NO.:

PROJECT NAME: Corrective Measures Implementation at Multiple (9) Sites at the Redstone Arsenal (RSA-014S Corrective Measures) PAGE _1__ OF _2__

CONTRACT NO.: W912DY-17-D-0003 DELIVERY ORDER NO.: W912DY19F1116

PRESENT REQUIREMENTS: REQUESTED BY:

PROPOSED CHANGE:

TECHNICAL JUSTIFICATION:

COST/SCHEDULE IMPACT:

REASON FOR CHANGE: _____ ADDITION _____ DELETION

CHANGE ORDER REQUIRED: _____ NO _____ YES CHANGE ORDER NO. _____

APPLICABLE DOCUMENT:

cc: Distribution

APPROVED BY _____ DATE _____
Project Manager

APPROVED BY _____ DATE _____
Quality Control Systems Manager

APPROVED BY _____ DATE _____
USACE Project Manager

FIELD WORK VARIANCE (FWV) TRACKING LOG

FWV NO.	AFFECTED DOCUMENT	SUBJECT	DATE WRITTEN	DATE SUBMITTED	DATE APPROVED BY USACE	REMARKS

MOTOR VEHICLE INSPECTION (TRANSPORTING HAZARDOUS MATERIALS)

(Read Instructions before completing this form.)

This form applies to all vehicles which must be marked or placarded in accordance with Title 49 CFR.	1. BILL OF LADING/TRANSPORTATION CONTROL NUMBER

SECTION 1 - DOCUMENTATION	ORIGIN a.	DESTINATION b.
2. CARRIER/GOVERNMENT ORGANIZATION		
3. DATE/TIME OF INSPECTION		
4. LOCATION OF INSPECTION		
5. OPERATOR(S) NAME(S)		
6. OPERATOR(S) LICENSE NUMBER(S)		
7. MEDICAL EXAMINER'S CERTIFICATE*		

8. *(X if satisfactory at origin)*

a. HAZMAT ENDORSEMENT		d. ERG OR EQUIVALENT COMMERCIAL:		YES		NO			
b. VALID LEASE*		e. DRIVER'S VEHICLE INSPECTION REPORT*							
c. ROUTE PLAN		f. COPY OF 49 CFR PART 397							

9. CVSA DECAL DISPLAYED ON COMMERCIAL EQUIPMENT*	YES	NO
a. TRUCK/TRACTOR		
b. TRAILER		

SECTION II - MECHANICAL INSPECTION

All items shall be checked on empty equipment prior to loading. Items with an asterisk shall be checked on all incoming loaded equipment.

10. TYPE OF VEHICLE(S)	11. VEHICLE NUMBER(S)

12. PART INSPECTED *(X as applicable)*	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT		ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
a. SPARE ELECTRICAL FUSES					k. EXHAUST SYSTEM					
b. HORN OPERATIVE					l. BRAKE SYSTEM*					
c. STEERING SYSTEM					m. SUSPENSION					
d. WINDSHIELD/WIPERS					n. COUPLING DEVICES					
e. MIRRORS					o. CARGO SPACE					
f. WARNING EQUIPMENT					p. LANDING GEAR*					
g. FIRE EXTINGUISHER*					q. TIRES, WHEELS, RIMS					
h. ELECTRICAL WIRING					r. TAILGATE/DOORS*					
i. LIGHTS AND REFLECTORS					s. TARPAULIN*					
j. FUEL SYSTEM*					t. OTHER *(Specify)*					

13. INSPECTION RESULTS *(X one)* **ACCEPTED** ☐ **REJECTED** ☐

(If rejected give reason under "Remarks". Equipment will be approved if deficiencies are corrected prior to loading.)

14. SATELLITE MOTOR SURVEILLANCE SYSTEM: *(X one)* **ACCEPTED** ☐ **REJECTED** ☐

15. REMARKS

16. INSPECTOR SIGNATURE *(Origin)*	17. INSPECTOR SIGNATURE *(Destination)*

SECTION III - POST LOADING INSPECTION

This section applies to Commercial and Government/Military vehicles. All items will be checked prior to release of loaded equipment and shall be checked on all incoming loaded equipment.

	ORIGIN (1) SAT	ORIGIN (1) UNSAT	DESTINATION (2) SAT	DESTINATION (2) UNSAT	COMMENTS (3)
18. LOADED IAW APPLICABLE SEGREGATION/COMPATIBILITY TABLE OF 49 CFR					
19. LOAD PROPERLY SECURED TO PREVENT MOVEMENT					
20. SEALS APPLIED TO CLOSED VEHICLE; TARPAULIN APPLIED ON OPEN EQUIPMENT					
21. PROPER PLACARDS APPLIED					
22. SHIPPING PAPERS/DD FORM 2890 FOR GOVERNMENT VEHICLE SHIPMENTS					
23. COPY OF DD FORM 626 FOR DRIVER					
24. SHIPPED UNDER DOT SPECIAL PERMIT 868					

25. INSPECTOR SIGNATURE *(Origin)*	26. DRIVER(S) SIGNATURE *(Origin)*
27. INSPECTOR SIGNATURE *(Destination)*	**28. DRIVER(S) SIGNATURE** *(Destination)*

INSTRUCTIONS

SECTION I - DOCUMENTATION

General Instructions.

All items (2 through 9) will be checked at origin prior to loading. Items with an asterisk (*) apply to commercial operators or equipment only. Only Items 2 through 7 are required to be checked at destination.

Items 1 through 5. Self explanatory.

Item 6. Enter operator's Commercial Driver's License (CDL) number or Military OF-346 License Number. CDL and OF-346 must have the HAZMAT and other appropriate endorsements IAW 49 CFR 383.

Item 7. *Enter the expiration date listed on the Medical Examiner's Certificate.

Item 8.a. Hazardous Materials Certification. In accordance with applicable service regulations, ensure operator has been certified to transport hazardous materials. Check the expiration date on driver's HAZMAT Certification.

b. *Valid Lease. Shipper will ensure a copy of the appropriate contract or lease is carried in all leased vehicles and is available for inspection. (49 CFR 376.12 and 376.11(c)(2)).

c. Route Plan. Prior to loading any Hazard Class/Division 1.1, 1.2, or 1.3 (Explosives) for shipment, ensure that the operator possesses a written route plan in accordance with 49 CFR Part 397. Route Plan requirements for Hazard Class 7 (Radioactive) materials are found in 49 CFR 397.101.

d. Emergency Response Guidebook (ERG) or Equivalent. Commercial operators must be in possession of an ERG or equivalent document. Shipper will provide applicable ERG page(s) to military operators.

e. *Driver's Vehicle Inspection Report. Review the operator's Vehicle Inspection Report. Ensure that there are no defects listed on the report that would affect the safe operation of the vehicle.

f. Copy of 49 CFR Part 397. Operators are required by regulation to have in their possession a copy of 49 CFR Part 397 (Transportation of Hazardous Materials Driving and Parking Rules). If military operators do not possess this document, shipper will provide a copy to operator.

Item 9. *Commercial Vehicle Safety Alliance (CVSA) Decal. Check to see if equipment has a current CVSA decal and mark applicable box. Vehicles without CVSA, check documentation of the last vehicle periodic inspection and perform DD Form 626 inspection.

SECTION II - MECHANICAL INSPECTION

General Instructions.

All items (12.a. through 12.t.) will be checked on all incoming empty equipment prior to loading. All UNSATISFACTORY conditions must be corrected prior to loading. Items with an asterisk (*) shall be checked on all incoming loaded equipment. Unsatisfactory conditions that would affect the safe off-loading of the equipment must be corrected prior to unloading.

SECTION II *(Continued)*

Item 12.a. Spare Electrical Fuses. Check to ensure that at least one spare fuse for each type of installed fuse is carried on the vehicle as a spare or vehicle is equipped with an overload protection device (circuit breaker). (49 CFR 393.95)

b. Horn Operative. Ensure that horn is securely mounted and of sufficient volume to serve purpose. (49 CFR 393.81)

c. Steering System. The steering wheel shall be secure and must not have any spokes cracked through or missing. The steering column must be securely fastened. Universal joints shall not be worn, faulty or repaired by welding. The steering gear box shall not have loose or missing mounting bolts or cracks in the gear box mounting brackets. The pitman arm on the steering gear output shaft shall not be loose. Steering wheel shall turn freely through the limit of travel in both directions. All components of a power steering system must be in operating condition. No parts shall be loose or broken. Belts shall not be frayed, cracked or slipping. The power steering system shall not be leaking. (49 CFR 396 Appendix G)

d. Windshield/Wipers. Inspect to ensure that windshield is free from breaks, cracks or defects that would make operation of the vehicle unsafe; that the view of the driver is not obscured and that the windshield wipers are operational and wiper blades are in serviceable condition. Defroster must be operative when conditions require. (49 CFR 393.60, 393.78 and 393.79)

e. Mirrors. Every vehicle must be equipped with two rear vision mirrors located so as to reflect to the driver a view of the highway to the rear along both sides of the vehicle. Mirrors shall not be cracked or dirty. (49 CFR 393.80)

f. Warning Equipment. Equipment must include three bidirectional emergency reflective triangles that conform to the requirements of FMVSS No. 125. FLAME PRODUCING DEVICES ARE PROHIBITED. (49 CFR 393.95)

g. Fire Extinguisher. Military vehicles must be equipped with one serviceable fire extinguisher with an Underwriters Laboratories rating of 10 BC or more. (Commercial motor vehicles must be equipped with one serviceable 10 BC Fire Extinguisher). Fire extinguisher must be located so that it is readily accessible for use and securely mounted on the vehicle. The fire extinguisher must be designed, constructed and maintained to permit visual determination of whether it is fully charged. (49 CFR 393.95)

h. Electrical Wiring: Electrical wiring must be clean and properly secured. Insulation must not be frayed, cracked or otherwise in poor condition. There shall be no uninsulated wires, improper splices or connections. Wires and electrical fixtures inside the cargo area must be protected from the lading. (49 CFR 393.28)

SECTION II *(Continued)*

i. Lights/Reflectors. (Head, tail, turn signal, brake, clearance, marker and identification lights, Emergency Flashers). Inspect to see that all lighting devices and reflectors required are operable, of proper color and properly mounted. Ensure that lights and reflectors are not obscured by dirt or grease or have broken lenses. High/Low beam switch must be operative. Emergency Flashers must be operative on both the front and rear of vehicle. (49 CFR 393.24, 25, and 26)

j. Fuel System. Inspect fuel tank and lines to ensure that they are in serviceable condition, free from leaks, or evidence of leakage and securely mounted. Ensure that fuel tank filler cap is not missing. Examine cap for defective gasket or plugged vent. Inspect filler necks to see that they are in completely serviceable condition and not leaking at joints. (49 CFR 393.83)

k. Exhaust System. Exhaust system shall discharge to the atmosphere at a location to the rear of the cab or if the exhaust projects above the cab, at a location near the rear of the cab. Exhaust system shall not be leaking at a point forward of or directly below the driver compartment. No part of the exhaust system shall be located where it will burn, char or damage electrical wiring, fuel system or any other part of the vehicle. No part of the exhaust system shall be temporarily repaired with wrap or patches. (49 CFR 393.83)

l. Brake System (to include hand brakes, parking brakes and Low Air Warning devices). Check to ensure that brakes are operational and properly adjusted. Check for audible air leaks around air brake components and air lines. Check for fluid leaks, cracked or damaged lines in hydraulic brake systems. Ensure that parking brake is operational and properly adjusted. Low Air Warning devices must be operative. (49 CFR 393.40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, and 55)

m. Suspension. Inspect for indications of misaligned, shifted or cracked springs, loosened shackles, missing bolts, spring hangers unsecured at frame and cracked or loose U-bolts. Inspect for any unsecured axle positioning parts, and sign of axle misalignment, broken torsion bar springs (if so equipped). (49 CFR 393.207)

n. Coupling Devices (Inspect without uncoupling). Fifth Wheels: Inspect for unsecured mounting to frame or any missing or damaged parts. Inspect for any visible space between upper and lower fifth wheel plates. Ensure that the locking jaws are around the shank and not the head of the kingpin. Ensure that the release lever is seated properly and safety latch is engaged. Pintle Hook, Drawbar, Towbar Eye and Tongue and Safety Devices: Inspect for unsecured mounting, cracks, missing or ineffective fasteners (welded repairs to pintle hook is prohibited). Ensure safety devices (chains, hooks, cables) are in serviceable condition and properly attached. (49 CFR 393.70 and 71)

o. Cargo Space. Inspect to ensure that cargo space is clean and free from exposed bolts, nuts, screws, nails or inwardly projecting parts that could damage the lading. Check floor to ensure it is tight and free from holes. Floor shall not be permeated with oil or other substances. (49 CFR 393.84)

p. Landing Gear. Inspect to ensure that landing gear and assembly are in serviceable condition, correctly assembled,

adequately lubricated and properly mounted.

SECTION II *(Continued)*

q. Tires, Wheels and Rims: Inspect to ensure that tires are properly inflated. Flat or leaking tires are unacceptable. Inspect tires for cuts, bruises, breaks and blisters. Tires with cuts that extend into the cord body are unacceptable. Thread depth shall not be less than: 4/32 inches for tires on a steering axle of a power unit, and 2/32 inches for all other tires. Mixing bias and radial on the steering axle is prohibited. Inspect wheels and rims for cracks, unseated locking rings, broken, loose, damaged or missing lug nuts or elongated stud holes. (49 CFR 393.75)

r. Tailgate/Doors. Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (49 CFR 177.835(h))

s. Tarpaulin. If shipment is made on open equipment, ensure that lading is properly covered with fire and water resistant tarpaulin. (49 CFR 177.835(h))

t. Other Unsatisfactory Condition. Note any other condition which would prohibit the vehicle from being loaded with hazardous materials.

Item 14. For AA&E and other shipments requiring satellite surveillance, ensure that the Satellite Motor Surveillance System is operable. The DTTS Message Display Unit, when operative, will display the signal "DTTS ON". The munitions carrier driver, when practical, will position the DTTS message display unit in a manner that allows the shipping inspector or other designated shipping personnel to observe the "DTTS ON" message without climbing aboard the cab of the motor vehicle.

SECTION III - POST LOADING INSPECTION

General Instructions.

All placarded quantities items will be checked prior to the release of loaded equipment. Shipment will not be released until deficiencies are corrected. All items will be checked on incoming loaded equipment. Deficiencies will be reported in accordance with applicable service regulations.

Item 18. Check to ensure shipment is loaded in accordance with 49 CFR Part 177.848 and the applicable Segregation or Compatibility Table of 49 CFR 177.848.

Item 19. Check to ensure the load is secured from movement in accordance with applicable service outload drawings.

Item 20. Check to ensure seal(s) have been applied to closed equipment; fire and water resistant tarpaulin applied on open equipment.

Item 21. Check to ensure each transport vehicle has been properly placarded in accordance with 49 CFR 172.504.

Item 22. Check to ensure operator has been provided shipping papers that comply with 49 CFR 172.201 and 202. For shipments transported by Government vehicle, shipping paper will be DD Form 2890.

Item 23. Ensure operator(s) sign DD Form 626, are given a copy and understand the hazards associated with the shipment.

Item 24. Applies to Commercial Shipments Only. If shipment is made under DOT Special Permit 868, ensure that shipping papers are properly annotated and copy of Special Permit 868 is with shipping papers.

Item 26. Ensure driver/operator signs DD Form 626 at origin.

Item 28. Ensure driver/operator signs DD Form 626 at destination.

LOST, DAMAGED & DESTROYED REPORT
CORRECTIVE MEASURES IMPLEMENTATION AT
MULTIPLE (9) SITES (RSA-014S) AT THE REDSTONE ARSENAL

Contract No.:		**Project No.:**	
Item Description:		**Date of Loss:**	
Vendor:		**Condition at Time of LDD:**	
PO Number:		**Date of Last Inventory:**	
Order Date:		**Est. Cost of Repair/Replacement:**	
Property ID:		**Cost of Item:**	
Manufacturer:		**Serial No.:**	

Report of Incident

Corrective Action

Investigation Performed By: _____

Signature **Title**

Review/Approval By: _____

Signature **Title**

Site Safety Inspection Log

Date:	Time:	Project location (site name, city and state):	Project number:
		RSA-014S, Redstone Arsenal, Madison County, AL	501388

Lost time accidents (hours):	Days since last reported injury:	Last reportable injury:

Type of Inspection: ☐ Daily: ☐ Weekly ☐ Monthly ☐ Special ☐ Re-inspection

I. ACTVITY INSPECTED (indicate results by an "X")	SATISFACTORY	UNSATISFACTORY	NOT APPLICABLE
a. Site Mobilization/Demobilization			
b. Surface Sweep Operations			
c. Subsurface Operations			
d. Geophysical Operations			
e. Survey/Vegetation Removal Operations			
f. Heavy Equipment/Earth Moving Machinery			
g. Personal Protection Equipment			
h. Safe Work Practices			
i. Site Controls			
j. First Aid/Medical Equipment			
k. Fire Extinguisher/Fire Fighting Equipment			
l. Demolition Operations			
m. Explosive Storage			
n. Explosive Transportation Procedures			
o. Emergency Procedures			
II. OVERALL INSPECTION RESULTS			

III. COMMENTS:

IV. ACTIONS (indicate results by an "X")	YES	NO	COMMENTS
Work stopped due to safety violations:			
Safety violation noted:			
Personnel involved:			
Corrective measures:			
Re-inspection required:			
Demolitions Operations Conducted:			

V. SITE VISITORS (Name, organization and purpose of visit)

VI. SIGNATURE. I acknowledge that I have been briefed on the results of this inspection and will take corrective actions as necessary.

Site Safety& Health Officer (print name/signature)

Explosive Storage and Security Survey Checklist

Project Site (name, city and state):				
Inspection conducted by/position:	**Signature**			**Date**
UXOQCS or UXOSO:	**Signature**			**Date**
Reviewed by SUXOS:	**Signature**			**Date**
1. Publications	**YES**	**NO**	**NA**	**COMMENTS**
a. ATF Federal Explosive Law & Regulations, ATF P 5400.7,	☐	☐	☐	
b. IW QAPP SOP 30.0 Explosive Accountability & Management	☐	☐	☐	
c. IW QAPP SOP 32.0 Explosive Storage, Inspection & Security	☐	☐	☐	
2. Explosive Storage	**YES**	**NO**	**NA**	**COMMENTS**
a. Proper explosive storage magazines, Type 2 conforming to BATF standard	☐	☐	☐	
b. Placards. Each magazine properly placarded with DOT Haz Class/Division symbol	☐	☐	☐	
c. Explosive compatibility groups. Separated into the appropriate Haz Class/Division	☐	☐	☐	
d. Physical Security survey conducted and documented	☐	☐	☐	
e. Locks met BATF standards	☐	☐	☐	
f. Key control system established and functional	☐	☐	☐	
g. Lightening Protection.	☐	☐	☐	
1) Magazine constructed of minimum 3/16 inch metal	☐	☐	☐	
2) Magazine grounded	☐	☐	☐	
3) Magazine located 6 feet from nearest fence	☐	☐	☐	
4) Installation/Client/Property Owner standards met	☐	☐	☐	
h. Fire Protection. Minimum size/type fire extinguisher located within 30 feet of storage magazine	☐	☐	☐	
1) Proper fire division symbol at entrance to storage site	☐	☐	☐	
5) Fire fighting control plan established in APP/SSHP	☐	☐	☐	
6) Area surrounding magazine free of rubbish, brush, dry grass, trees for a minimum of 25 foot.	☐	☐	☐	
i. Magazine location site meets IBD/PTR distances	☐	☐	☐	
j. Commercial explosives being stored in DoD facilities require DoD HC/SCG approval	☐	☐	☐	
k. Adequate earth cover used to meet IBD & PTR distances	☐	☐	☐	

Explosive Storage and Security Survey Checklist

3. Explosive Accountability & Management	YES	NO	NA	COMMENTS
a. Explosive accountability and management responsibilities and organization established	☐	☐	☐	
b. Explosive material purchase/receipt signature authority on-hand	☐	☐	☐	
c. Accountability records & tracking established	☐	☐	☐	
d. MEC final disposition accountability tracking records established	☐	☐	☐	
e. Lost, missing and stolen procedures in place	☐	☐	☐	
f. Disaster preparedness plan in place	☐	☐	☐	
g. Receipt procedures accounting for each item of explosives properly documented on-site	☐	☐	☐	
h. Individuals authorized to receive issue and transport Identified and granted explosive access by the BATF FELC.	☐	☐	☐	
4. Explosive Transportation	**YES**	**NO**	**NA**	**COMMENTS**
a. Hazardous waste manifest on-hand and maintained	☐	☐	☐	
b. Explosive Transport Vehicle	☐	☐	☐	
1) Vehicle inspection checklist on hand	☐	☐	☐	
2) Proper DOT placards, lettering, and/numbering on hand	☐	☐	☐	
3) Operators licensed (CDL/HazMat endorsement)	☐	☐	☐	
4) First aid kit on board vehicle	☐	☐	☐	
5) Communication protocols established	☐	☐	☐	
6) Day boxes on hand	☐	☐	☐	

Key Control Register and Inventory Log

SITE NAME/LOCATION:	PERIOD COVERED: FROM: TO:

KEY CONTROL NUMBER(S)

(Enter serial number or other identifying number from key)

1.	13.	25.	37.
2.	14.	26.	38.
3.	15.	27.	39.
4.	16.	28.	40.
5.	17.	29.	41.
6.	18.	30.	42.
7.	19.	31.	43.
8.	20.	32.	44.
9.	21.	33.	45.
10.	22.	34.	46.
11.	23.	35.	47.
12.	24.	36.	48.

KEY ISSUE AND TURN IN

KEY NUMBER	ISSUED (Date/Time)	ISSUE BY (Printed Name/Signature)	ISSUED TO (Printed Name/Signature)	TURNED IN (Date/Time)	RECEIVED BY (Printed Name/Signature)

Key Control Register and Inventory Log

KEY ISSUE AND TURN IN					
KEY NUMBER	ISSUED (Date/Time)	ISSUE BY (Printed Name/Signature)	ISSUED TO (Printed Name/Signature)	TURNED IN (Date/Time)	RECEIVED BY (Printed Name/Signature)

DEMOLITION/BURN NOTIFICATION CHECKLIST CORRECTIVE MEASURES IMPLMENTATION AT RSA-014S

Function	Phone	Date/Time	Initials
USACE PM	Landline: Cell:		
USACE OESS	Landline: Cell:		
Contractor PM	Landline: Cell:		
Contractor UXOQCS	Landline: Cell:		
Contractor UXOSO	Landline: Cell:		
Security	Landline: Cell:		
Range Control	Landline: Cell:		
Medical	Landline: Cell:		
Fire Department	Landline: Cell:		
ADEM	Landline: Cell:		
	Landline: Cell:		
	Landline: Cell:		
	Landline: Cell:		
	Landline: Cell:		
	Landline: Cell:		
	Landline: Cell:		
SUXOS Signature:		**Date:**	

GENERAL DEMOLITION SAFETY PRECAUTIONS CORRECTIVE MEASURES IMPLEMENTATION AT RSA-014S

1. Carry blasting caps in approved containers and keep them out of the direct rays of the sun. Keep the caps located at least 25 feet from other explosives until they are needed for priming.
2. Do not work with electric blasting caps or other electro-explosive devices while wearing clothing prone to producing static electricity such as nylon, silk, synthetic hair, etc.
3. Do not use explosives or accessory equipment that are obviously deteriorated or damaged. They may cause premature detonation or fail completely.
4. Always point the explosive end of blasting caps, detonators, and explosive devices away from the body during handling.
5. Use only standard blasting caps of at least the equivalent of a commercial No. 8 blasting cap.
6. Use electric blasting caps of the same manufacturer for each demolition shot involving more than one cap.
7. Do not use improvised methods for initiating blasting caps.
8. Do not bury blasting caps. Use detonating cord to transmit the explosive wave from the blasting caps, on the surface, to a buried/tamped explosive charge. Buried blasting caps are subject to unobserved pressures and movement, which could lead to premature firing or misfires.
9. Test electric-blasting caps for continuity at least 50 feet from any other explosives prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wires together. The wires will remain shunted until ready to be connected to the firing circuit.
10. In the event of a misfire when disposing of explosives by detonation, do not approach the disposal site for at least 60 minutes after the expected detonation time, when firing electrically. When conducting non-electric procedures, the wait time will be at least one hour from the expected time of detonation.
11. Items with lugs, strong backs, tail-booms, base plates, etc., should be oriented away from personnel locations.
12. Consideration should be given to tamping the UXO to control fragments, if the situation warrants. Fragments will be minimized not only to protect personnel but also property, such as buildings, trees, etc.
13. Avoid inhaling the smoke, dust or fumes of burning pyrotechnic or incendiary materials. The smoke, dust and fumes from many of these materials are irritating and/or toxic if inhaled.
14. Do not use water on incendiary fires. Water may induce a violent reaction or be completely ineffective, depending on the mixture.
15. Anticipate a high order detonation when burning pyrotechnic or incendiary-loaded MEC. Safety measures for personnel and property must be based upon this possibility.
16. Inert ordnance will not be disposed of, or sold for scrap, until the internal fillers have been exposed and unconfined. Heat generated during a reclamation operation can cause the inert filler, moisture, or air to expand and burst the sealed casings. Venting or exposure may be accomplished in any way necessary to preclude rupture due to pressure from being confined. All requirements of the UXO Procedure for the Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH) will be met prior to releasing any inert ordnance material.
17. Do not conduct blasting or demolition operations during an electrical, dust, sand or snowstorm severe enough to produce atmospheric static electrical charges, or when such a storm is nearby (within 10 miles). Under such conditions, all operations will be suspended or terminated, cap and lead wires shunted, and personnel removed from the demolition area. Demolition operations will also be terminated if visibility becomes less than 600 feet.
18. Loose initiating explosives: lead azide, mercury fulminate, lead styphnate, and tetracene. These explosives manifest extreme sensitivity to friction, heat, and impact. Extra precautions are required when handling these types of explosives. Keep initiating explosives in a water-wet condition at all times until ready for final preparation for detonation. Sensitivity of these explosives is greatly increased when dry.
19. Exercise extreme care when handling and preparing high explosives for detonation. They are subject to detonation by heat, shock or friction.
20. Do not pack bomb fuze wells with explosives unless it can be positively confirmed that the fuze well does not contain any fuze components.
21. Photo flash bombs must be handled with the same care as black powder filled munitions.
22. MEC containing white phosphorous will not be detonated into the ground. White phosphorous munitions will be counter-charged on the bottom centerline (CCBC) when possible.

23. A search of the detonation site, after the demo operation, will be conducted to assure complete disposal was accomplished.
24. Do not abandon any explosives.
25. Do not leave explosives, empty cartridges, boxes, liners or other materials used in the packing of explosives lying around where children, unauthorized persons or livestock can get at them.
26. Do not allow any wood, paper or other materials used in packing explosives to be burned in a stove, fireplace or other confined space, or be re-used for any other purpose. Such materials will be destroyed by burning at an isolated location out of doors, with no one allowed within 100 feet of the burning operation.
27. Do not fight fires involving explosive material. Evacuate all personnel to a safe location and secure the area.
28. Know and observe federal, state, and local laws/regulations, which apply to the transportation, storage and use of explosives.
29. Do not permit metal, except approved metal truck bodies, to contact explosive containers.
30. Do not transport metal, flammable, or corrosive substances with explosives.
31. Do not allow smoking, or the presence of unauthorized personnel, in vehicles transporting explosives.
32. Carefully load and unload explosives from vehicles. Never throw or drop explosives from the vehicle.
33. Assure the load is blocked and braced to prevent it from movement and displacement.
34. Do not drive vehicles containing explosives over public highways until all permits and certifications have been obtained from the state enforcement agencies.
35. All routes must be approved in writing prior to transporting explosive materials over public highways.
36. Licensed commercial carriers will conduct the shipment of explosive materials over public highways unless HGL UXO personnel have been specifically licensed and certified to make the shipment.
37. Never leave vehicle loaded with explosives unattended.
38. Do not store blasting caps, detonators, or other items containing initiating explosives in the same box, container or magazine with other explosives.
39. Store explosive materials in military or ATF approved magazines only. Ensure the magazines used for the storage comply with quantity distance requirements, for the class of explosive material they contain. Reference documents include: OP-5, TM 9-1300-206, AMCR 385-100, ATF - Explosives Law and Regulation, ATF P 5400.7 and 49 CFR.
40. Do not store spark-producing metal/tools in an explosive magazine.
41. Do not permit smoking, matches or any source of fire or flame within 100 feet of an explosive magazine.
42. Do not allow leaves, grass, brush or debris to accumulate within 50 feet of an explosive magazine.
43. Do not permit the discharge of firearms within 300 feet of an explosive magazine.
44. Do not use any alkaline material such as lye, washing soda, or soap to remove TNT exudate. Alkaline materials will react with TNT to render it more sensitive.
45. Do not permit smoking, matches or other sources of fire or flame within 100 feet of an area in which explosives are being handled.
46. Do not expose explosives or devices containing explosive to prolonged exposure to direct sun light. Such exposure can increase sensitivity and deterioration.
47. Ensure all unused explosives are returned to their proper containers and the container closed after use.
48. Do not carry explosives or explosive components in pockets or on the body.
49. Do not insert anything but time fuse or detonating cord into the open end of a blasting cap.
50. Do not strike, tamper with, or attempt to remove or investigate the contents of an electric/non-electric blasting cap, detonator or other explosive initiating device. A detonation may occur.
51. Do not pull on the electrical lead wires of electric blasting caps, detonators or their electro-explosive devices. A detonation may occur.
52. Do not attempt to remove an unfired or misfired primer or blasting cap from a base coupling. There is a high risk of an explosion.
53. Do not allow unauthorized or unnecessary personnel to be present when explosives are being handled.
54. Always point the explosive end of blasting caps, detonators and other explosive devices away from the body.
55. Do not use pull rings or safety pins to lift or handle explosive devices.
56. Work involving priming devices and explosives shall be planned and organized so as to prevent injury or damage to personnel and surroundings. The main responsibility for such a task shall devolve upon one person. Among other things, this person shall ensure that all participants receive necessary information concerning the preconditions for the task and that explosives are handled and stored in a correct and safe manner.
57. If the main person responsible does not herself/himself participate in the work task (s)he shall appoint a deputy who thus also bears responsibility for the practical performance of the task.

58. Never handle damaged detonators. Undamaged detonators can be repacked in packages similar to original boxes.
59. Never use damaged products or partially damaged products (that have been shocked or submitted to excessive temperatures, etc.) During handling and transport of explosives only those personnel who are essential for the performance of the work involved shall be present.
60. Any explosive temporarily stored at a work site shall be protected against mechanical influences, heat, etc. that could conceivably cause unintentional detonation.
61. Different classes and types of dangerous goods shall be stored and transported separately.
62. To avoid the risk of unintentional injury and/or damage to surroundings a triggering method that enables full control over the instant of detonation is recommended. The firing system shall initiate the charge reliably and immediately upon triggering.
63. When triggering exposed firing systems (detonators and surface connectors) ensure that they cannot cause injury or damage to property. As a guideline there should be a safety distance of at least 20 meters.
64. Damaged, undetonated detonators are safety hazards and shall be handled with the utmost care. If possible, they should be neutralized *in situ* by being blasted to destruction by an explosive charge. Damaged, undetonated detonators shall under no circumstances be put together with other explosive goods in any way.
65. Handle with care, avoid all forms of commotion, impact and friction on products and their packages, keep products and packages away from heat, flames and sparks.
66. Keep far from children.
67. The control and implementation of pyrotechnic articles must be done by authorized staff.
68. For shock tube only, consider initial isolation of at least 15 meters (50 feet) in all directions.
69. Fight fire with normal precautions and methods used for plastic fires from a reasonable distance.

IF DETONATORS OR OTHER EXPLOSIVES ARE PRESENT, DO NOT FIGHT FIRE.

I have read, understand, and agree to follow the General Demolition Safety Precautions.

Printed Name	Signature	Representing	Date

RSA DEMOLITION BRIEF AND PLAN

CORRECTIVE MEASURES IMPLEMENTATION AT RSA-014S

1. **I AM THE DEMO SUPERVISOR. ALL ACTIONS WILL BE CLEARED THROUGH ME**. If any changes to the demo plan are made, operations will be halted until the Demo Team Leader and the SUXOS have approved the changes. We will be conducting _____ demolition shots. All personnel must sign the JSA for this operation.
2. Demolition operations will be performed IAW 60A1-1-31, EID-MR-470, the IM WP, and HNC-ED-CS-S-98-7.
3. The RSA authorities will be notified in event of an emergency.
4. No Smoking within 50' of any explosives.
5. The Rally Point will be at the trucks.
6. Only small fires may be extinguished if necessary.
7. NEVER fight fire involving explosives, or a suspicion that explosives may be involved.
8. Radio Frequency Hazards: All radios, cell phones and pagers emit a radio frequency. This can be hazardous to the operation and could cause an unintentional detonation. All cell phones should remain in the vehicle or designated safe area. There are to be no RF transmissions within 25' of blasting caps and firing lead wires when caps are attached.
9. All Demo team personnel shall observe RF and static safety protocols, including checks for static producing clothing.
10. Only personnel DIRECTLY involved with the shot preparation and buildup are to be downrange.
11. Always ground yourself before handling blasting caps.
12. Face 180 degrees away from caps when doing cap build up.
13. Tape ALL connections both electrical and non-electrical.
14. Demo Team Leader will retain control of the blasting machine key.
15. Shot prep and build up:
    A. Cap preparation will be done by: _____
    B. Priming in: _____
    C. Firing shot: _____
16. Barricades and road guards will be positioned at the predetermined points located at:
_____
17. Safe firing point is located at: _____
18. A **5-MINUTE WAIT TIME WILL BE OBSERVED AFTER ALL DEMOLITION OPERATIONS** unless otherwise stated in ordnance specific publications.
19. Any misfires will be dealt with IAW 60A1-1-31, EID-MR-470, the IM WP and the CSS. **WAIT TIME FOR ANY MISFIRE IS 60 MINUTES.**
20. **ANY QUESTIONS?**

Shot Diagram:

Anticipated Shot Time:	**Location:**
SUXOS Approval:	**DTL Approval:**

DEMOLITION SHOT RECORD

Site Name/Location:		Date:
Shot Location (Anomaly ID No./GPS Coord.)	Demolition Supervisor:	State License # (if applicable):
Type of UXO/MEC Destroyed, Vented, or Burned:	Firing Method:	Time of Shot:
Direction and Distance to Nearest Building, Road, Utility Line, etc.:	Temp: _____ Wind Dir./Speed: _____ Ceiling: _____ Clouds/Sun: _____	
Type and Amount of Tamping Used:	Mat or Other Protection Used (list):	
Seismographic/Sound Level Meter Used: Yes ☐ No ☐	Readings/Results:	

Demolition Materials Used

Description	Amount	Description	Amount
Perforator		Time Fuze	
Det Cord		Squibs	
Electric Detonator		Black/Smokeless Powder	
Non-Electric Detonator		Two Component	
Non-El Detonator		Other (list)	

Certification

I certify that the explosives listed were used for their intended purpose, and that the UXO/MEC listed were rendered inert/destroyed.

Signature of Demolition supervisor:_____ Date: _____

DEMOLITION SHOT RECORD

Site Name/Location:		Date:
Shot Location (Anomaly ID No./GPS Coord.)	Demolition Supervisor:	State License # (if applicable):
Type of UXO/MEC Destroyed, Vented, or Burned:	Firing Method:	Time of Shot:
Direction and Distance to Nearest Building, Road, Utility Line, etc.:	Temp: _____ Wind Dir./Speed: _____ Ceiling: _____ Clouds/Sun: _____	
Type and Amount of Tamping Used:	Mat or Other Protection Used (list):	
Seismographic/Sound Level Meter Used: Yes ☐ No ☐	Readings/Results:	

Demolition Materials Used

Description	Amount	Description	Amount
Perforator		Time Fuze	
Det Cord		Squibs	
Electric Detonator		Black/Smokeless Powder	
Non-Electric Detonator		Two Component	
Non-El Detonator		Other (list)	

Certification

I certify that the explosives listed were used for their intended purpose, and that the UXO/MEC listed were rendered inert/destroyed.

Signature of Demolition supervisor:_____ Date: _____

Munitions and Explosives of Concern Demilitarization/ Disposal by Detonation Accountability Record

Site Name:	Site Location:	Contract Number:	Delivery/Task Order No:
RSA-014S	**RSA, Madison County, AL**	**W912DY-17-D-0003**	**W912DY19F1116**

Anomaly No.	Grid or GPS Coordinates Location	Depth Detected (feet)	Identification/Nomenclature (include DMM, MC, MEC or UXO)	Date Located	Date of Demil/ Disposal	Method of Demil/Disposal	Comments

SUXOS review and acceptance (print name):	SUXOS signature:	Date:

Explosive Material Disposition Record – Bill of Lading

Date:	Site Name/Location:	Grid #/Area or GPS coordinate:	Distributee Explosive License #:

This form will be used as a Bill of Lading anytime explosives are transported in a APTIM vehicle under DOT regulations and kept with the explosive driver in the vehicle until the explosives are issued, expended or returned to storage.

SECTION I. Explosive Material Issued for Demilitarization/Demolition Operations:

Lot Number/Manufacturer's Marks of Identification	Brand Name, Nomenclature or Description	Quantity	Hazard/ Class	Receipt Initials

Print Explosive Driver Name:	Explosive Driver Signature:

SECTION II. Explosive Material Expended by Detonation:

Lot Number/Manufacturer's Marks of Identification	Brand Name, Nomenclature or Description	Quantity	Hazard/ Class	Receipt Initials

SECTION III. Explosive Material Returned to Storage:

Lot Number/Manufacturer's Marks of Identification	Brand Name, Nomenclature or Description	Quantity	Hazard/ Class	Receipt Initials

Demolition Supervisor Signature:	SUXOS Signature:

Manufacturer of Explosives Record of Acquisition

Site Name/Location:	License Number:

Project Site Activity:	Supervisor's Name/Position:

Date of Manufacture or other Acquisition	Lot Number or Manufacturer's Marks of Identification	Brand Name, Nomenclature or Description and Size (when mixing binary materials)	Quantity Acquired	Name, Address and License or Permit Number of Distributor

OMB No. 1140-0026 (09/30/2016)

U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives

Report of Theft or Loss-Explosive Materials

For ATF Use Only

Date Received	Date E-Mailed to JSOC & Field Division	BATS ID
		Case Number

To Be Completed By Person Making Report

Upon discovery of any theft or loss of any of your explosive materials:
- First, contact ATF toll free at 1-800-461-8841 between 8:00 a.m. - 5:00 p.m. EST or after hours and weekends contact ATF at 1-800-800-3855 to report the theft or loss;
- Second, contact your local law enforcement office to report the theft or loss to obtain a police report; and
- Third, complete this form and attach any additional reports, sheets or invoices necessary to provide the required information, and fax the form with additional material(s) to the ATF U.S. Bomb Data Center (USBDC) at 866-927-4570 or email to USBDC@atf.gov.

1. Date	2. Type of Report *(Check one)*: ☐ Theft ☐ Loss ☐ Attempted Theft/Suspicious Activity ☐ Supplement
3. Full Name of Person Making the Report *(Last, First, Middle)*	4a. Licensee or Permittee Name
4b. Federal Explosives License or Permit Number	
5a. Office Address *(Street Address, City, State, and Zip Code)*	5b. Telephone Number
	5c. E-mail Address

6. Actual Location of Theft or Loss *(If different from item 5a)*

7. Theft or Loss	Date	Time	8. Name of Local Law Enforcement Officer to Whom Reported
a. Discovered			9. Name and Address of Local Authority to Whom Reported
b. When Was the Magazine Last Checked			
c. Occurred *(Show approximate if exact not known)*			
d. Reported to ATF by Telephone			10. Telephone Number
e. Reported to Local Authorities			11. Police Report Number

12. Explosive Materials Lost or Stolen *(Attach invoices or additional sheets, if necessary)*

a. Manufacturer and/or Importer	b. Brand Name	c. Date Shift Code	d. Size *(Length & Diameter)*	e. Quantity *(Pounds of Explosives, Number of Dets)*	f. Type and Description *(Dynamite, Blasting Agents, Detonators, etc. Include for each type, size, MS delay or length of legwire, as applicable)*

13. Theft or Loss Occurred from *(Check applicable box on each row)*

a. Magazine Type:

☐ 1 ☐ 2 ☐ 2 Det. Box ☐ 3 Day Box ☐ 4 ☐ 5

☐ Outdoor ☐ Indoor

☐ Permanent ☐ Portable ☐ Mobile Truck ☐ Mobile Trailer

☐ Overnight Storage ☐ Day Storage

b. Types of Locks *(Check all that apply)*:

☐ Padlock ☐ Mortise ☐ 3-Point ☐ Puck Lock ☐ Other *(Explain)* _____

c. Location Description/Type:

☐ Licensed/Permitted Premises ☐ Remote Storage ☐ Work Site ☐ In Transit ☐ During Operations

14. Method of Entry:

☐ Door Was a Key Used? ☐ Yes ☐ No Suspected Employee-Involved Theft? ☐ Yes ☐ No

☐ Wall(s) ☐ Roof ☐ Floor/Bottom

Lock(s) Defeated? *(If yes, check additional appropriate boxes)* ☐ Yes ☐ No

☐ Lock Shackle Cut *(How?)* _____ ☐ Lock Pried, Twisted or Levered

☐ Lock Left Unlocked ☐ Lock Picked or Shimmed

☐ Keyway Drilled Out ☐ Lock Body Drilled Out or Cut

☐ Other *(Explain)* _____

Manufacturer and Model of Lock:	Location of Magazine Keys: ☐ Office ☐ Employee ☐ Other *(Address)* _____	Are All Keys Accounted For? ☐ Yes ☐ No

15. Hood Defeated? *(If yes, check all applicable)* ☐ Yes ☐ No

☐ Hood Cut ☐ Hood Removed

☐ Other *(Explain)* _____ ☐ Hood Broken

Hood Width *(Inches)* _____ Hood Length (Inches) _____

Hood Depth *(Inches)* _____ Hood Thickness (Inches) _____

16. Circumstances Pertaining to the Theft, Loss or Suspicious Activity *(Any details you can provide)*

16a. Was Theft or Loss Disclosed During an ATF Inspection or Being Reported as a Result of Inspection? ☐ Yes ☐ No

16b. Additional Security Measures in Place?

☐ Alarm ☐ Security System/Service ☐ Fencing ☐ Lighting ☐ Other *(Explain)* _____

17. Signature and Title of Person Making Report	18. Date

Reporting Instructions

Email or fax this completed form to the ATF address listed below or call if no fax is available:

Bureau of Alcohol, Tobacco, Firearms and Explosives
U.S. Bomb Data Center
99 New York Ave., N.E. 8.S-295
Washington, DC 20226
Toll Free Fax: 1-866-927-4570
Email Address: USBDC@atf.gov

Questions regarding the completion of this form should be referred to the U.S. Bomb Data Center toll free at 1-800-461-8841.

Privacy Act Information

The following information is provided pursuant to section 3 of the Privacy Act of 1974 (5 U.S.C. § 522a(e)(3).

1. **Authority.** Solicitation of this information is made pursuant to Title XI of the Organized Crime Control Act of 1970 (18 U.S.C. Chapter 40). Disclosure of a theft or loss of explosive materials is mandatory pursuant to 18 U.S.C. § 842(k) for any person who has knowledge of such theft or loss from his stock.

2. **Purpose.** The purpose for the collection of this information is to give ATF notice of the theft or loss of explosive materials, and to furnish ATF with the pertinent facts surrounding such theft or loss. In addition, the information is used to confirm and verify prior notification of this theft or loss of explosive materials.

3. **Routine Uses.** The information will be used by ATF to aid in the administration of laws within its jurisdiction concerning the regulation of explosive materials and other related areas. In addition, the information may be disclosed to other Federal, State, foreign, and local law enforcement of laws within their jurisdiction. System of records notice Justice/ATF-008 Regulatory Enforcement Record System FR Vol.68 No.16 Page 3558 dated January 24, 2003.

4. **Effects of not supplying information requested.** 18 U.S.C. § 842(k) makes it unlawful for any person, who has knowledge of the theft or loss of explosive materials from his stock, to fail to report such theft or loss within twenty-four hours of discovery thereof, to the Secretary and to appropriate local authorities. The penalty for violation of this section is a fine of not more than $1,000 or imprisonment for not more than one year, or both. 18 U.S.C. § 844(b).

Paperwork Reduction Act Notice

This request in accordance with the Paperwork Reduction Act of 1995. The purpose of this information collection is to report the theft or loss of explosive materials. The information is used for investigative purposes by ATF officials. This information is mandatory by statute. (18 U.S.C. § 842)

The estimated average burden associated with this collection of information is 1 hour and 48 minutes per respondent or recordkeeper, depending on individual circumstances. Comments concerning the accuracy of this burden estimate and suggestions for reducing this burden should be addressed to Reports Management Officer, Document Services, Bureau of Alcohol, Tobacco, Firearms and Explosives, Washington, DC 20226.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

PREVIOUS EDITION MAY BE USED

1	2	3	4	5	6	7	23	24	25	26	27	28	29	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
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5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS

10. QTY. REC'D	11.UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE

22. RECEIVED BY	23. DATE RECEIVED

24. DOCUMENT NUMBER & SUFFIX

25. NATIONAL STOCK NO. & ADD (8-22)

26. RIC (4-6)
UI (23-24)
QTY (25-29)
CON CODE (71)
DIST (55-56)

27. ADDITIONAL DATA

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MATERIEL COURIER RECEIPT

SHIPPER'S CONTROL/DOCUMENT NO.

SHIPPER

SUPPLY ACCOUNT NUMBER

DESTINATION

SUPPLY ACCOUNT NUMBER

I certify by my signature that I have received the materiel listed on this form and am aware of the applicable safety and security requirements.

SHIPMENT TRANSFERS

FIRST	LOCATION OF TRANSFER	DATE *(YYYYMMDD)*
RECIPIENT'S PRINTED NAME *(Last, First, Middle Initial)*	ORGANIZATION OR ACCOUNT NO.	
SIGNATURE		
SECOND	LOCATION OF TRANSFER	DATE *(YYYYMMDD)*
RECIPIENT'S PRINTED NAME *(Last, First, Middle Initial)*	ORGANIZATION OR ACCOUNT NO.	
SIGNATURE		
THIRD	LOCATION OF TRANSFER	DATE *(YYYYMMDD)*
RECIPIENT'S PRINTED NAME *(Last, First, Middle Initial)*	ORGANIZATION OR ACCOUNT NO.	
SIGNATURE		
FOURTH	LOCATION OF TRANSFER	DATE *(YYYYMMDD)*
RECIPIENT'S PRINTED NAME *(Last, First, Middle Initial)*	ORGANIZATION OR ACCOUNT NO.	
SIGNATURE		
FIFTH	LOCATION OF TRANSFER	DATE *(YYYYMMDD)*
RECIPIENT'S PRINTED NAME *(Last, First, Middle Initial)*	ORGANIZATION OR ACCOUNT NO.	
SIGNATURE		

SHIPMENT DESCRIPTION

LINE NUMBER	QUANTITY	SERIAL NUMBERS	REMARKS

DD FORM 1911, APR 2010

PREVIOUS EDITION IS OBSOLETE.

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Calibration Log

Project Name: CORRECTIVE MEASURES IMPLEMENTATION AT MULTIPLE (9) SITES (RSA-014S) AT THE REDSTONE ARSENAL MADISON COUNTY, ALABAMA
Project Number:

Date/Time	Calibrated By	Instrument	Standard/Manufactured Lot No.	Standard Concentration	Instrument Reading	Comments

RESPONSE TO COMMENTS

Responses to Alabama Department of Environmental Management (ADEM) Review Comments on the Corrective Measures Implementation Work Plan, RSA-014S, Unlined Inactive Burn Trenches, Unit #2, Operable Unit 14 Redstone Arsenal, Madison County, Alabama Dated September 15, 2021

Comments from ADEM dated December 14, 2021 (received December 15, 2021).

General Comment

Comment 1: **As described within this CMI Work Plan, the Army has designated RSA-014 South as having a "Moderate/High Probability for UXO". With this particular designation of moderate to high probability of encountering munitions and explosives of concerns (MEC), the activity performed within this area must be conducted using anomaly avoidance techniques or explosive ordnance disposal (EOD)/unexploded ordnance (UXO)-qualified personnel must attempt to identify and remove any explosive or chemical agent hazards in the construction footprint prior to any activities. The CMI Work Plan does not clearly state that the operational team will be removing the soils in lifts (potentially 1 foot) using EOD/UXO-qualified personnel anomaly avoidance techniques. The CMI Work Plan also does not disclose what actions will be taken if an anomaly is found within the designated soil to be removed. In order to continue removing the desired soil, this occurrence would necessitate pausing the operation and bringing in EOD/UXO-qualified personnel to clear an anomaly each time one is found while non-essential personnel vacate the potential hazard area. Within the scoping presentation slides pertaining to MEC in Appendix D: Quality Assurance Project Plan, it is stated, "Planned CMI activities − Contingencies will be discussed for unforeseen but possible events at the site (e.g., MEC is unexpectedly encountered during excavation)". These contingencies were not found within the CMI Work Plan and should be included. The Department recommends that the project use EOD/UXO-qualified personnel to clear the excavation footprint of anomalies prior to the soil removal. This would ensure that the project objectives are met efficiently and that the potential explosive hazard is mitigated. Please revise the document to address these concerns.**

Response 1: In lieu of excavating soil in 1-foot lifts for anomaly avoidance, a surface clearance and subsurface removal will be conducted at the planned excavation areas prior to performing the soil excavation task. To support this revised approach, the Army will prepare an ESS and add text to the CMIP and appendices to address surface clearance and subsurface removal for MEC/MD in the excavation areas and the subsequent MEC disposal and records management to comply with Section 6.7 of EP 75-1-2 as well as other relevant guidance.

Specific Comment

Comment 1: **Appendix I, Land-Use Controls, Page I-4, Section I4.3, Last Sentence – The sentence states, "RSA shall notify the ADEM at least 90 days in advance of the proposed closing on any sale or other conveyance of any interest in any or all of the Property, in accordance with the RSA Permit (ADEM, 2021)". The referenced version of the Alabama Hazardous Wastes Management and Minimization Act (AHWMMA) Permit for Redstone Arsenal does not contain information pertaining to the notices for RSA-014 South. The Department recommends that the Army revise the statement to reference ADEM's Uniform Environmental Covenants Program, which are located in Alabama Administrative Code Rules 335-5-1. Please address.**

Response 1: The second sentence in Section I4.3 will be revised to state: "RSA shall notify ADEM in advance of the proposed closing on any sale or other conveyance of any interest in any or all of the Property, in accordance with Alabama Administrative Code, Chapter 335-5-1 (ADEM, 2019). Similar text in Section 4.15.3 in the main CMIP will also be revised.