

Diving Operations Plan

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Under contract to:
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Project: Dominion Energy South Carolina, Inc.
Congaree River Project UXO Support

Diving Operations Plan

This Diving Operations Plan is a general overview of the underwater diving operations to be performed while conducting underwater intrusive activities at Congaree River Project in Columbia, SC.

If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the Designated Diving Coordinator (DDC) will be contacted in order to review and accept the alteration prior to actual operation.

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Contents

Table of Contents

1. Project Introduction 1

 1.1 PROJECT WORK AUTHORITY 1

 1.2 PROJECT PURPOSE 1

 1.3 PROJECT LOCATION 1

 1.4 SITE BACKGROUND, AND DESCRIPTION 3

 1.5 Removal Objectives 5

 1.6 SCHEDULE 7

 1.7 DIVING OPERATIONS PLAN ORGANIZATION 7

2. Dive Team 8

 2.1. PERSONNEL 8

3. Equipment 11

 3.1. DIVE EQUIPMENT AND PLATFORM 11

4. Tasks 12

 4.1. TASK 1 MOBILIZATION AND DEMOBILIZATION 12

 4.2. TASK 2 DOCUMENTATION 12

 4.3. TASK 3 CRP REMOVAL ACTION 12

5. Dive Operations 13

 5.1. CRP REMOVAL ACTION 13

 5.2. DIVING CONDITIONS 14

 5.3. QUALITY ASSURANCE OVERSIGHT 14

6. Key Personnel 15

 6.1. RESPONSIBILITIES 15

 6.1.1. Dive Supervisor 15

 6.1.2. Diving UXO Specialist (Diver) 15

 6.1.3. Standby Diver 15

 6.1.4. Tender 15

7. Project Records and Reporting 16

 7.1. PROJECT RECORDS 16

 7.1.1. Field Documentation 16

 7.1.2. Dive Logs 16

 7.2. PROJECT REPORTING 16

8. References 17

List of Tables

Table 2-1 DIVE TEAM PERSONNEL COMPOSITION 8

Table 2-2 DIVE TEAM PERSONNEL AND DUTIES 9

List of Figures

Figure 1-1 Site Location 2

Figure 1-2 TLM Distribution and Thickness 4

Figure 1-3 Modified Removal Area 6

List of Attachments

Attachment A Emergency Management Plan

Attachment B Activity Hazard Analysis

Acronyms and Abbreviations

°F	degrees Fahrenheit
AHA	activity hazard analysis
AOC	area of concern
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
CRP	Congaree River Remediation Project
DDC	Designated Dive Coordinator
DDESB	Department of Defense Explosives Safety Board
DESC	Dominion Energy South Carolina, Inc.
DFW	definable feature of work
DoD	Department of Defense
DOP	Diving Operations Plan
DQCR	Daily Quality Control Report
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
ESP	Explosives Site Plan
EZ	exclusion zone
ffw	feet of fresh water
GPS	global positioning system
HAZWOPER	Hazardous Waste Operation and Emergency Response
HE	high explosives
IAW	in accordance with
IRA	Interim Removal Action
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
NAVFAC	Naval Facilities Engineering Command
No.	number
NWS	Naval Weapons Station
OSHA	Occupational Safety and Health Administration
PM	Project Manager
QA	quality assurance

QC	quality control
RI	Remedial Investigation
SCUBA	self-contained underwater breathing apparatus
SI	Site Investigation
SOW	scope of work
SSHP	Site Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
SWMU	solid waste management unit
TLM	Tar Like Material
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USCG	United States Coast Guard USN
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

1. Project Introduction

1.1 PROJECT WORK AUTHORITY

Apex Companies, LLC (Apex) has contracted TITAN Associates Group Inc to prepare plans to perform underwater clearance of Munitions and Explosives of Concern (MEC) [also commonly referred to as Unexploded Ordnances (UXOs) in support of contaminated sediment removal on the Congaree River Project (CRP), Columbia, South Carolina (SC).

This Diving Operations Plan (DOP) is a living document. A living document is one that can be modified, as necessary, to best achieve the goals and objectives stated within. Based on field observations, site conditions, and other unknown circumstances or conditions, this document may be modified in order to best achieve the objectives of the underwater intrusive activities. If for any reason the DOP is altered in procedures, depth, personnel, or equipment, the Designated Dive Coordinator (DDC) will be contacted in order to review and accept the alteration prior to actual operation.

This DOP provides the technical approach, rationale, and field procedures to be followed in order to achieve the objectives of the underwater clearance activities during the CRP, Columbia, SC. This DOP was prepared in accordance with (IAW) the APEX Contract No. 87500614, dated October 29, 2021.

1.2 PROJECT PURPOSE

The purpose of the CRP diving activities in the cofferdam and remediation areas shown on **Figures 1-1 through 1-3** is to remove MEC in order to reduce hazards from Civil War era military munitions co-located within the Tar Like Material (TLM) contaminated sediment removal areas. TITAN will be performing dive operations to remove MEC / UXO from coffer dam footprints prior to installation. The underwater intrusive activities will be completed IAW the USACE and the Department of Defense (DoD) Explosives Safety Board (DDESB) approved Explosives Safety Submission (ESS).

1.3 PROJECT LOCATION

The CRP area is located on the Congaree River in Columbia, SC. The site, also referred to as the “project area”, has been divided into two separate areas And begins directly south of the Gervais Street Bridge. Area 1 consists of approximately 2.6 acres and Area 2 is approximately 0.5 acres in total and extends downriver, towards the Blossom Street Bridge. Cofferdam installations are planned around each area, so the areas may be dewatered and MEC / UXO screening and sediment removal may occur in dry conditions. The underwater intrusive activities will occur within the cofferdam footprint areas prior to installation on the eastern side of Congaree River between Gervais and Blossom Street Bridges, shown on Figure 1-1.

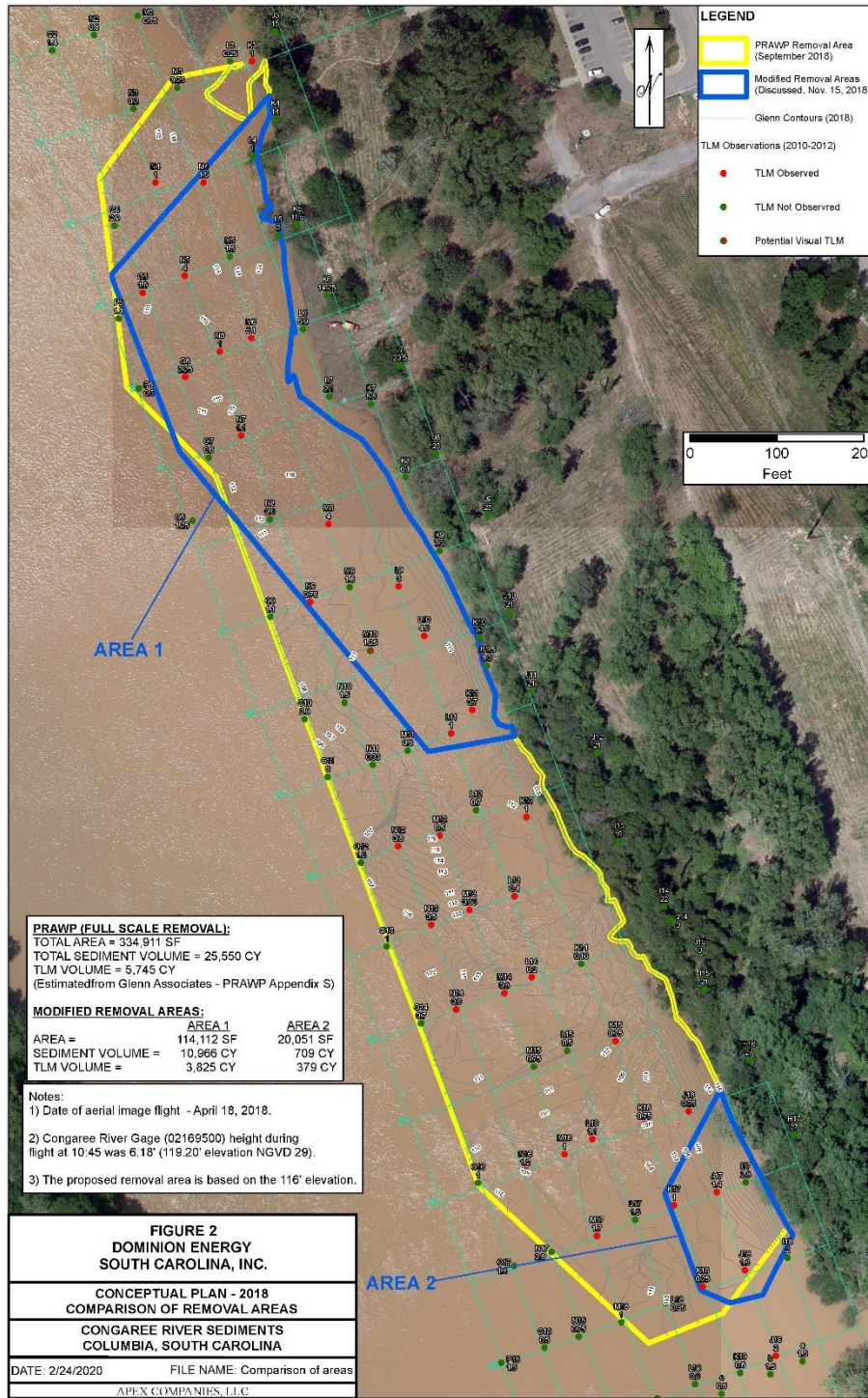


Figure 1-1 Site Location

1.4 SITE BACKGROUND, AND DESCRIPTION

In 1865, during the Civil War, live munitions and other articles of war produced by the Confederacy were dumped into the Congaree River near the Gervais Street Bridge by Union forces under the direction of General Sherman. This activity took place during Sherman's occupation of Columbia. The Union Army kept some of these items for its own use and the remainder was destroyed. One of the methods for destruction was dumping the items into the river.

Archeological investigations, conducted as late as 1980, recovered some live and unstable munitions or unexploded ordinance (UXO) from the area as well as some other potentially historically significant artifacts. Specifically, this work was focused in and adjacent to the unnamed tributary that enters the river just south of the Gervais Street Bridge. Several live cannonballs were identified during this operation and properly disposed of by trained explosive ordinance disposal (EOD) personnel located at nearby Fort Jackson.

Due to the potential presence of live munitions within the project area, an additional reconnaissance and screening of the area in question was conducted as part of the investigative activities. An acoustic (side scan sonar) and magnetic (magnetometer) remote sensing survey was performed to identify ordnance and other submerged cultural resources in the remediation area by Tidewater Atlantic Research, Inc. and a report submitted on 8 February 2012. Analysis of the survey data identified concentrations of anomalies with unexploded ordnance (UXO) potential in the immediate vicinity of the Senate Street landing and scatters extending into the river. A terrestrial magnetometer investigation of the unnamed tributary below the Gervais Street Bridge was also carried out and that investigation identified eight additional anomalies with a potential association with ordnance.

In June 2010, the occurrence of a tar-like material (TLM) within the Congaree River was reported to the South Carolina Department of Health and Environmental Control (SCDHEC). Preliminary testing indicated that the material may be attributable to the Huger Street former Manufactured Gas Plant (MGP) that was operated by predecessor companies of Dominion Energy South Carolina, Inc. (DESC) beginning in the early 1900s and ending in the 1950s.

Preliminary sample results conducted on the material by SCDHEC and DESC indicated that the TLM had similar chemical and physical characteristics as coal tar, a by-product of Manufactured Gas Operations which were common in cities from the late 1800s until the 1950s. Additional research found that the most likely source of the TLM was a former Manufactured Gas Plant (MGP) located northeast of the river at 1409 Huger Street that operated from about 1906 until the mid-1950s. Later this was the location of the city bus terminal until 2008. Figure 1-2 shows the location of TLM detected during the investigative activities.

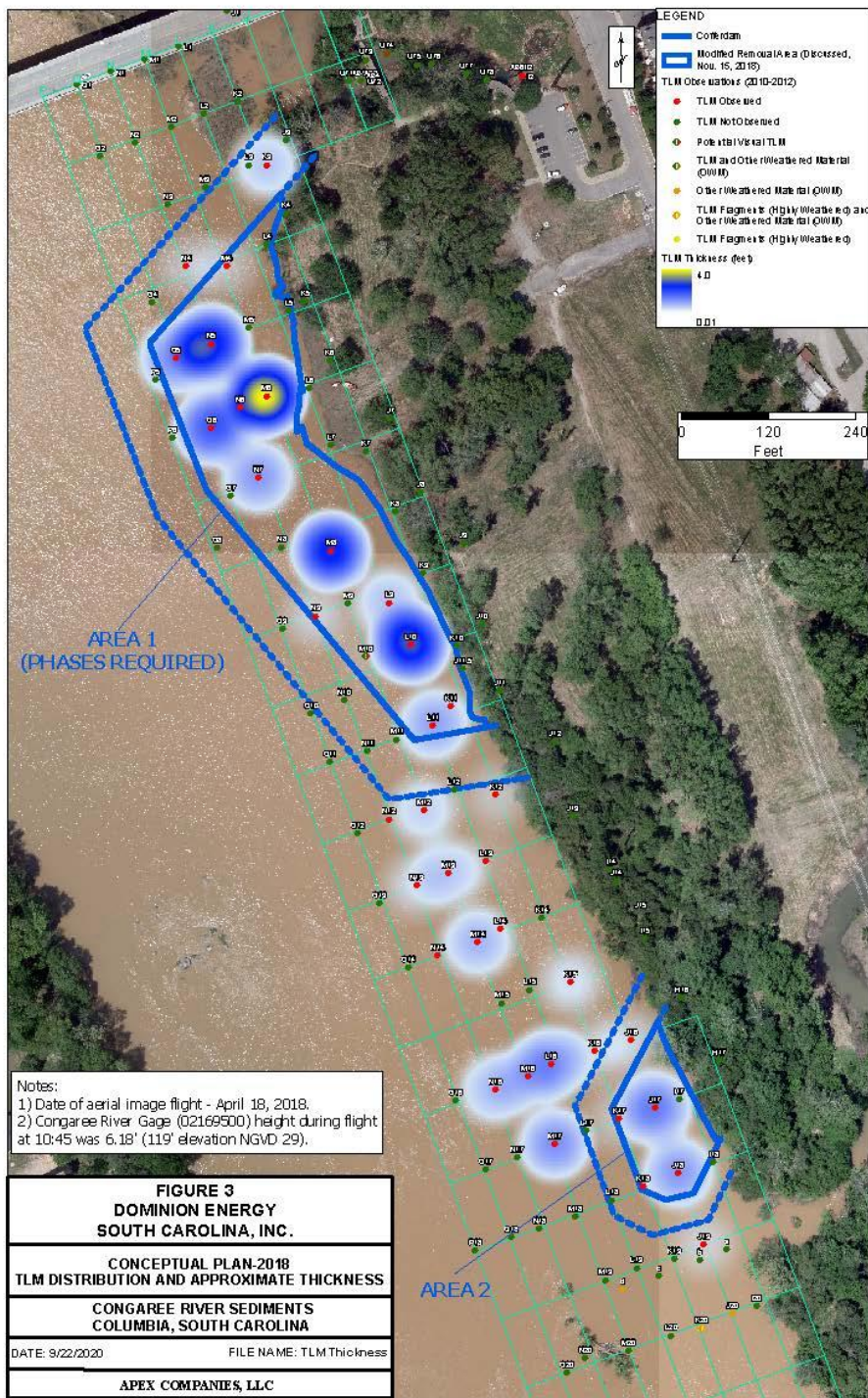


Figure 1-2 TLM Distribution and Thickness

DESC had previously entered into a Voluntary Cleanup Contract (VCC) with DHEC in August 2002 to conduct environmental assessment and cleanup activities at the former Huger Street MGP site. DESC has worked proactively and cooperatively with DHEC under its existing VCC to determine the extent of TLM in the Congaree River and to develop a plan for cleanup.

To address the presence of TLM within the river, a Stakeholder-Developed Modified Removal Action was developed and submitted to SCDHEC in December 2018. Two areas within the river, along the eastern shoreline, were proposed for removal of impacted sediment. The TLM-impacted sediment varies in thickness from a few inches to approximately 6 feet thick in some areas. The current total estimate of sediment requiring removal is approximately 11,675 cubic yards. The total project area within the river, including cofferdam footprints and removal areas, is estimated to be 5.8 acres. Sediment removal from within the river will occur after coffer dams are installed and water has been removed. Intrusive Dive removal operations of metallic anomalies will be conducted prior to installation of the coffer dams.

In December 2018, a Stakeholder-Developed Plan for the Modified Removal Action (MRA) was developed to reduce the footprint of the project area. The footprint was reduced to the current 2.6-acre area 1 and area 2 approximately 0.5 acres. See figure 1-3.

1.5 Removal Objectives

The objective of this dive plan is to locate and remove MEC / UXO from underwater sediment in the location of future cofferdam area footprints. The cofferdams are to be installed prior to coal tar contaminated sediment removal. Figure 1-3 shows the location of the footprint to be cleared for each project area. The overall objective of removing MEC is to reduce the risk to environmental construction workers and eliminate/reduce the potential of MEC within the removal action area boundaries.

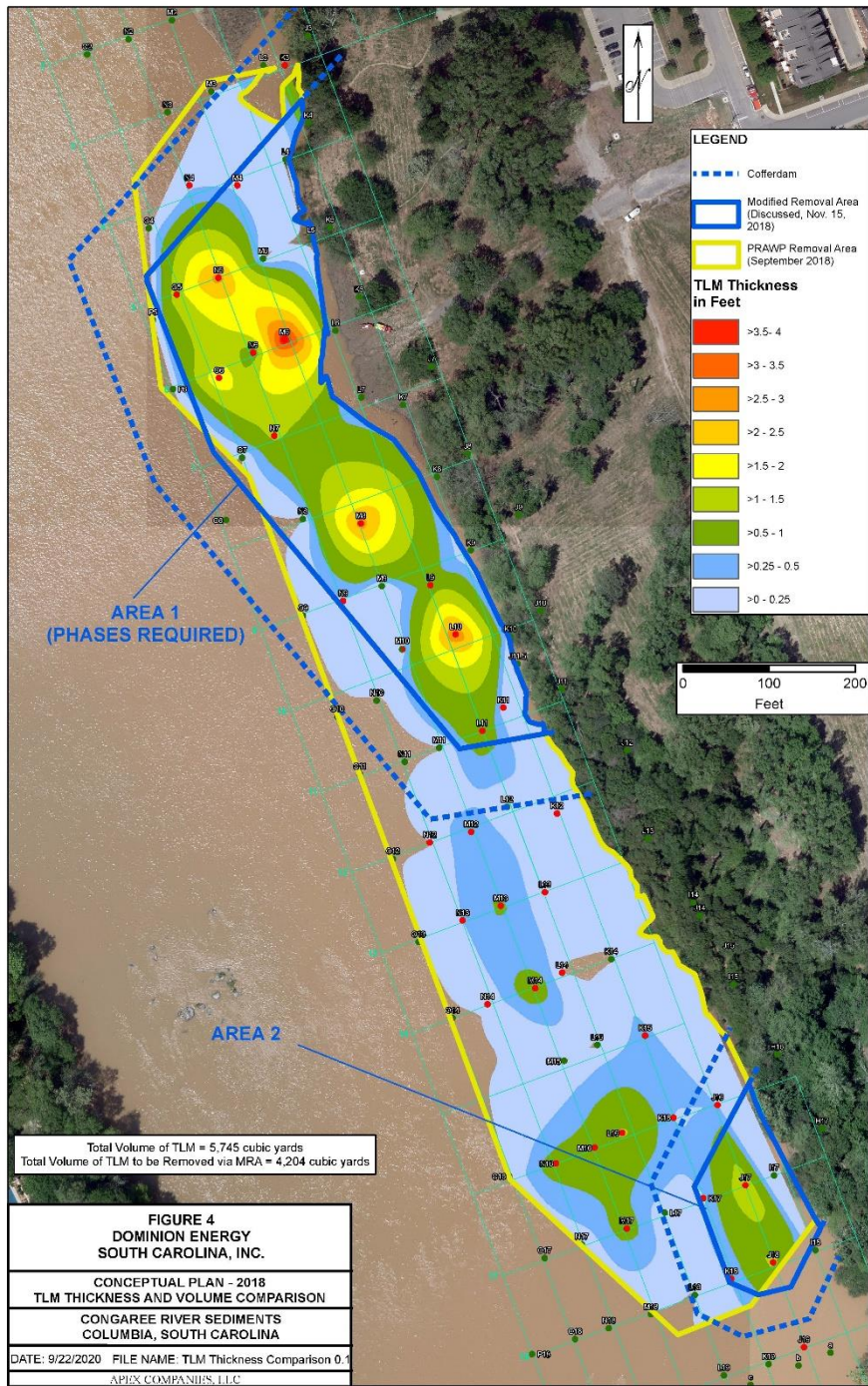


Figure 1-3 Modified Removal Area

1.6 SCHEDULE

The underwater intrusive activities for the cofferdam footprints are tentatively scheduled to begin in Spring/Summer 2021. The preliminary schedule is as follows:

- Respond to comments and finalize DOP in February 2021.
- Complete Area 1 and 2 coffer dam underwater intrusive activities in May up to August 2021.
- Project reporting activities November to December 2021.

During the course of the underwater intrusive activities, modifications to the schedule may be necessary. The schedule modifications will be submitted to DESC, and will include:

- Reasons for the modification
- Descriptions of the alternatives evaluated to increase productivity (e.g., increase manpower, lengthen workdays, more efficient equipment, etc.)
- Methods that will be used to prevent similar delays from happening again

1.7 DIVING OPERATIONS PLAN ORGANIZATION

This DOP is organized as follows:

Section 1 – Introduction. Presents the authority, purpose, project description and general scope, personnel, site description and history, removal objectives, and tentative schedule for CRP underwater intrusive activities.

Section 2 – Dive Team. Summarizes the names and duties of personnel involved with diving operations for CRP.

Section 3 – Equipment. Provides a description of required equipment and platform to be utilized during diving operations.

Section 4 – Tasks. Summarizes the tasks for underwater intrusive activities.

Section 5 – Dive Operations. Details the procedures to be followed during diving operations, underwater intrusive activities, field Quality Control (QC) procedures and requirements to be followed.

Section 6 – Key Personnel. Describes project key personnel and organization for diving activities.

Section 7 – Project Records and Reporting. Lists project reporting deliverables for the CRP underwater intrusive activities.

Section 8 – References. Provides references used to develop this DOP.

This section provides information on the CRP Dive Operations Team for underwater intrusive activities.

2. Dive Team

2.1. PERSONNEL

Listed in the Table 2-1 below are the team requirements, as defined in Appendix O of EM 385-1-1, that will be met for self-contained underwater breathing apparatus (SCUBA) diving operations:

Table 2-1 DIVE TEAM PERSONNEL COMPOSITION

Personnel Assignments	Number of personnel
Dive Supervisor (Dive qualified, unexploded ordnance [UXO] qualified)	1
Stand-By Diver	1
Diver in the water (tethered with communications)	2
Tender	1
Total Team Requirements	5

The divers in the water will be tethered using a safety harness equipped with a positive buckling device, an attachment point for the safety line, and a lifting point to distribute the weight over the diver's body while maintaining a heads-up attitude if unconscious. The safety line will be a positive control link to the surface that can also be used for line pull signals and diver recall. The tenders will maintain constant communication with the tethered diver using two-way voice communications or using line pull signals as described in Attachment B of TITAN's Diving Safe Practices Manual. In visibility of less than three feet two-way voice communication will be maintained and the diver will be line tended. The tender will not perform any other duties while the diver is in the water. This will ensure that the diver is in constant contact with at least one other member of the dive team. If it becomes necessary for the stand-by diver to enter the water, the Dive Supervisor will serve as his tender.

The Project Dive Operations Team is identified on **Table 2-2**.

Table 2-2 DIVE TEAM PERSONNEL AND DUTIES

NAME	DUTIES
Nelson Figeac	Dive Supervisor, Diver, Standby Diver, Tender, Senior Unexploded Ordnance Supervisor (SUXOS)-Qualified, Safety Boat Operator
Tom Dailey	Dive Supervisor, Diver, Standby Diver, Tender, UXOQCS
Rickey Hammer	Diver, Standby Diver, Tender, UXO Technician
Harry Craig	Diver, Standby Diver, Tender, UXO Technician
Kevin Kerns	Diver, Standby Diver, Tender, UXO Technician

If for some reason a diver is unable to complete the project (e.g., health, family problems, etc.) a qualified alternate diver will be substituted. Alternate diver qualification will be submitted to DESC prior to a new diver joining the dive operations.

Dive station will be manned by no less than a Dive Supervisor, Diver, Standby Diver and Tender. Under normal operations, one diver will be in the water at a time. The tender will maintain constant contact with the diver, tend the tether and monitor potential hazards to the diver. A standby diver will be dressed and ready to assist in an emergency any time that a diver is in the water. The primary Dive Supervisor is Nelson Figeac. He is the person responsible for all dive operations.

The Dive Supervisor is responsible for all dive-planning, briefings, monitoring diver depths and dive times, and recovering and deploying the dive teams accordingly.

Prior to mobilization, personnel training and requirements will be confirmed to ensure that dive personnel have the appropriate training, licenses, certifications, and experience. Copies of certifications/qualifications will be submitted for review two weeks prior to beginning dive operations and copies will be maintained on site and available for review by DESC representatives. The relevant personnel requirements for underwater intrusive activities at CRP will include the following:

- Workers who may be exposed to contaminated media will have completed 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certification, 8-hour HAZWOPER refresher certification as appropriate, and medical monitoring set forth in 29 Code of Federal Regulations (CFR) 1910.120. Workers who are not in direct contact with contaminated media will be exempt from this requirement. Exempt workers include Quality Assurance (QA) representatives and project management, as long as they are protected from exposure to contaminated media and remain outside the exclusion zone (EZ) for intrusive activities.¹

¹ 29 CFR 1910.120(e)(3)(i) defines employees who are required to have 40-hour HAZWOPER training. It requires workers "...engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards..." to receive 40 hours of HAZWOPER training. An OSHA Interpretation Letter dated November 19, 1991 states that "if potential for exposure is extremely unlikely the standard would not apply." Employees protected from exposure and that remain outside of the exclusion zone during intrusive operations are extremely unlikely to be present.

- Divers will meet or exceed the minimum qualification in accordance with DDESB Technical Paper (TP) 18.
- Site supervisors must successfully complete the Occupational Safety and Health Administration (OSHA) 8-hour HAZWOPER Supervisor Course.
- Diver personnel have completed the OSHA-approved basic 40-hour health and safety training HAZWOPER course, annual refreshers of the same, military diver course for the apparatus utilized onsite, oxygen administrator, first aid, and cardiopulmonary resuscitation (CPR). Field personnel, required training, and the most current completion date of training are presented in a separate stand-alone document submitted to USACE and are not included in this DOP.
- Diver will meet or exceed the training and experience requirements of EM 385-1-1, Section 30.A.08.

All workers will be required to read and understand the Site Safety and Health Plan (SSHP), Diving Safe Practices Manual, Emergency Management Plan, Activity Hazards Analysis (AHA), and daily safety briefings will be completed as work progresses.

This section provides information on the anticipated diving and support equipment to be utilized at CRP.

3. Equipment

3.1. DIVE EQUIPMENT AND PLATFORM

The diving method will utilize SCUBA. The associated equipment to support SCUBA operations will include the following:

- SCUBA Tank -80 CF Steel or Aluminum Construction
- Diver Communications – Two-way voice communication similar to Ocean Technologies System Model OTS-BUD-D2
- Emergency Gas Supply – 30 CF with separate regulator
- Diver Knife
- Full Face Diving Mask – with integral regulator
- Surface Communications
- Thermal Protection –Wet Suit or Dry Suite
- Diver Swim Fins
- Buoyancy Compensator
- Diver Computer
- Underwater Light

The minimum support equipment to be utilized will include the following:

- Dive Flag
- Medical Kit
- Underwater Camera
- Current Flow Probe
- Oxygen Kit
- Marine Radio
- Fathometer
- Litter/Backboard
- Cellular Phone

The diver will be walking in from the shore with safety boat attending in the water.

This section provides the required tasks for underwater intrusive activities at CRP.

4. Tasks

4.1. TASK 1 MOBILIZATION AND DEMOBILIZATION

Once pre-mobilization activities are complete, the dive crew and all associated materials and equipment necessary to perform the underwater intrusive activities will mobilize to CRP. The personnel and operations-specific equipment are summarized in **Sections 2 and 3**.

Demobilization of all diving-related personnel and equipment will occur after all underwater intrusive objectives have been safely completed and accepted by DESC.

4.2. TASK 2 DOCUMENTATION

TITAN will prepare all USACE required diving-related documents and plans for review by APEX and DESC. All plans will be approved by SCDHEC prior to mobilization to CRP. Required documents include the Diving Safe Practices Manual and this Diving Operations Plan with its attachments including an Emergency Management Plan and AHA.

4.3. TASK 3 CRP REMOVAL ACTION

The goal of the removal action is to locate and remove MEC from within the cofferdam footprint. The Dive Operations Team will perform underwater mag and dig of anomalies encountered using the stationary jackstay method described in Section 2.7 of the TITAN Dive Safe Practice Manual. Each anomaly identified will be manually investigated not to exceed four feet below river bottom.

This section details the procedures to be followed during diving operations, underwater intrusive activities.

5. Dive Operations

Diving operations shall be performed IAW with USACE Engineering Manual (EM) 385-1-1. If for any reason the dive plan is altered in mission, depth, personnel, or equipment, the DDC will be contacted in order to review and accept the alteration prior to actual operation.

Direct communications between the dive sites, project office, DESC representative, DDC and other involved personnel will be via cell phone. Divers will have communication with the surface, and diver-to-diver. Dive supervisor will positively control diver movement within the designated work area. Divers will be monitored by thru-water communication system.

Familiarization dives may be conducted to verify competency of the overall dive team.

5.1. CRP REMOVAL ACTION

The goal of the removal action is to locate and remove MEC from within the cofferdam footprint in two separate areas, as shown on Figure 1-3. The Dive Operations Team will perform underwater mag and dig of anomalies encountered. Each anomaly identified will be manually investigated not to exceed a depth of 4 feet or to bedrock whichever is encountered first. Removal of MEC from the area within the cofferdams will be done after the water has been removed under a separate effort covered under a work plan for dry land portion of the MEC clearance.

Divers will gather information describing the source of each anomaly, including the following; item description, item weight, MEC condition, MEC nomenclature, bottom type/condition, and any other notable features. Acceptable to move MEC and MD will be transferred to land for final disposition. Unacceptable to move MEC will be detonated in place. Non-munitions-related debris will be left in place during this task.

Each MEC or MD item found will be marked using a GPS unit to an accuracy of +/- 3 meters. Once an item has been positively identified, and determined acceptable to move, it will be relocated within the land portion of the project area. The final explosives safety status of a discovered MEC item as acceptable or not acceptable to move will be made by the SUXOS-qualified Dive Supervisor in consultation with the diver who investigated the item. Information such as the munition type, nomenclature, condition, and surrounding environment will be considered when determining if an item is acceptable to move or not.

Divers will use an all metals locator along grid lines established as part of the stationary jackstay method described in Section 2.7 of the TITAN Dive Safe Practice Manual. Each target anomaly location will be manually investigated and resolved not to exceed four feet in depth below river bottom. The anticipated maximum depth of dives is 30 ffw. Divers will be utilizing a “no decompression limit” of 30 ffw for a maximum bottom time of 371 minutes (U.S. Navy Diving Manual, Rev. 6, 15 April 2008). A maximum single dive bottom time will be no greater than 180 minutes.

Munitions Constituent (MC) sampling of the sediment is not required for this field effort. Should MC sampling be needed it may be conducted by divers either during the removal process or as a separate dive. In the event that sediment sampling is needed, the TITAN Dive Supervisor will coordinate underwater sampling activities.

At the end of each diving day, all data including field notes, site photographs, and positioning data will be consolidated and submitted to the TITAN PM.

5.2. DIVING CONDITIONS

The Dive Operations Team will perform all assigned tasks during daytime within allowed current restrictions. Other factors that affect diving operations include:

- Surface conditions - No diving will be performed if the surface conditions do not permit the diver to maintain depth control. Dive operations will be suspended at Beaufort scale Sea State 3.
- Boat Traffic – Anticipate some boat traffic during the operation period. Whenever boat traffic is present in the vicinity of diving operations, the TITAN safety boat will keep other boats away from the area of dive operations. The safety boat will be positioned with visibility of the dive operation and avenues for approaching boats. Communication will be maintained between the safety boat and dive location. If possible, the safety boat will divert boat traffic around the exclusion zone. If a boat enters the exclusion zone the dive supervisor will be notified and will immediately halt intrusive operation until the boat is safely outside of the exclusion zone.
- Underwater conditions – Shallow dives are heavily influenced by the surface conditions and may impact diving operations. No dives will be performed if conditions do not permit the diver to maintain depth control. The dive supervisor will have ultimate decision to cease diving operations if unsafe conditions occur.
- Visibility – Visual survey will be suspended when nominal visibility is less than 1 foot. A tactile survey with tethered divers may be conducted if visibility is degraded below 3 feet.
- Water Temperature – Thermal protection for the divers will be provided by a wetsuit or dry suit, as needed, to ensure diver protection and comfort. Divers will choose dive dress, and selection will be approved by the TITAN Dive Supervisor/SUXOS.
- Currents – Prior to conducting dive operations and prior to deploying any divers, the Dive Supervisor will measure current velocity using an FP 211 Global Flow Probe or similar instrument. If currents exceed 1-knot, divers will not be deployed, and dive operations will be suspended until the current falls below 1-knot.

5.3. QUALITY ASSURANCE OVERSIGHT

Oversight of field activities maybe requested by DESC or other stakeholders. At least 48 hours prior notice will be given to TITAN by those requesting oversight for purposes of coordination.

It is anticipated that DESC will have an on-site representative assigned in a safety and quality oversight role and may also be present during diving operations. If there is a need to answer questions, etc. the TITAN dive team leader/SUXOS will be the primary point of contact.

This section presents the project team, key personnel, and responsibilities for underwater intrusive activities during the MEC clearance dive activities.

6. Key Personnel

6.1. RESPONSIBILITIES

Project team responsibilities are discussed below.

6.1.1. Dive Supervisor

The Dive Supervisor is responsible for implementing the DOP, Diving Safe Practices Manual, Emergency Management Plan, and applicable AHA's. The Dive Supervisor will also serve as the UXOQCS and is responsible for field equipment calibration, oversight of diving operations, field documentation, submittal of Daily Quality Control Reports (DQCRs) to the TITAN PM and DESC representative, and assisting in the preparation of progress reports.

The Dive Supervisor will report directly to the TITAN PM and is responsible for leading and coordinating the day-to-day activities of the various resource specialists. Specific Dive Supervisor responsibilities are identified in Section 3.3 of the TITAN Diving Safe Practices Manual.

6.1.2. Diving UXO Specialist (Diver)

The diving UXO Specialist is the diver in the water. He is a U.S. Navy trained diver that is UXO qualified with the proper diving and MEC experience to perform assigned tasks. Specific requirements and responsibilities for the position are described in Section 3.3 of the TITAN Diving Safe Practices Manual.

6.1.3. Standby Diver

The standby diver meets all of the requirements of the Dive UXO Specialist and is dressed and prepared to enter the water to assist the diver anytime the diver is in the water. Specific requirements and responsibilities for the position are described in Section 3.3 of the TITAN Diving Safe Practices Manual.

6.1.4. Tender

A dedicated tender will be assigned to the diver while he is in the water. If the standby enters the water, the Dive Supervisor will serve as his tender. Responsibilities of the Tender are described in Section 3.3 of the TITAN Diving Safe Practices Manual.

This section presents the Project Records and Reporting for underwater intrusive activities during the MEC clearance diving activities.

7. Project Records and Reporting

7.1. PROJECT RECORDS

7.1.1. Field Documentation

Field documentation includes daily reports for each day of fieldwork that present information pertaining to field activities. These reports will be maintained by the Dive Supervisor and include field notes, photographs and positioning data. Reports are submitted to the TITAN PM and the DESC representative.

7.1.2. Dive Logs

Dive logs/records will be completed for each diver on each diving day during underwater intrusive activities. The individual dive logs will document conditions and exposure to diving. Dive logs will be maintained by members of the dive team and crosschecked for completeness at the end of each day by the Dive Supervisor. They will be signed and dated by each individual diver making their personal entries, their dive buddy (if applicable), and the Dive Supervisor. Dive logs will be submitted to DESC upon completion of dive operations.

7.2. PROJECT REPORTING

Project reporting requirements include preparation of reports that document all diving-related field activities completed at CRP. These will include draft/draft final deliverable project reports, as well as documents summarizing field activities. These reports will be based on project records that include field logbooks; discrepancy reports; and records of conversations, meetings, and correspondence.

8. References

Dominion Energy South Carolina, Inc. (DESC). 2018. Congaree River Project Conceptual Plan for a Modified Removal Action – December 2018.

Department of the Army (DA). 2008. Technical Manual (TM) 60A-1-1-31, Explosive Ordnance Disposal Procedures, General Information on EOD Disposal Procedures (Revision 5). October.

Department of Defense Explosives Safety Board (DDESB). 2004. Technical Paper (TP) 18. Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel. 20 December.

Department of Defense (DoD) Ammunition and Explosives Safety Standards. 2012. DoD Ammunition and Explosives Safety Standards DOD Manual 6055.09-M

Department of Defense (DoD). 2008. DoD Instruction (DoDI) 4140.62, Material Potentially Presenting an Explosive Hazard. November.

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South Carolina Department of Health and Environmental Control (SCDHEC) 2013. Public Notice- Congaree River Project. 21 August.

Tidewater Atlantic Research, Inc. 2012. A Terrestrial Remote-Sensing Survey of the Congaree River Below the Gervais Street Bridge, Phase IV Report, Columbia, South Carolina. 8 February.

United States Army Corps of Engineers (USACE) 2013. Safety and Health Requirements Manual EM 385-1-1

United States Army Corps of Engineers (USACE) 2010. USACE Dive Program. ER 385-1-86. September.

United States Navy (USN). 2008. USN Diving Manual. Revision 6. April.

Note: *This Emergency Management Plan is to be used in conjunction with the Site Safety and Health Plan. Ensure that all personnel are familiar with the policies, procedures, and requirements outlined in both plans.*

Emergency Service (Ambulance, Fire, Police)—911

Columbia Fire Dept.

1800 Laurel St
Columbia, SC
(803) 545-3700

Palmetto Health Richland

5 Richland Medical Park Drive
Columbia, SC 29203
(803) 434-7000

Nearest Hyperbaric Chamber Facility

Palmetto Health Richland

5 Richland Medical Park Drive
Columbia, SC 29203
(803) 434-7000

Divers Alert Network (D.A.N.)

Emergency +1-919-684-9111 Phone 1-800-446-2671

Poison Control Center

(800) 962-1253

DESC Project Manager

Rusty Contrael
Cell: (412) 721-6494
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Apex Project Manager

William Zeli
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TITAN Project Manager

Matthew Norris,
Office: 423-368-9197
Cell: 865-924-9591
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Nearest Hospital Information and Route

Name: **Palmetto Health Richland**
Address: 5 Richland Medical Park Drive
Columbia, SC 29203
Phone: (803) 434-7000

See description and map of the route below.

Nearest Recompression Chamber

Name: **Palmetto Health Richland
Hyperbaric Medicine**
Address: 5 Richland Medical Park Drive
Columbia, SC 29203
Phone: (803) 434-7000

From the Project Area, 9 min (3.2 miles)

Take US-176 W/US-21 N/US-321 N and US-76 E to Bull St

Head east on Gervais St/Gervais St Bridge toward Gist St 0.3 mi

Turn left onto US-176 W/US-21 N/US-321 N/Huger St 0.8 mi

Keep right at the fork, follow signs for US-21/US-176/US-321/Elmwood Ave

Continue onto US-176 W/US-21 N/US-321 N/US-76 E 0.9 mi

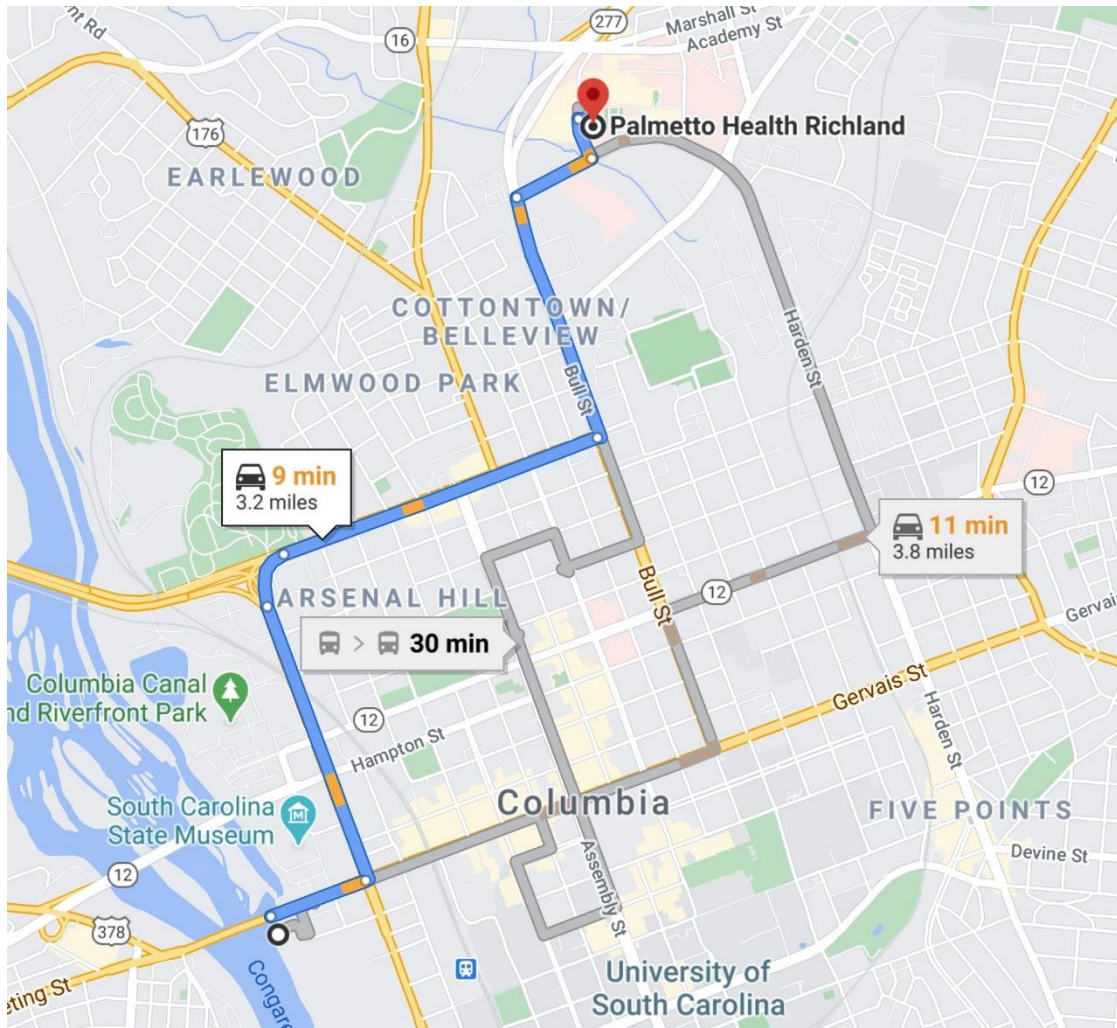
Continue on Bull St to your destination

Use the left 2 lanes to turn left onto Bull St 0.7 mi

Turn right onto Harden Street Extension (signs for Harden St) 0.2 mi

Turn left onto Medical Park Rd 0.1 mi

Arrived.



Emergency Procedures

In every diving operation, the possibility of an accident occurring must be considered. The need for a prompt, decisive plan of action in an emergency is essential for the safety of all diving personnel. The Dive Supervisor will implement the following procedures for the respective situations described below.

1. Buddy Separation

- The divers will look/feel 360 degrees around for his dive partner; and
- Both divers will come to the surface with one hand above head.

2. Lost Diver

- Initiate diver recall and wait one (1) minute for response;
- Mark the last known position of the lost diver with a buoy to establish a reference point where searches can start;
- Deploy the standby diver (Dive Supervisor direction) to swim after bubbles or to conduct a circle line search starting at the lost diver buoy;
- Notify ship/boats in the area to look out for the lost diver;
- Request emergency medical help and report situation to DESC Project Office and TITAN Corporate Offices; and
- Ensure stricken divers recovered get immediate, effective treatment.

3. Loss of Air/Equipment Malfunction

- Signal dive partner and abort dive;
- Buddy breath/activate reserve; and
- Exhale to the surface.

NOTE: No diving will proceed until the equipment is replaced/repared (with functional checks performed) and the Dive Supervisor has given the OK to proceed with the operation.

4. Mechanical Injury

- Diver will inform the Dive Supervisor of any mechanical injuries no matter how slight they may seem;
- Dive Supervisor will rule out any doubt of decompression sickness; and
- If immediate treatment is required, recall all divers and transport to recompression chamber/emergency Room.

5. Decompression Sickness (“The Bends”) or Arterial Gas Embolism (air embolism)

Diving Operations Plan

- Recall all divers from the water;
- Arrange immediate transport of stricken diver(s) to chamber;
- Notify DESC Project Office and TITAN Corporate Office of circumstances;
- Perform neurological exam and record on (TITAN Diving Safe Practices Manual, Attachment J); and

- Treat for shock.

6. Fouled Diver

- Diver will notify dive partner, if appropriate, otherwise will notify Dive Supervisor through line pull signals;
- If only one diver is in the water, then the standby diver will assist the fouled diver under the direction of the Dive Supervisor;
- Diver and dive boat personnel must remain calm; and
- Take additional cylinders of air to the fouled diver, if needed.

7. Explosive Detonation with Diver (s) in the Water

- Attempt to establish communications with the diver via tending line:
- If communications are established with the diver immediately recall diver to the surface;
- If no communications are reestablished slowly pull the tending line to the surface to recover the diver. If the tending line is fouled deploy the standby diver;
- If the tending line has parted, mark the last location of the diver and begin a surface search of the area. If no contact is made, deploy the standby diver in the last known diver location and begin a systematic search of the area.

8. Diver Emergency Recall

- If diver is tended use standard line-pull signals to recall diver (See Attachment B of the TITAN Diving Safe Practices Manual);
- If diver is untended use diver audible (Metal-on-metal in the water) or mechanical recall; and
- Upon notification of recall by any means the diver will surface immediately.

9. Injured Diver: If a diver is injured and unable to enter the boat under his/her own power, the remaining team aboard the boat/platform (Dive Supervisor, Tender/assistant, etc.) will be used to assist or place the injured diver into/on the boat/platform or may hold onto the diver and use the boat/platform to get to the shoreline. Contact first responders immediately and render emergency first aid as necessary.

10. Fire: Fire extinguishers will be maintained ready at the dive site location. Only attempt to put out small fires as necessary of prevent injury or loss of life. Contact first responders immediately upon discovery. Also see Site Safety and Health Plan submitted as part of the Work Plan.

11. Inclement weather: All diving operations will be suspended if lightning is located within 10 nautical miles of the dive site. During high winds greater than 30 miles per hour, boating and platform operations will be suspended. Also see Site Safety and Health Plan submitted as part of the Work Plan.

- 12. Medical Injury or Illness:** See Attachment A to the TITAN Diving Safe Practices Manual as well as the Site Safety and Health Plan submitted as part of the Work Plan. Contact first responders immediately. Render first aid as necessary until an emergency medical team arrives.
- 13. Critical Equipment Failure:** In the event of an equipment failure of a critical component of the dive operations, all dive operations will be discontinued until the equipment is replaced or repaired and the Dive Supervisor has given authorization for dive operations to continue.
- 14. Injury/illness of surface crew:** If a severe injury or illness occurs while a diver is in the water, the diver will be recalled immediately to the surface. Diver will either enter the boat/platform to help render assistance or head to the shore and provide assistance as necessary.
- 15. Dive Blow Up / Over Rapid Ascent to the Surface:** Depths of dives for the project are unlikely to produce a requirement for decompression during ascent. If a diver is believed to have ascended too rapidly, the Dive Supervisor will evaluate the situation to confirm that no decompression stop was required. Dive tables will be consulted. The diver will be observed on the surface for one hour. If symptoms of decompression sickness are observed or suspected, the diver will be treated for decompression sickness as described above.
- 16. Loss of Communications:** If communications are lost between a tender and diver and cannot be regained quickly, an audible recall signal will be sounded. If the diver does not surface in a reasonable amount of time after the audible re-call signal has been initiated the stand-by diver will be dispatched to the last known location of the diver. If communications are lost between the diver and the tender and cannot be regained quickly, the diver will surface immediately. The reason for the loss of communications will be investigated and remedied prior to continuation of the dive.
- 17. Emergency Victim Transportation:** If an injury or illness requires treatment beyond first aid, the victim will be transported to the appropriate medical facility, identified above (or as determined by first responders). The first aid-trained technician treating the victim will make the initial assessment related to the need for additional treatment. First responders will be notified of the situation through a call to 911. If the situation requires transportation by ambulance the victim will be moved (if determined safe and necessary to do so) to a pick-up location where first responders can be directed. Two personnel will remain with the victim until emergency responders arrive. One will administer first aid and monitor the victim and the other will maintain communication with the first responders. If it is appropriate or necessary for TITAN to transport a victim for follow-up care, three personnel will accompany the victim. One will administer first aid and monitor the victim, one will drive and the third will maintain communication with the treatment facility, as necessary.

FIRST AID FOR DIVING RELATED INJURIES

1. FIRST AID FOR INJURIES REQUIRING IMMEDIATE TRANSPORT TO A CHAMBER FACILITY

1.1 Air Embolism

Recognition - Usually occurs during or immediately after surfacing

Symptoms (one or more of the following)

Disorientation or Fatigue

Skin Itch

Chest Pain

Numbness, Tingling, Paralysis or Weakness

Dizziness, Vertigo, or Ringing in the Ears

Blurred Vision

Personality Change

Signs (one or more of the following)

Bloody froth from nose or mouth

Paralysis or Weakness

Unconsciousness

Convulsions

Shortness of Breath or Cessation of Breathing

Apparent Death

Note: Symptoms and signs usually appear within 15 minutes to 12 hours after surfacing; in severe cases, symptoms may appear immediately or even before the dive is completed. Delayed occurrence of symptoms is rare but can occur, especially if air travel follows diving. The quicker treatment begins, the better the chances of a full recovery.

Early Management

CPR, if required

Open airway, prevent aspiration, and incubate if trained person available

Give O₂; remove only to open airway or if convulsion ensue

If conscious, give nonalcoholic liquids

Place in horizontal, neutral position

Restrain convulsing person loosely and resume O² as soon as airway is open

Protect from excessive cold, heat, water, or fumes

Arrange emergency transport, send divers profile with the diver, and send all diving equipment for examination or have it examined locally.

1.2 Decompression Sickness

Recognition - Symptoms usually appear 15 minutes to 12 hours after surfacing

Symptoms (one or more of the following)

Tired Feeling

Itching

Pain, arms, legs or trunk

Dizziness

Numbness, tingling or paralysis

Chest compression or shortness of breath

Anything unusual after the dive

Signs (one or more of the following)

Blotchy Rash

Paralysis or weakness anywhere in the body

Coughing Spasms

Staggering or instability

Unconsciousness

Personality change

Early Management

Stabilize patient the same way as for Air Embolism

Arrange for emergency transport, send divers profile with the diver, and send all diving equipment for examination or have it examined locally

2.0 FIRST AID FOR INJURIES REQUIRING TRANSPORT TO A HOSPITAL FACILITY

2.1 Pneumothorax

Symptoms (one or more of the following)

Pains in the chest

Shortness of breath

Signs (one or more of the following)

- Shallow Rapid Breathing
- Cyanosis (blue skin, lips, fingernails)
- Possible crackling under the skin of the neck
- Possible mediastinal shift (heart sounds not in the usual place).

Emergency Actions:

Call for help and immediate transport

2.2 Mediastinal Emphysema (Lung over pressure accident).

Recognition - Always associated with pneumothorax_

Symptoms (one or more of the following)

Pain in the chest (beneath the breastbone)

Faintness

Shortness of breath

Signs (one or more of the following)

Obvious difficulty breathing

Brassy change in voice

Emergency Actions:

Transport to medical facility for evaluation

2.3 Drowning-Near Drowning

Recognition

Unconsciousness

Lack of respiration

Cyanosis (blue skin, lips, fingernails)

Management

Try to identify the time the victim was last seen breathing

Assess ABC's airway, breathing and circulation

Removal of gear

Transport to the boat or shore

Immediate call for help and transport to facility

Start CPR

2.4 Oxygen Toxicity (with convulsions)

Signs (one or more of the following)

Decreased or loss of consciousness; followed by

Convulsions

Symptoms (one or more of the following)

Nausea

Dizziness

ringing in the ears

Abnormal Vision

Confusion

Prevention

Avoidance of gases with high O² concentrations (as in Nitrox at inappropriate depth)

Avoid CO² retention that can precipitate O² convulsions at any depth

If convulsions occur at depth, be prepared to treat near drowning and/or air embolism

TREATMENT - Call for help and immediate transport

2.5 Severe Trauma or Large Predator Injury (Head Injury, Limb Injury due to falls, Equipment Crush, Prop Injuries)

- call for help and immediate transport

- open airway
- treat for shock on site and stabilize before evacuation
- face up neutral position
- direct pressure over bleeding wounds
- CPR if no pulse or respiration
- keep warm
- be mindful of the possibility of neck injury
- splint limb injuries
- call for help and immediate transport

2.6 Suspected Heart Attack or Stroke

- Call for help and immediate transport
- Treat for shock
- CPR if no pulse or respiration
- Keep warm
- Call for help and immediate transport

2.7 Severe Allergic Reaction

- Remove any remnant of allergen (i.e., jellyfish tentacles, foreign material)
- Wash out wounds of injury with alcohol, vinegar, or water
- Call for help and immediate transport
- Treat for shock
- CPR if no pulse or respiration
- Keep warm
- Pain Relief, if available
- Transport to medical facility for evaluation

2.8 Stinging Fishes (Stingrays, Scorpion fish)

- Immobilize
- Remove spine and debride (scrub the wound)
- Irrigate wound
- Soak in hot water (thermolabile toxin) 50° C, for 30-90 minutes
- Call for help and immediate transport
- Treat for shock, hydrate

2.9 Hypothermia

- Keep core temperature above 95° F
- Keep airway open
- Immobilize
- Wrap in blankets, preferably next to another person
- Basic life support, CPR, if needed
- Warm liquids, if alert, unless very cold - then avoid due to possibility of ventricular tachycardia (rapid, useless fluttering of the heart)
- Call for help and immediate transport

2.10 Hyperthermia (Heat Exhaustion due to excessive fluid loss)

- Remove from source of heat
- Lower temperature (cool compresses at arterial points and head)
- Keep calm
- Keep airway open
- Call for help and immediate transport if unstable

2.11 Heat Stroke

- Remove all clothing
- Cover with cool wet sheet

- Place in air-conditioned area
- Cold packs to neck, scalp, groin and armpits
- If convulsions occur ensure victim does not cause further harm to themselves
- Call for help and immediate transport

3.0 AID FOR INJURIES THAT CAN BE TREATED ON BOARD

3.1 Nitrogen Narcosis

Signs (one or more of the following)

- Inappropriate behavior at depth
- Ignoring hand signals and instructions
- Stupor or coma

Symptoms (one or more of the following)

- Inflexible thinking and attitude
- Decrease or loss of judgment
- False sense of security
- Lack of concern for safety
- Inability to think through problems
- Panic
- Near unconsciousness or loss of consciousness at depth

Treatment

- Ascend until free of symptoms
- Surface with controlled ascent
- Transport to medical facility for evaluation

3.2 Carbon Dioxide Poisoning

Symptoms (one or more of the following)

- Rapid breathing
- Feeling of suffocation or shortness of breath

Headache, nausea, dizziness

Rapid heartbeat

Confusion and unclear thinking

Signs (one or more of the following)

Slowed responses

Muscle irritability (twitching)

Loss of consciousness

Treatment

Remove the cause (over-exertion, equipment failure, rebreathers, etc.)

Stop and rest during early symptoms to avoid loss of consciousness

Surface; Transport to medical facility for evaluation

3.3 Ear Disorders

Middle Ear Barotrauma

Keep quiet and calm

Without DCS or rupture of the round or oval windows, give Benadryl 25 mg

Transport to medical facility for evaluation

Discontinue diving until cleared by EMT

Inner Ear Barotrauma

Recognize round or oval window damage (loss balance, ataxia, tinnitus, deafness)

Keep head up and affected ear elevated

Discourage straining

Transport to medical facility for evaluation

EMT evaluation, no more diving until cleared by EMT

3.4 Sea Sickness

The best medications have been found to be Meclizine, Bonine, Dramamine and Trans-derm Scope.

Keep your eyes on the horizon

Diving Operations Plan

Stay on deck

Keep yourself well hydrated with non-alcoholic beverages

Try antacid tablets or lemon drops

If diving, try to be the first diver in water.

ATTACHMENT B MOBILIZATION ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

Prepared By: Matthew Norris

Reviewed By: Dave Farmer

Minimum Protective Clothing and Equipment:
PPE Level D (outside exclusion zone): General work clothes, traffic vest, safety glasses, hard hat, steel-toed boots, hearing protection, work gloves

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
S E V E R I T Y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Movement of materials to the site Installation of temporary facilities and utilities, to include: Ground preparation for trailer (site)	Driving/vehicle movement (including trucks, heavy equipment)	<ul style="list-style-type: none"> Obey traffic rules. 15 miles per hour is the maximum speed allowed in the work area. Use caution when entering roadways. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Do not use cell phones when operating vehicles. Secure all loads, including equipment within the cab, containerize small equipment and secure container. Wear seat belts, including those provided in cabs of heavy equipment. Use caution and wear orange vests if working near active roads or around heavy equipment. 	18.A 18.B 08.B

ATTACHMENT B MOBILIZATION ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
office) and milvan pads, dumpsters, and sanitary stations, Electricity connections to site office Explosive storage establishment Field engineering (survey of preliminary conditions)		<ul style="list-style-type: none"> Leave enough time to get to your destination without hurrying. Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; “blind spots” of some equipment can be very large. Verify back-up alarms are functional for all heavy equipment for pick-ups or SUVs with obstructed rear view; use a back-up alarm or a spotter when backing up. 	<p>18.B.03</p> <p>18.B.03</p> <p>16.B.02</p> <p>18.B</p>
	Dust	<ul style="list-style-type: none"> Minimize generation of dust. Stay out of visible dust clouds. <p>Wet soil if necessary to eliminate visible dust.</p>	06.A.04

ATTACHMENT B MOBILIZATION ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Noise	<ul style="list-style-type: none"> • Reduce the volume of detection equipment before donning a headset. • Site-specific training and daily tailgate briefing. 	05.C.01
	Electricity	<ul style="list-style-type: none"> • Assure electrical work is performed by qualified personnel with verifiable credentials who are familiar with applicable code requirements. 	11.A.01.c
	Slips, trips, and falls	<ul style="list-style-type: none"> • Make sure you have good solid footing and that walking/working surfaces are as clean and dry as possible. • Inspect areas daily and findings are recorded on daily inspection reports. • Personnel will wear sturdy all leather work boot with traction sole and composite safety toe. 	14.C
	Hand tools	<ul style="list-style-type: none"> • Inspect tools prior to use. • Use tools for their intended use only. • Don't use damaged tools. • Push, don't pull wrenches. 	13.A.02 13.A.02 13.A.02

ATTACHMENT B MOBILIZATION ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Biological hazards	<ul style="list-style-type: none"> • Use repellents and proper clothing for protection against insects including ticks and mosquitoes. • Check the area for poisonous plants, insects, snakes, spiders, and scorpions. • Avoid animal droppings they may contain the Hanta Virus. • Avoid holes and rocks that are potential animal habitats. • If contact with insects, animals, animal droppings, or poisonous plants then wash area immediately. • Avoid walking through dense foliage. • Wear protective clothing in areas where poison oak and poison ivy are present. • Wear protective clothing, including long pants and sturdy boots for protection against snakes and spiders. • Site-specific training and daily tailgate briefings. 	<p>06.D.01</p> <p>06.D.01</p> <p>06.D.01</p> <p>06.D.01</p> <p>06.D.01</p> <p>06.D.01</p> <p>06.D.01</p> <p>06.D.02</p> <p>06.D.02</p> <p>06.D.01</p>
	Material handling	<ul style="list-style-type: none"> • Use safe lifting techniques, bending at the knees and lifting with the legs. • Use caution and do not twist the back when carrying a load. • Use mechanical devices to move loads when possible. • Wear protective gloves when handling materials. • 	<p>14.A.01</p> <p>14.A.01</p> <p>14.A.04</p> <p>05.A</p>

ATTACHMENT B MOBILIZATION ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Cold stress	<ul style="list-style-type: none"> • Wear cold weather clothing and provide shelter as needed based on site conditions. • Conduct temperature monitoring when temperatures fall below 45°F. • Site-specific training and daily tailgate briefing. 	<p>06.J.10</p> <p>06.J.11</p>
	Heat stress	<ul style="list-style-type: none"> • Make drinking water available to all workers and encourage workers to drink small amounts of water frequently. • Adjust work/rest regimens during hot weather. • Use sun screen. • Avoid consuming caffeine. • Site-specific training and daily tailgate briefings. 	<p>06.I.03</p> <p>06.I.04</p>
	Extreme weather	<ul style="list-style-type: none"> • When there are warnings or indications of severe weather, monitor conditions and take precautions to protect personnel. • Monitor conditions and will call a safety stand down in the event of inclement weather. 	<p>06.J.01</p>
	Fire	<ul style="list-style-type: none"> • Provide portable fire extinguishers in all equipment and in the field trailer. • Inspect fire extinguishers monthly. • Obtain hot work permits prior to any welding or torch cutting activities. 	<p>09.E</p> <p>09.E</p> <p>06.C</p>

ATTACHMENT B MOBILIZATION ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Temporary facilities (if used, not anticipated)	<ul style="list-style-type: none"> • Anchor trailers with rods and cables or by steel straps to ground anchors designed to withstand winds and meet applicable standards. • Post signs warning of the presence of construction hazards every 300 feet. • Provide one portable toilet with adequate ventilation on site. • Provide washing facilities at the portable toilet location to maintain sanitary conditions. • Provide type II 16-unit first aid kits and make these kits accessible at the site. 	<p>04.A.03</p> <p>04.A.04/08.A</p> <p>02.C</p> <p>02.D</p> <p>03.B</p>
	Powered machine tools	<ul style="list-style-type: none"> • Use, inspect, and maintain power tools according to manufacturer's recommendations. • Equip power tools with designed guards. • Provide electrical power control on each power tool to make it possible for the operator to cut off the power without leaving the point of operation. • Connect all electrical power tools to an in-line GFCI. 	<p>13.A.02</p> <p>13.A.03</p> <p>13.A.15</p> <p>11.C.05</p>

**ATTACHMENT B
MOBILIZATION
ACTIVITY HAZARD ANALYSIS**

Date Prepared: 11/6/2021

Project: Congaree River Remediation Project

Job: **Mobilization**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Temporary haul roads (if used, not anticipated)	<ul style="list-style-type: none"> Construct haul roads with suitable width for safe operation at the speed anticipated. Post speed limits on haul roads. 	08.D.05 08.D.06

BOAT USE ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/16/20

Project: Congaree River Remediation Project

Job: **Boat Use**

Risk Assessment Code (RAC):

L

Prepared By: Matthew Norris

Reviewed By: Dave Farmer

Minimum Protective Clothing and Equipment:

PPE Level D:

General work clothes, safety glasses, hard hat, safety-toed boots, leather work gloves, and respirator (when working in dry, dusty conditions).

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
S E V E R I T Y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

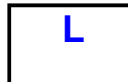
BOAT USE ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/16/20

Project: Congaree River Remediation Project

Job: **Boat Use**

Risk Assessment Code (RAC):



JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Mobilization, Demobilization, Loading and Unloading	Driving/vehicle movement (including truck/trailer bringing the boat to the job site)	<ul style="list-style-type: none"> • Obey traffic rules. • Use caution when entering roadways. 	16.A/18.A 08.B
	Unloading the boat from the trailer	<ul style="list-style-type: none"> • Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). • Do not use cell phones when operating vehicles. 	
	Loading the boat onto the trailer	<ul style="list-style-type: none"> • Secure all loads, including equipment within the cab, containerize small equipment and secure container. • Wear seat belts, including those provided in cabs of heavy equipment. • Use caution and wear orange vests if working near active roads or around heavy equipment. • Leave enough time to get to your destination without hurrying. • Be aware of heavy equipment and do not park or conduct work in the blind spot of the equipment operator; “blind spots” of some equipment can be very large. • Verify back-up alarms are functional for all heavy equipment for pick-ups or SUVs with obstructed rear view; use a back-up alarm or a spotter when backing up. 	16.B.08/18.B.03 16.B.01/18.B.03 16.B.02 16.B/18.B 16.B.12b

BOAT USE ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Boat Use**

Risk Assessment Code (RAC):

L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
Boat Use	Potential MEC (If in an area where MEC is suspected)	<ul style="list-style-type: none"> Observe MEC/anomaly avoidance procedures in accordance with EP-75-1-2 	
	Boat Operations to include: Diving, Sediment Sampling, water sampling, and surveying	<ul style="list-style-type: none"> Boat shall be equipped with Coast Guard Approved Type III Personal Flotation Devices with attached whistles for each passenger/worker onboard. Boat shall be equipped with at least one Coast Guard Approved Type IV Personal Flotation Device, first aid kit large enough for the crew, charts, compass, GPS, cell phone or radio, survival kit, anchor, and paddles. For off-shore operations the boat shall be equipped with marine band radios, radars, bow hook, spotting mirrors, flare gun, and flares. A qualified boat operator will be in charge of boat operations The boat engine shall be placed in neutral prior to splashing divers (as conditions permit). The boat engine shall be turned off (if conditions permit) when recovering divers. 	

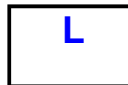
BOAT USE ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Boat Use**

Risk Assessment Code (RAC):



JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Slips, trips, and falls	<ul style="list-style-type: none"> • Make sure you have good solid footing and that walking/working surfaces are as clean and dry as possible. • Inspect areas daily and findings and recorded on daily inspection reports. • Sturdy all leather work boots with traction sole and safety toe. 	14.C
	Biological hazards	<ul style="list-style-type: none"> • Use repellents and proper clothing for protection against insects including ticks and mosquitoes. • Check the area for poisonous plants, insects, snakes, spiders, and scorpions. • Avoid animal droppings they may contain the Hanta Virus. • Avoid holes and rocks that are potential animal habitats. • If contact with insects, animals, animal droppings, or poisonous plants then wash area immediately. • Wear protective clothing, including long pants and sturdy boots for protection against snakes and spiders. • Site-specific training and daily tailgate briefings. 	06.D.01 06.D.01 06.D.01 06.D.01 06.D.01 06.D.01 06.D.01 06.D.01 06.D.02 06.D.02 06.D.01

BOAT USE ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Boat Use**

Risk Assessment Code (RAC):

L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Cold stress	<ul style="list-style-type: none"> Wear cold weather clothing and provide shelter as needed based on site conditions. Conduct temperature monitoring when temperatures fall below 45°F. Site-specific training and daily tailgate briefing . 	<p>06.J.10</p> <p>06.J.11</p>
	Heat stress	<ul style="list-style-type: none"> Make drinking water available to all workers and encourage workers to drink small amounts of water frequently. Adjust work/rest regimens during hot weather. Use sun screen. Avoid consuming caffeine. Site-specific training and daily tailgate briefings. 	<p>06.I.03</p> <p>06.I.04</p>
	Extreme weather	<ul style="list-style-type: none"> When there are warnings or indications of severe weather, monitor conditions and take precautions to protect personnel. Monitor conditions and will call a safety stand down in the event of inclement weather. 	<p>06.J.01</p>
	Fire	<ul style="list-style-type: none"> Provide Coast Guard Approved portable fire extinguishers onboard. Inspect fire extinguishers monthly. 	<p>09.E</p> <p>09.E</p>

BOAT USE ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Boat Use**

Risk Assessment Code (RAC):

L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Noise	<ul style="list-style-type: none"> Wear hearing protection when operating or working near the mower. Site-specific training and daily tailgate briefing. 	05.C.01

DIVE OPERATIONS ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Dive Operations**

Risk Assessment Code (RAC):

M

Prepared By: Matthew Norris

Reviewed By: Dave Famer

E = Extremely High Risk
H = High Risk
M = Moderate Risk
L = Low Risk

Minimum Protective Clothing and Equipment:
Dry Suit/ Wet Suit, Tether, Reserve air. Dive flags, Dive boat, Hand tools, Back Board, Breathing gas supply, Buoys, Dive

		PROBABILITY				
		Frequent	Likely	Occasional	Seldom	Unlikely
S E V E R E I T Y	Catastrophic	E	E	H	H	M
	Critical	E	H	H	M	L
	Marginal	H	M	M	L	L
	Negligible	M	L	L	L	L

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
MEC Dive Operations for Anomaly Investigation and Removal	Radiation Hazards: Sun	Use sunblock as appropriate. Avoid extended periods of direct exposure to sun.	06.J.13
	Chemical Hazards: Marine Battery- Lead Acid	Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Do not handle near heat, sparks, or open flames. Protect containers from physical damage to avoid leaks and spills. Place cardboard between layers of batteries to avoid damage and short circuits. Do not allow conductive material to touch battery terminals. Use protective acid resistant gloves and eye protection if coming in contact with battery acid	05.A 05.B

DIVE OPERATIONS ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Dive Operations**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
		from leaks or spills.	
	Biological Hazards: Stinging and biting Insects Animals and Reptiles	Use appropriate insect repellents. Training to avoid poisonous insects and avoid contact. A poster indicating various types of biological hazards will be displayed in the site trailer. Training on symptoms of rabies and avoidance of animals.	06.D.01 06.D.02
	Physical Hazards: Slips, trips, and falls while walking on uneven walking surfaces; weather hazards, such as snow and ice; and poor visibility	Care will be exercised during off-loading and loading of boats to reduce slip, trip or fall hazards associated with the landing or docking area. Work areas will be kept organized; ice, snow, and mud will be cleared to reduce hazards. Work will be completed in adequate natural light or sufficient artificial illumination will be maintained. Site personnel will use the “buddy system” at all times.	14.C
	Underwater Hazards from stepping in holes or on sharp objects	Be observant while in the water and move cautiously.	14.C
	Manual lifting	Use proper lifting techniques—keep back straight, lift with legs, avoid twisting back, use mechanical equipment, or get help from others whenever possible. Heavy loads will be carried with assistance. Verify the path of travel is clear prior to the lift.	14.A.01 14.A.04 05.A

DIVE OPERATIONS ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Dive Operations**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Hands or fingers caught between objects; abrasions and lacerations	Personnel will be made aware of the hazard and asked to coordinate carefully the handling and placement of heavy objects. Materials and objects being handled will be inspected for rough or sharp edges and appropriate precautions will be taken to avoid contact with rough or sharp edges. Personnel will wear work gloves and avoid placing hands between objects.	05.A
	Hand tools, manual	Tools will be inspected prior to use. Damaged tools will be tagged out of service until repair can be performed by a qualified person. Tools will be used properly and for their intended purpose.	13.A.02
	Inclement weather, heat and cold stress	When there are warnings or indications of severe weather, monitor conditions and take precautions to protect personnel. UXOSO will monitor conditions and will call a safety stand down in the event of inclement weather. Electrolyte/fluids replacement will be available to workers as needed. Work/rest periods will be established according to ACGIH and NIOSH guidelines. Personnel will be monitored. Dive gear will include appropriate thermal protection.	06.J.01
	Fire	Fire prevention will be a priority through awareness. A 1A:10BC extinguisher will be required to be on the boat during boating and diving activities.	09.E
	MEC Hazards	On-site MEC training will be conducted. UXO personnel will be EODS graduates. Perform MEC intrusive investigation using approved methods and techniques. EM-385-1-97 will be followed for performing MEC work.	

DIVE OPERATIONS ACTIVITY HAZARD ANALYSIS

Date Prepared: 11/06/20

Project: Congaree River Remediation Project

Job: **Dive Operations**

Risk Assessment Code (RAC):

M

JOB STEPS	HAZARDS	ACTIONS TO ELIMINATE OR MINIMIZE HAZARDS	EM 385-1-1 (PARA REF)
	Drowning Hazards	Two way communications system will be employed. Review dive procedures in the Safe Practices Manual. Standby diver will be dressed and ready when a diver is in the water. U.S. Navy No-Decompression tables will be used. All dive gear will be inspected and serviceable. Check lists will be used to insure all procedures are followed.	30.A 30.B
Post Diving	Decompression Stress resulting from Flying After Diving	Divers will not fly within 12 hours after diving or within 24 hours after multiple dives.	30.A.11