APPENDIX A:
TASK ORDER STATEMENT OF WORK

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Performance Work Statement
Remedial Investigation / Feasibility Study
at the Former Cape Poge Little Neck Bomb Target Site
Chappaquiddick Island, Dukes County, Massachusetts, FUDS D01MA0595,
Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard
Edgartown, Massachusetts, FUDS D01MA0486 and Tisbury Great Pond, West Tisbury,
Martha's Vineyard, Dukes County, Massachusetts FUDS D01MA0453
13 November 09
Revision: 0
Revision Date: N/A

1.0 OBJECTIVE: The objective of this task order is to obtain acceptance of a Decision Document meeting the requirements of ER 200-3-1 and CX Interim Guidance 06-04. Work to be accomplished includes the conduct of a Remedial Investigation (RI), Feasibility Study (FS) and all necessary activities required to accomplish this objective.

2.0 BACKGROUND: Work required under this Performance Work Statement (PWS) falls under the Formerly Used Defense Sites (FUDS) Military Munitions Response Program (MMRP). Munitions and Explosives of Concern (MEC) are a safety hazard and may constitute an imminent and substantial endangerment to site personnel. Applicable provisions of Chapter 29 of the Code of Federal Regulations (CFR) 1910.120 apply. The Contractor shall perform all work in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104 and the National Contingency Plan (NCP), Sections 300.120(d) and 300.400(e). All activities involving work in areas potentially containing MEC hazards shall be conducted in full compliance with United States Army Corps of Engineers (USACE), United States Army Engineering and Support Center Huntsville (USAESCH), Department of the Army (DA), Active Installation, and Department of Defense (DOD) safety regulations. All MEC encountered during this munitions response shall be destroyed on-site.

2.1 Location: The FUDS sites are located on Martha's Vineyard, Dukes county Massachusetts, see figures 1 -3.

2.2 History: Each FUDS has one Munitions Response Site. Available historical data will be provided electronically.

2.3 Previous Investigations: A Site Inspection was performed for Tisbury Great Pond in 2008. The latest version of the Site Inspection Report will be provided electronically.

2.4 Recent Activities: A Time Critical Removal Action was performed at Cape Poge Little Neck Bomb Target Range and Moving Target Machine Gun Range at South Beach in 2009. Available data will be provided electronically.

3.0 SPECIFIC TASKS: Methods to be used to achieve task order objectives at the specified level of performance shall be determined by the Contractor. The Contractor will be evaluated periodically during each of the following tasks to ensure compliance with the PWS and to document that quality objectives, delivery schedule, and the overall completion date are being met. This evaluation will be performed according to a Quality Assurance Surveillance Plan (QASP). A programmatic QASP modified for the specific task order requirements will be provided by the government. The QASP will be updated upon acceptance of the Contractor's Quality Control Plan (QCP). Failure to adequately complete any service or submittal to at least a satisfactory level of quality or timeliness may result in a repeat of the work, or a poor performance evaluation, or both. Performance metrics are provided in Section 6.0. Minimum requirements for contractor performance and QC are provided in Section 7.0.

3.1 Task 1, Technical Project Planning (TPP): This is a Firm Fixed Price/Unit Price task. The objective of this task is for the Contractor to implement the TPP process IAW EM 200-1-2, and Interim Guidance Document 01-02. Disputes between the Project Delivery Team (PDT) and the regulators regarding the adequacy of DQO will be resolved by the USACE Project Manager. The Contractor shall anticipate 3 meetings to be conducted on Martha's Vineyard, Massachusetts. First meeting shall be 2 days, second meeting shall be one day and third meeting shall be 2 days plus travel. The Contractor shall plan for meetings to occur as follows: first meeting, pre-Work Plan with resulting TPP Memorandum; second meeting, to finalize Work Plan; third meeting, verify all data gaps have been filled and finalize Remedial Investigation Report The Contractor shall also provide a unit price per TPP meeting in the event more meetings are necessary. The Contractor shall organize and coordinate all meetings. The Contractor shall identify and involve all stakeholders, upon approval by the Government, to be included in the TPP process. The Contractor shall be responsible

for presentation materials and the logistics of these meetings to include but not limited to, providing a facilitator, obtaining meeting location, sending invitation letters. All presentations, correspondence and handouts shall be provided to the government for review and acceptance prior to dissemination. The Contractor shall prepare, submit for review and gain acceptance of a TPP memorandum containing the DQO's and other results of the first TPP meeting, including a conceptual site model (CSM). Updates to the TPP memorandum shall be prepared as necessary after each successive TPP meeting. The conceptual site model will be compatible with current GIS standards. The Contractor shall prepare/revise the preliminary Munitions Response Site Prioritization Protocol for each Munitions Response Site covered under this task order.

3.2 Task 2, RI/FS Work Plan (WP): This is a Firm Fixed Price task. The objective of this task is for the Contractor to prepare, submit and gain acceptance of a WP that is a detailed and comprehensive plan covering all aspects of the site characterization in accordance with data item description (DID) MR-001 and EM 1110-1-4009.

3.2.1 Task 2a Optional, Explosive Siting Plan (ESP): This is a Firm Fixed Price task. An Explosives Siting Plan shall be submitted for acceptance in accordance with DID MR-005-04 and Interim Guidance 08-01 as a stand alone document inserted in the WP after acceptance.

3.2.1 Task 2b Optional, Dive Plan: This is a Firm Fixed Price task. The objective of this task is for the Contractor to prepare, submit and gain acceptance of a Dive Plan that is a detailed and comprehensive plan covering all aspects of the site characterization in accordance with EM 385-1-1

3.3 Task 3, GeoSpatial Data: This is a Firm Fixed Price/Unit Price task. The objective of this task is for the Contractor to utilize GIS in the development of the Conceptual Site Model (CSM). The Government will provide existing GIS data. The existing GIS will be used to build upon and managed IAW DID MR-005-07.01. A pre and post-project response action geospatial data analysis shall be performed using a GIS. All available existing data that is applicable to the project shall be consolidated into the GeoDatabase and analyzed to relay pertinent information to the PDT. The analysis of data from the GIS shall support all conclusions of the CSM. The information attained through the pre-RI analysis shall be documented in the work plan. The information attained in the post-RI and FS analysis shall be documented in the RI and FS reports. The pre-RI analysis shall encompass social, environmental and/or economic entities that will be or may be impacted by response-action activities. The post-RI and FS analysis shall detail entities impacted by RI/FS activities and impacts of future response action activities (if applicable). The pre and post-RI and FS analysis may detail the fieldwork strategies, areas of concern, survey requirements, environmental concerns, milestones and/or other factors that affect product delivery and future action planning. Entities that may be affected by response actions include but are not limited to: landowners, homeowners, rental tenants, schools, utilities, roads, businesses, recreational areas, air traffic, water bodies and/or industries. The GeoDatabase shall be a living repository that is refined throughout the life of the project. The Contractor shall incorporate layers that overlay on maps of the site that identify physical features, and MPPEH/MD and Range-Related Debris found during the investigation. Examples include: streets, anomalies, MEC positively identified, identifiable MD, sampling location, cultural resources, environmental, biological, and socio-economic variables. Archeological site location(s) will not be released to the public without written permission from USACE. The Contractor shall perform civil surveys IAW EM 1110-1-4009 and DID MR-005-07.01. The contractor shall obtain property GIS data for all landowners with in the project boundaries. The contractor shall maintain property ownership data in the GIS, track and assist in obtaining property Right –of –Entry. The Contractor shall also provide a unit price per month for GIS in the event additional GIS is necessary.

3.4 Task 4, RI/FS Field Activities: This task is a Firm Fixed Price/Unit Price and Time and Materials task.

3.4.1 The objective of this task is for the Contractor to perform all necessary field activities to meet the overall objective of this task order and the DQOs established for this project. The Contractor shall characterize the nature and extent, per agreed upon requirements during TPP, of MEC contamination at the required munitions response sites (MRS) for the purpose of developing and evaluating effective remedial alternatives. This task shall include all field activities necessary to execute this task except MC sampling. MC sampling requirements are covered under the Environmental Sampling & Analysis task. All DGM shall be IAW DID MR-005-05.01. For this task order 1 acre of transects equals 14,520 If (2.75 miles) of transects 3 feet wide. One acre's worth of grids equals seventeen (17) 2500 sf grids or four (4) 10,000 sf grids. A pricing schedule is provided in Appendix A for unit price which will be used for price increase or decrease based on the final level of effort determined during TPP. The Government is responsible for the cost of evacuation. The contractor is responsible for coordinating evacuations. On-call UXO support will be in a similar manner as performed by the Massachusetts Department of Environmental Protection (MassDEP) contract with the exception that under this task order the Contractor

is required to perform demolition if required. The MassDEP contract specifics will be provided by the U.S. Army Engineering and Support Center, Huntsville (USAESCH).

3.4.1.1 Task 4a, Optional Ocean Area of Former Cape Poge Little Neck Bomb Target Site, D01MA0595. This subtask is a Time and Materials subtask.

3.4.1.2 Task 4b, Optional Former Cape Poge Little Neck Bomb Target Site, D01MA0595. This task is a Firm Fixed Price task. This task covers all area not covered by Task 4a.

3.4.1.3 Task 4c, Optional Ocean Area of Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, D01MA0486. This subtask is a Time and Materials subtask.

3.4.1.4 Task 4d, Optional All Other Areas of Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, D01MA0486. This task is a Firm Fixed Price task. This task covers all area not covered by Task 4c.

3.4.1.5 Task 4e, Optional Ocean Area of Tisbury Great Pond, D01MA0453. This subtask is a Time and Materials subtask.

3.4.1.6 Task 4f, Optional Pond Area of Tisbury Great Pond, D01MA0453. This subtask is a Time and Materials subtask.

3.4.1.7 Task 4g, Optional Tisbury Great Pond Land, D01MA0453. This task is a Firm Fixed Price task. Boundaries are intended to include the properties referenced in historical research. Boundaries will be adjusted if review of property documents indicates the relevant areas are not covered.

3.4.1.8 Task 4h, Optional Investigation of Anomalies Requiring Off-Shore Dive Support. This subtask is a Time and Materials subtask. The Objective of this task is to investigate selected anomalies discovered by others beyond the limits of on-shore dive support.

3.4.2 MEC Disposal: The Contractor shall be responsible for the destruction of all MEC encountered during project activities. Whenever possible, avoid demolition operation in the early hours of the day to reduce sound nuisance.

3.4.3 Backfilling Excavations: All access/excavation/detonation holes shall be backfilled by the Contractor. The Contractor shall restore such areas to their prior condition.

3.4.4 MPPEH and MD Accountability: The Contractor shall maintain a detailed accounting of all MPPEH and MD items/components encountered. This accounting shall include the amounts of MPPEH and MD, nomenclature and condition, location and depth of MEC, and disposition. The accounting system shall also account for all demolition materials utilized to detonate MPPEH and MD on site. The Contractor shall take digital photographs of all MPPEH and MD found during the investigation.

3.4.5 Disposal/Disposition of MPPEH: All MPPEH and munitions debris shall be handled in accordance with Chapter 14, EM 1110-1-4009 and Errata Sheet No. 2.

3.5 Task 5, Remedial Investigation (RI) Report: This task is a Firm Fixed Price task. The objective of this task is for the Contractor to prepare, submit and gain acceptance of a RI report in accordance with EM CX Interim Guidance 06-04. . The Contractor also shall incorporate all available data and data from previous reports into this RI. The Contractor shall prepare as an appendix to this report a determination of the Munitions Response Site (MRS) priority for each MRS covered under this task order using the Munitions Response Site Prioritization Protocol (MRSPP) worksheets.

3.6 Task 6, Feasibility Study (FS) Report: This task is a Firm Fixed Price task. The objective of this task is for the Contractor to prepare, submit and gain acceptance of a FS report in accordance with EM CX Interim Guidance 06-04.

3.7 Task 7, Proposed Plan: This task is a Firm Fixed Price task. The objective of this task is for the Contractor to prepare, submit and gain acceptance of a Proposed Plan IAW ER 200-3-1 FUDS Program Policy and MM CX Interim Guidance 06-04. After government review, the draft version of the Proposed Plan will be subject to a minimum 30-day public review.

3.8 Task 8, Decision Document: This task is a Firm Fixed Price task. The objective of this task is for the Contractor to prepare, submit and gain acceptance of a separate Decision Document for **each** MRS in accordance with ER 200-3-1 FUDS Program Policy and MM CX Interim Guidance 06-04 and Appendix B. Appendix B provides new formatting requirements for the Decision Document and supersedes MM CX Interim Guidance 06-04 for formatting of Decision Documents.

3.9 Task 9, Community Relations Support: This task is a Firm Fixed Price/Unit Price task. The objective of this task is for the Contractor to successfully complete public meetings and support the New England District with community relations. The Contractor shall attend and participate in 6 public meetings, 2 per trip, 3 each in West Tisbury and Edgartown area. These meetings are different and in addition to TPP meetings. The Contractor shall provide a unit price per meeting for possible additional meetings. The support shall include, but is not limited to: preparation and delivery of briefings, graphics, maps, posters, and support of question and answer sessions. The Contractor shall also obtain the meeting site, perform public notification and prepare any correspondence necessary to meet the objectives of this task. The USACE shall approve all correspondence, public notices and other materiel being presented to the public before use. These actions are independent of the field activities that involve interaction with the community. The meeting for the Proposed Plan shall be covered under this task. Transcripts of the public meeting for the Proposed Plan shall be prepared and submitted with the Final Proposed Plan. The Contractor shall also develop and maintain a project website for viewing by the public to include links to other webpages as required by the government. All data place on the website shall be pre-approved by CENAE and USAESCH. The Contractor shall maintain this website for the 24 month period of performance. The Contractor shall provide a monthly unit price to maintain the site.

3.10 Task 10, Public Involvement Plan (PIP): This task is a Firm Fixed Price} task. The objective of this task is for the Contractor to review, update as needed, submit and gain acceptance of the PIP in accordance with EP 1110-3-8. The PIP should include template material designed for site specific use as provided in the FUDS Public Involvement Toolkit.

3.11 Task 11, Administrative Record: This task is a Firm Fixed Price task. The objective of this task is for the Contractor to establish and maintain the Administrative Record for **each** MRS in accordance with the guidance given in EP 1110-3-8, Chapter 4 (Establishing and Maintaining Administrative Records) and Standard Operating Procedure for Formerly Used Defense Sites (FUDS) Records Management, Revision 5, dated January 2008. This task requires close coordination with the New England District (CENAE) and USAESCH to secure all required documents to support the Administrative Record. The Contractor shall secure a place to establish and house the Administrative Record in the local city or community of the project. The Contractor shall provide all final documents in the Administrative Record on CD/DVD submitting two copies each to USAESCH and CENAE**.** These files shall be suitable for placement on the PIRS web site.

3.12 Task 12, Environmental Sampling & Analysis: This task is a Firm Fixed Price/Unit Price task.

3.12.1 The objective of this task is for the Contractor to determine the presence of and the nature and extent of, the munitions constituents (MC) that are detected above the applicable regulatory criteria and to perform an ecological and human health risk assessment in accordance with the EPA Risk Assessment Guidance (RAGS) and USACE EM 200-1-4, Volumes I and II. Existing site data shall be reviewed and evaluated. Sampling shall be conducted to support the MC baseline risk assessment. The Contractor shall prepare and submit for acceptance a single sampling and analysis plan (SAP) that shall include a field sampling plan and a quality assurance project plan in accordance with DID MR-005-10.01 and UFP QAPP that describes their phased approach and addresses contaminants of interest and sample media (soil/groundwater/sediment/surface water). The price of the SAP shall be firm fixed price and shall be covered under the Work Plan Task. The contractor shall propose the analytical methodology, media and analytical parameters including QC and QA requirements for determination of explosives and metals in soil, sediment and surface water samples, and at Tisbury Great Pond only, perchlorate in water samples which will be used to execute this Task order. The contractor shall provide an independent laboratory to analyze QA samples separate from the contractor's primary laboratory. Data from the QA laboratory will be sent directly to the government. Additionally, a price spreadsheet is provided in Appendix A for unit price required for this task order and will be used to increase or decrease the scope of the Task Order based on the final level of effort determined during TPP. The Contractor shall include QA/QC, MS/MSD pricing in unit prices in addition to stated sampling requirements.

3.12.1.1 Task 12a, Optional Former Cape Poge Little Neck Bomb Target Site, D01MA0595. This task is a Firm Fixed Price/Unit Price task.

3.12.1.2 Task 12b, Optional Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, D01MA0486. This task is a Firm Fixed Price/Unit Price task.

3.12.1.3 Task 12c, Optional Tisbury Great Pond, D01MA0453. This task is a Firm Fixed Price/Unit Price task.

3.12.2 The SAP and the data deliverables shall be performed and submitted in accordance with DID MR-005-10.01 and acceptance be gained from the Government. The Contractor shall also provide a discussion on data evaluation and fate and transport analysis. The potential for fate and transport shall address all transport pathways, and it should also address future degradation products resulting from biodegradation, photolysis, and chemical reactions.

3.12.3 Any deviations from the accepted SAP shall be documented in the Daily Quality Control Reports (DQCR). Any deviations that may affect Data Quality Objectives (DQO's) shall be conveyed to USAESCH personnel [project manager (PM), project engineer (PE), project chemist, etc.] immediately.

3.13 Task 13, Employee Awareness Training: This Task is a Fixed Unit Price task. The Objective of this task is for the Contractor to conduct military munitions awareness training for the select employees of the town of Edgartown, MA, local law enforcement, and The Trustees of Reservations, who are involved with work at both FUDS, on the hazards of ordnance and the appropriate safety precautions required during the initial response. The Contractor shall provide training on safe reconnaissance of suspected ordnance items and establishment minimum safe exclusion areas to protect the public. Reconnaissance training will include safe approach, hazard area awareness, photographic requirements, marking and safe standoff distances. Existing training materials will be provided to the Contractor. The Contractor shall review materials to ensure incorporation of the Army 3-R's logo and slogans. Educational awareness training materials can be accessed at https://www.denix.osd.mil/portal/page/portal/denix/environment/uxo. This website should also be provided in training materials. Revised training materials shall be submitted and approved by USACE prior to training session. The Contractor shall coordinate training schedule with town of Edgartown and West Tisbury, MA, local law enforcement, and The Trustees of Reservations while keeping USACE copied on all correspondence. The Contractor shall provide a unit price for additional training sessions as needed.

3.13.1. Task 13a, Educational Awareness Field Training: The Contractor shall also include field training of employees to recognize potentially dangerous items while conducting typical inspection of beaches between the low and high waterlines, initiate safe evacuation and proper line of notification. This training will be conducted over two consecutive days for TToR personnel and other local officials participating in the training as appropriate.

3.13.2 Task 13b, Optional Video Tape Training Session: The contractor shall provide a professional quality video tape of the Employee Awareness Session. The Contractor shall ensure District Public Affairs Office contact information be clearly represented in the video in case there are questions from the viewers.

3.14 Optional Task 14, Environmental and Cultural Compliance Support: This Task is a Time and Materials task. The objective of this task is for the contractor to provide Environmental and Cultural Compliance Support to the District as directed.

3.14.1 Based on prior consultations conducted by the New England District for execution of the TCRA with the appropriate natural resource and cultural resource regulatory agencies and stakeholders relative to the Federal and State Endangered Species Acts and the National Historic Preservation Act, both Federal and State-listed threatened and endangered species along with sensitive habitats and significant cultural and archaeological resources are present in all three FUDS sites.

3.14.2 Therefore the Contractor shall include procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural and archaeological resources during site field activities in the Environmental and Cultural Protection Plan. The Contractor will be notified of specific areas of concern and the presence of the aforementioned resources. The objective for the New England District in collaboration with the Contractor is to complete consultations with the appropriate natural resource and cultural resource regulatory agencies and stakeholders in advance of execution of the RI/FS to incorporate adequate environmental and cultural protection measures into the Work Plan. The purpose of these measures is to avoid, minimize, and/or mitigate potential environmental and cultural resource impacts to the maximum extent practical without compromising the ability to achieve the primary objective of the RI/FS, i.e. to characterize the nature and extent of MEC contamination at the required munitions response sites (MRS) for the purpose of developing and evaluating effective remedial alternatives.

4.0 SUBMITTALS AND CORRESPONDENCE:

4.1 Computer Files: All final text and spreadsheet files generated by the Contractor under this task order shall be furnished to the Contract Officer in MS Office Suite 2003 compatible format. Other computer files shall be in accordance with the DIDs. All computer files shall be submitted on CD or DVD.

4.2 PDF Deliverables: In addition to the paper and digital copies of submittals, all versions of any and all reports and/or plans shall be submitted in their entirety (including appendices), uncompressed, on CD or DVD in Adobe Portable Document Format (PDF) format along with a linked table of contents, linked tables, linked photographs, linked graphs and linked figures, all of which shall be suitable for viewing on the Internet. In the case of large reports, the appendices can be provided as one .pdf file separate from the narrative .pdf file. PDF files shall be produced from source documents wherever possible.

4. 3 Identification of Responsible Personnel: Each submittal shall identify the specific members and title of the Contractor's and subcontractor staff that had significant input into the report's preparation or review. All submittals shall be signed by a registered Professional-In-Charge.

4.4 Public Affairs: The Contractor shall not publicly disclose any data generated or reviewed under this contract. The Contractor shall refer all requests for information concerning site conditions to the CENAE PAO with a copy furnished to the CENAE and USAESCH Project Managers. Reports and data generated under this contract are the property of the DoD and distribution to any other source by the Contractor, unless authorized by the Contracting Officer, is prohibited.

4.5 Submittals: The Contractor shall furnish copies of the plans, maps, and reports as identified in Table 4-1 to each addressee listed below in the quantities indicated in the Submittal Guidance table, Table 4-2. The Contractor shall submit 1 copy on CD with each hard copy of all submittals (WPs, Reports, Plans, etc) in accordance with paragraphs computer files and PDF Deliverables. Hardcopies shall be printed on both sides of the paper whenever possible.

4.6 Addressees:

US Army Engineering & Support Center, Huntsville
Attn: CEHNC-OE-CW (Ralph Campbell)
PO Box 1600
Huntsville, AL 35807-4301
4820 University Square
Huntsville, AL 35816-1822

Commander
US Army Corps of Engineers, New England District
Attn: CENAE-PP-M (Ms. Carol Charette)
696 Virginia Road
Concord, MA 01742-2751

The Trustees of Reservations
Islands Regional Office
Attn: Chris Kennedy, Regional Director
PO Box 2106
Vineyard Haven, MA 02568

Commonwealth of Massachusetts
Department of Environmental Protection
ATTN: Anne Malewicz, Environmental Engineer
One Winter Street
Boston, MA 02108

The Commonwealth of Massachusetts,

Department of Resource and Conservation
Attn: John Varkonda
Correllus State Forest
P.O. Box 1612
Vineyard Haven, MA 02568
(Only Correspondence for South Beach)

Town of Edgartown
Parks and Recreation Department
Attn: Marilyn Wortman
Edgartown, MA

Note: Addresses shall be verified by the Contractor.

4.7 Submittals and Due Dates.

Table 4-1 List of Deliverables

Submittals	**Due Dates (Calendar days)**
Explosives Siting Plan	Separate MACOM approval before intentional physical contact with MEC on site
Proposed schedule	7 days after kick-off conference call
Advanced TPP package & CSM	14 days before 1st TPP
Draft TPP Memorandum	TBD
Final TPP Memorandum	14 days after comments
Draft Public Involvement Plan	TBD
Final Public Involvement Plan	14 days after receipt of comments
Draft Work Plan	21 days after DQOs are determined (TPP)
Draft Final Work Plan	14 days after receipt of comments
Final Work Plan	14 days after receipt of comments
Draft RI Report w/ GIS on CD/DVD	60 days after completion of fieldwork
Draft Final RI Report	14 days after receipt of comments
Final RI Report	14 days after on board Review
Draft FS Report	TBD
Draft Final FS Report	14 days after receipt of comments
Final FS Report	14 days after on board Review
Draft Proposed Plan	14 days after receipt of acceptance of the FS Report
DF	
Final Proposed Plan	7 days after receipt of comments
PP Meeting Transcripts	with final Proposed Plan
Responsive Summary	with Decision Document Submittals
Draft Decision Document	14 days after acceptance of Proposed Plan
Draft Final Decision Document	7 days after receipt of comments
Final Decision Document	7 days after receipt of comments
Final Administrative Record (On CD/DVD)	Upon completion of the Record
Daily QC Report for Environmental Sampling	Daily during Environmental Sampling Activities
Analytical Data Submittal for QA Evaluation	30 days after completion of fieldwork
Electronic Laboratory Data Submittal	45 days after completion of fieldwork
Final GIS Files on CD	End of Project

4.8 Submittal Quantities

Provide the number of submittals shown in Table 4-2 to the addressees given in Section 4.6.

Table 4-2 Submittal Guidance

Draft TPP/Plans /Reports/Documents	Draft Final/Final TPP /Plans /Reports/Documents	Others

USAESCH	#	#	TBD
CENAE	#	#	TBD
Others	#	#	TBD

4.9 Review Comments: Various reviewers will have the opportunity to review submittals made by the Contractor under this contract. The Contractor shall review all comments received through the Project Delivery Team/Contracting Officer and evaluate their appropriateness based upon their merit and the requirements of the PWS. The Contractor shall issue to the Project Manager a formal, annotated response to each. The Contractor shall not non-concur with a comment without discussing with the PM and/or comment maker. Where comments refer to a specific paragraph of a document and the paragraph number has changed since the comment was made, the Contractor shall note the new paragraph number in the annotated response to the comment.

4.10 Schedule: A final schedule shall be submitted a minimum of 30 days before commencing field work in a format compatible with Microsoft Project. A PDF version shall also be submitted. This is an electronic submittal only. The Contractor shall update the schedule in accordance with DID MR-085 Project Status Report.

4.11 Telephone Conversations/Correspondence Records/Meeting Minutes: The Contractor shall keep a record of each phone conversation, written correspondence concerning this Task Order and meeting minutes in accordance with DID MR-055 and DID MR-045. A copy of these records shall be attached to the Project Status Report.

4.12 Project Status Reports: The Contractor shall prepare and submit Project Status Reports in accordance with DID MR-085 and include any other items required in the PWS.

4.13 Period of Performance: The Completion Date for this Task Order is 31 December 2012.

4.14 Milestone Payments for firm fixed price tasks: Milestones will be considered met or completed when the required QC documentation has been submitted, QA completed and the submittal and/or product is accepted. Any payment vouchers submitted that do not coincide with the final accepted milestones or do not have the appropriate QC documentation will be rejected. All payments will be made utilizing an agreed upon Payment Milestone Schedule. The Contractor shall provide suggested milestones for payment.

5.0 REFERENCES:

5.1 Refer to "Basic Contract."

5.2 Data Item Descriptions: are available at the following: http://www.hnd.usace.army.mil/oew/didsindex.aspx. DIDs MR-005-05, MR-005-05A, MR-005-07 and MR-005-10 have been revised. The new DIDs are MR-005-05.01, MR-005-07.01 and MR-005-10.01. MR-005-05A is no longer used.

5.3 A DVD of existing data to include but not limited to GIS, and reports will be provided to the contractor.

6.0 PERFORMANCE METRICS:

6.1 Performance Metrics for Performance Assessment Record (PAR)

	Exceptional	**Very Good**	**Satisfactory**	**Marginal**	**Unsatisfactory**
PAR Category: Quality of Product or Service					
Performance indicator: Document reviews					
Draft Plans, Reports, and documents [Plans, documents and reports are considered draft until accepted as final by the Government]	All contract-milestone documents accepted as submitted	No substantive comments (i.e. limited to grammar, spelling, terminology) to any of the documents or subplans, but a	One or more documents or subplans required revisions to be resubmitted for approval prior to proceeding. However, no	One or more documents or subplans required revisions to be resubmitted for approval prior to proceeding. Two backchecks were	One or more documents or subplans did not comply with contract requirements, or one or more documents or subplans

	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
		few exceptions were noted and corrected by change pages	document or subplan required more than one backcheck, all original comments were resolved satisfactorily.	required on one or more documents or subplans before original comments were resolved satisfactorily.	required more than two backchecks before original comments were resolved satisfactorily, or one or more documents or subplans were rejected.
Performance indicator: Project Execution					
Process Compliance	Zero Corrective Action Requests (CAR)	1-5 CARs for non-critical violations to WP requirements	6-8 CARS for non-critical violations and/or 1 CAR for critical violation	8-10 CARS for non-critical violations and/or 2-4 CARS for critical violations	>10 CARS for non-critical violations and/or >4 CARS for critical violations, or any unresolved CARS
Project Execution	Zero letters of reprimand, grievances, or formal complaints AND one or more unsolicited letters of commendation		Zero letters of reprimand, grievances, or formal complaints	One letter of reprimand, grievance or formal complaint that was resolved through negotiation	More than one letter of reprimand, grievance or formal complaint that were resolved through negotiation
Task Completion			All final data and QC documentation submitted and accepted		Final data and QC documentation submitted but not accepted
PAR Category: Schedule					
Performance indicator: Timely completion of tasks					
Final Plans and Reports, project milestones, T.O. invoices	All document submittals and task order milestones and invoices complete and accepted by T.O date, project closed out/final invoice approved ahead of schedule	Project closed out/final invoice accepted ahead of schedule	Project closed out/final invoice accepted on T.O. date	Project closed out/final invoice accepted within 30 calendar days after T.O. date.	Project closed out/final invoice accepted more than 30 calendar days after T.O. date.
Project status reports accurate			Yes		No
Performance indicator: Impacts to schedule					
Impacts caused by			Yes		No

	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
Contractor or other causes identified, in writing to HNC CO/ PM, in a timely manner to apply acceptable corrective actions.					
PAR Category: Cost Control (Not Applicable for Firm Fixed Price)					
Performance indicator: No unauthorized cost overruns					
Unauthorized cost overruns			No		Yes
Total Project Costs	Total contract invoices less than 98% of T.O. authorized amount	Total contract invoices greater than 98% but less than 99.99%of T.O. authorized amount	Total contract invoices between 99.99% and 100% of T.O. authorized amount	Total contract invoices greater than 100% but less than 105% of T.O. authorized amount	Total contract invoices greater than or equal to 105% of T.O. authorized amount
Performance indicator: Monthly cost report					
Monthly cost reports accurate			Yes		No
Performance indicator: Impacts to cost					
Impacts caused by Contractor or other causes identified, in writing to HNC CO/PM, in a timely manner to apply acceptable corrective actions.			Yes		No
PAR Category: Business Relations					
Performance indicator: Met contractual obligations					
Corrective Actions taken were timely and effective (Refer to CARs issued to Contractor)			Yes		No
Performance indicator: Professional and Ethical Conduct					
Meetings and correspondences with Public, project delivery team and other stakeholders	Zero letters of reprimand, grievances, or formal complaints AND one or more unsolicited letters of commendation		Zero letters of reprimand, grievances, or formal complaints	One letter of reprimand, grievance or formal complaint that was resolved through negotiation	More than one letter of reprimand, grievance or formal complaint that were resolved through negotiation OR removal of one or more project personnel as a results of a letter of reprimand,

	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
					grievance or formal complaint.
Performance indicator: Customer has overall satisfaction with work performed					
Customer survey results for rating period	4.0-5.0	3.0-3.9	2.0-2.9	1.0-1.9	<1.0
Performance indicator: Personnel responsive and cooperative					
Key personnel responsive, and cooperative	Always		Most Times		Almost Never
PAR Category: Management of Key Personnel and Resources					
Performance indicator: Personnel knowledgeable and effective in their areas of responsibility					
Personnel assigned to tasks	All personnel proposed by Contractor were assigned to project, some personnel were substituted by higher qualified individuals.		All personnel proposed by Contractor were assigned to project, some personnel were substituted by equally qualified individuals.	All personnel proposed by Contractor were assigned to project, some personnel were substituted by equally qualified individuals, Letter of reprimand received for personnel conduct from HNC.	All personnel proposed by Contractor were assigned to project, some personnel were substituted by lesser qualified individuals or HNC requested, in writing, removal of assigned personnel for poor performance.
Performance indicator: Personnel able to manage resources efficiently					
Instances when resource management had negative impact on project execution	0	1-2	3-4	5-6	>6
PAR Category: Safety					
Performance indicator: Accidents and Violations					
*No Class A Accidents, Contractor at fault	0 No class A accidents IAW AR 385-40	No class A accidents IAW AR 385-40	<1 non-explosive related Class D, accidents, or <2 non-explosive Class C accidents IAW AR 385-40.	<2 non-explosive related Class C accidents, or 1 non-explosive Class B accident, IAW AR 385-40	1 Any Class A accident IAW AR-385-40, or Any explosive related accident.
*Major safety violations	0 accidents/injuries No safety violations	0 accidents/injuries No safety violations	0 accidents/injuries 1 non-explosive related safety violation.	2 non-explosive safety violations.	>1 any violation of procedures for handling, storage, transportation, or use of

	Exceptional	Very Good	Satisfactory	Marginal	Unsatisfactory
					explosives IAW the WP, and all Federal, State and local laws/ordinances .
*Minor safety violations	No safety violations	1 safety violation	2 safety violations.	3 safety violations	>3 safety violations

Classes of Accidents:

- **Class A:** Fatality or permanent total disability (Government Civilian, Military Personnel, and/or Contractor), or >$1,000,000 property damage.

- **Class B:** Permanent partial disability or impatient hospitalization of 3 or more persons (Government Civilian, Military Personnel, and/or Contractor), $200,000< $1,000,000 property damage.

- **Class C:** Lost Workday (Contractor) or Lost Time (Government Civilians), $20,000< $200,000 property damage.

- **Class D:** $2000 < $20,000 property damage.

* From Section C of Solicitation Number W912DY-04-R-0003, Amendment 0001 (may be included but are not limited to these).

The following guidelines are provided for issuing ratings that are subjective in nature, these ratings will be supported by the weight of evidence documented during the government's surveillance efforts:

Exceptional: Performance *meets* contractual requirements and *exceeds many* to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with *few minor problems* for which corrective actions taken by the Contractor were *highly effective*.

Very Good: Performance *meets* contractual requirements and *exceeds some* to the Government's benefit. The contractual performance of the element or sub-element being assessed was accomplished with *some minor problems* for which corrective actions taken by the Contractor were *effective*.

Satisfactory: Performance *meets* contractual requirements. The contractual performance of the element or sub-element contains *some minor problems* for which corrective actions taken by the Contractor *appear or were satisfactory*.

Marginal: Performance *does not meet all* contractual requirements. The contractual performance of the element or sub-element being assessed reflects a *serious problem* for which the Contractor has *not yet identified corrective actions*. The Contractor's proposed actions appear only *marginally effective or were not fully implemented*.

Unsatisfactory: Performance *does not meet most* contractual requirements and *recovery is not likely* in a timely manner. The contractual performance of the element or sub-element contains *serious problems* for which the Contractor's corrective actions *appear or were ineffective*

7.0 CONTRACTOR MINIMUM PERFORMANCE AND QC REQUIREMENTS: Marine removal QC shall be recommended by the Contractor in the QCP. Government QA is expected to be limited to visual observation of the Contractors work and QC operations due to the dynamics of this high energy environment. The government recognizes that submerged metallic items can move great distances due to the local current and surf conditions and that prolonged seeding of test items (more than 1 day) is not feasible for the South Beach Time Critical Removal Action. The government requests that the Contractor submit a modified Performance Requirement table for the marine and beach portions of the project to meet the needs of the project and still insure acceptable data quality to meet the project objectives.

The following tables will be used for the land survey/clearance operations. The Contractor shall include in their QC plan specific tests that are itemized below. The values listed in the various requirements listed in Tables 7-1 and 7-2 below may be adjusted upon request, provided the Contractor supplies supporting documentation and rationales for Government concurrence. All reported QC results from these tests will be reviewed as part of government QA. In the event a requirement is not met and the contractor submits the data to the Government, the contractor shall provide rationales for accepting them. All such rationales will be reviewed as part of government QA. If the rationales are either insufficient or technically unfeasible, or are attempts to justify non-conformances that should be corrected to meet project needs, the Government will issue a Corrective Action Request to the contractor and the submittal(s) will be rejected. Some performance standards are default values and may be changed by the PDT to suit project needs. These requirements are marked with an asterisk (*). These QC requirements supersede the required QC entries in the DID MR-005-05.01 Access Database. The database template shall be used; however, the required fields will change based on these tables.

Table 7-1 Performance Requirements for RI/FS using DGM Methods [1]

Requirement	Applicability (Specific to Collection Method/Use)	Performance Standard	Frequency	Consequence of Failure[2]
Static Repeatability (instrument functionality)[3]	All	Response (mean static spike minus mean static background) +-10% of GPO/original value on all channels	Min 1 daily	Day's data fails unless seed item is mapped that day with repeatable anomaly characteristics (see Dynamic Detection Repeatability)
Along Line Measurement Spacing	All	98% <=25cm along line[4]	By dataset	Dataset submittal fails
Speed	Transects without seeds[5]	95% within max project design speed or demonstrated speed	By dataset	Dataset submittal fails unless new max speed successfully demonstrated at GPO.
Coverage(*)	Grids	>90% coverage at project design line spacing.[6]	By dataset or grid[7]	Submittal fails unless gaps filled, additional data collected, or government refund for missing acreage.
Dynamic Detection Repeatability	Grids	Test item anomaly characteristics (peak response and size) repeatable with allowable variation +/-25%.[8]	1 test item per grid or dataset. [7]	Submittal fails
	Transects	(a) #anomalies on repeat segment w/in +-20% or +-8 of original or within range of adjacent sections (b) Test item (in test strip or on transect) anomaly characteristics (peak response and size) repeatable with allowable variation +/-25%. Or Fit coefficient[10] over test strip is acceptable.	(a) repeat 2% per lot[9] or (b) repeat test strip once per system per lot or daily; or 2 test items per system per lot	(a) Lot submittal fails or (b) Lot (or day's data) fails
Dynamic Positioning Repeatability	Grid coverage	Position offset of Test item target <=35cm + 1/2 line spacing[11] (<=50cm + 1/2 line spacing for fiducially positioned data).	1 test item per grid or dataset [7] (same item as Dynamic Detection Repeatability)	submittal fails
	Transects with reacquisition/digging	(a) Demonstrate reacquisition by reproducing randomly chosen anomaly signals (reac amplitude >= original & offset <= 1m) [12] or	(a) 2 targets per system per lot or (b) 2 test items per system per lot (can be	Lot submittal fails

Requirement	Applicability (Specific to Collection Method/Use)	Performance Standard	Frequency	Consequence of Failure[2]
		(b) Test item anomaly characteristics (peak response and size) repeatable with allowable variation +/-25% and position offset <=1m.	same as detection repeatability test items)	
Target Selection	All	All dig list targets are selected according to project design	By grid or dataset[7]	submittal fails
Anomaly Resolution(*)[13]	Verification checking by DGM re-mapping[14] Or Verification checking with original instrument of anomaly footprint after excavation [15]	If MEC[16]: 70% confidence <10% unresolved anomalies[17] If no MEC: 90% confidence <5% unresolved anomalies Accept on zero.	Rate varies depending on lot size. [18] See Acceptance Sampling Table.	Lot submittal fails
Geodetic Equipment Functionality(*)	All	Position offset of known/temporary control point within expected range as described in the approved work plan. [19]	Daily	Redo affected work or re-process affected data
Geodetic Internal Consistency	Grids with line/fiducial positioning	Grid corners are internally consistent within 30cm on any leg or diagonal.	Per Grid	Redo affected work (corner placement & data collection, or data processing)
Geodetic Accuracy	Points used for RTK or RTS base stations	Project network must be tied to HARN, CORS, OPUS or other recognized network[20]. Project control points that are used more than once must be repeatable to within 5cm	For points used more than once, repeat occupation[21] of each point used, either monthly (for frequently used points) or before re-use (if used infrequently[22]).	Re-set points not located at original locations or resurvey point following approved work plan.
Geodetic Repeatability(*)	Grid centroids or corners/transect points without anomaly reacquisition	Measured locations are reoccupied within 10m. [23]	1 per lot	Lot submittal fails

[1] These are the critical requirements for RI DGM methods. Contractors shall use additional methods/frequencies that they deem beneficial and as required in their SOPs.

[2] All failures also require a Root Cause Analysis.
[3] Item should be placed on a jig that ensures consistent geometry between the sensor and item to ensure repeatability, response not to exceed 500 units, or optionally use the Geonics calibration coil. Duration of data collection needed TBD by the contractor. Must compare to original to ensure instrument is consistent throughout the project. .It is recognized that this QC requirement may be redundant and could contradict results from seeding QC, however, in the event of seed failure, information from this test may aid in determining cause of failure, i.e. instrument or processing.
[4] 25cm based on institutional knowledge and common instrument physical dimensions. Assumes speed used achieves detection. This requirement can be relaxed if supporting documentation is provided to the Government for concurrence.
[5] Needed because increase in speed can reduce SNR and increase # false hits (alternatively this test can be supplanted by repeatable anomaly characteristics of seed items within the dataset).
[6] Recommended default line spacing is 0.6m for items of interest the size of 40mm grenades and smaller, else 0.8m
[7] The terms “grid” and “dataset” refer here to logical groupings of data or data collection event. Logical groupings of data are contiguous areas mapped by the same instrument and in the same relative time-frame. These can be grids, acres, or some other unit of area. A data collection event is similar to logical groupings of data but refers to data collected over a contiguous time frame, such as “morning”, “afternoon”, “battery life”, or some other measure of contiguous time. It is recognized that physical marking of corners on the ground is not always beneficial to the government. Additionally, size and shape of the grid is not specified.
[8] A standard test item shall be placed within the survey area (i.e. a small pipe or flat plate with a small area response. Item can be placed flush with the surface or buried at a standard depth and standard orientation). This test does not demonstrate the detection capabilities of the MEC of interest. The standard response to this test item must be defined prior to the start of production field activities. Response repeatability to this standard test item in the mapping data will indicate data quality is consistent and sufficient for detection of the MEC items of interest.
[9] Fit Coefficient means how well the repeated data matches the original data. Method of calculation and acceptance criteria can be proposed by the Contractor, and could be based on the UX-Process repeatability gx value.
[10] Contractor shall propose the lot size and criteria for designation (i.e. woods vs. open)
[11] For 0.8m line spacing, this would be a 0.75m allowable error radius (or 0.9 for fiducial).
[12] Does not necessarily mean the peak response or actual item location (i.e. for transect data the response could still be ramping up off-line). This could also be demonstrated through blind seed items.
[13] Resolved is defined as 1) there is no geophysical signal remaining at the flagged/selected location, or 2) a signal remains but it is too low or too small to be associated with UXO/DMM, or 3) a signal remains but is associated with surface material which when moved results in low, or no signal at the interpreted location, or 4) a signal remains and a complete rationale for its presence exists.
[14] Mapping shall cover the required number of anomaly locations. This is used in-lieu of checking individual anomalies for those instances where it is quicker to re-map sections of land rather than return to individual anomalies. Only the data at the anomaly locations is reviewed for resolution.
[15] This may require leaving flags at excavated locations until QC is complete. It is up to the contractor to indicate which holes knowingly have metal left in them where the PDT has agreed such is acceptable. It is the contractor’s responsibility to not put hot material back in the hole before QC is complete. As part of this requirement location accuracy must also be demonstrated (i.e. cleared location is within dynamic positioning error radius as described above). Contractor SOPs that incorporate post-excavation inspections using digital geophysical instruments can be used to meet the excavation verification need of this requirement provided appropriate QC protocols are in place to monitor and document the SOPs are followed. Acceptance sampling or alternative QC protocols to monitor and document the reacquisition SOP would be required to demonstrate the correct locations are excavated.
[16] If MEC (or intact or partial training or practice rounds) are not detected in a lot then the information from that lot may be used to support certain decisions where the confidence in the results must be greater than that for grids where MEC are detected.

[17] This is a statistical test number. It does not imply there are 10% bad units. It tests there are fewer than 10% bad units, including zero bad units. Values for confidence levels will be determined by the PDT and are dependent on the information needed. Stopping rules will take precedence over this standard (i.e. for high MEC density, decision could be made to stop because the team has enough data for characterization)

[18] For example, if lot size is 500 anomalies, to achieve a 90% confidence that there are less than 5% unresolved anomalies, 43 anomalies must be re-checked. If any one of the 43 is unresolved, then the confidence level has not been met, the lot submittal fails and all anomalies in that lot must be re-checked (i.e. accept on zero). The contractor shall propose the lot size for government concurrence (i.e. The contractor determines the amount of risk they are willing to take. The larger the lot, the less sampling needs to be done, but the larger the risk of increased costs/rework if failure occurs.) For anomaly resolution, in order to use statistics/confidence levels, it is based on number of anomalies, not grids.

[19] Most high-accuracy systems should demonstrate repeatability between 5cm and 10cm. Typical accuracies achievable for some high-accuracy systems are: 2cm to sub-centimeter for RTK DGPS and RTS units depending on manufacturer and site conditions. Less accurate systems should demonstrate repeatability within manufacturer published ranges. Typical accuracies for less accurate systems are 5m to sub-meter for WAAS or satellite correction service DGPS units depending on manufacturer, correction service and site conditions, and 30m to 1m for USCG beacon corrected units depending on manufacturer.

[20] The plan for tying the project network to a common reference network must be described in the approved work plan. If monumentation is part of the plan, specific monumentation procedures and data quality objectives will also need to be specified and installation of monumentation or network control points shall follow all guidance and accuracies specified in EC 1110-1-73 – “Standards and Specifications for Surveys, Maps, Engineering Drawings, and Related Spatial Data Products”.

[21] Repeat occupation means demonstrate the control points being used can be recovered and reoccupied and that they have not moved more than the requirement specification. This can be accomplished using the same methodology used to initially tie the local network to a HARN, CORS, OPUS, or other recognized network, or it can be accomplished by other means that achieve this requirement.

[22] An example of frequently used control points would be points used as RTK DGPS base stations. Infrequently used points could be those used during RTS operations where the control point was used during mapping and then again at some later time for reacquisition and QC statistical sampling. Infrequently used points could also include grid corners they are used for line and fiducial positioning and then subsequently re-used for reacquisition or QC statistical sampling.

[23] The exact location of a single transect/grid is not critical when the information is used only for characterization by interpolating over large areas (e.g. transect spacings are larger than geodetic accuracies). The acceptable accuracy may be tightened by the PDT if more exact positioning is needed (e.g. trying to characterize extents of small MRS’s). If specific anomalies/locations must be recovered this metric must be revised to meet project needs and will likely have the same accuracy needs as the Geodetic Accuracy requirement.

Table 7-2 QC Requirements for RI/FS using Analog Methods[1]

Requirement	Limited Applicability (Specific to Collection Method/Use)	Performance Standard	Frequency	Consequence of Failure[2]
Repeatability (instrument functionality)	All	All items in test strip detected (trains ear daily to items of interest)[3]	Min 1 daily[4]	Remedial training and additional remedial measures as described in the approved work plan if due to operator error, or replacement of faulty equipment.[5]
Dynamic Repeatability	Transects used only for density estimates	Repeat a segment of transect & show #Counts repeated w/in the greater of +-20% or +-8, or w/in range of adjacent segments.	2nd party repeat of 2% per lot	Redo lot
	Transects with digging	Repeat a segment of transect & show extra flags/digs not greater than the greater of 20% or 8 flags/digs, or w/in range of adjacent segments.	2nd party repeat of 2% per lot	Redo lot
Coverage(*)	Grids	Blind coverage seeds and blind detection seeds recovered[6]: 75% if MEC 90% if no MEC[7]	Variable rate at 2, 3 or 4 times # operators, per lot.	Redo lot.
Detection & Recovery (*)	No DGM QC remapping	Blind detection seeds recovered: 80% if MEC 100% if no MEC	Per operator per lot: variable 1-2 large/deep and 1-3 small/ shallow[8]	Redo lot
	With DGM QC remapping	If MEC[9]: 70% confidence <10% unresolved anomalies[10] If no MEC: 90% confidence <5% unresolved anomalies Accept on zero. [11]	Rate varies depending on lot size. [Table showing acreage rates per lot size for varying confidence levels will be provided][12]	Redo lot
Anomaly Resolution(*)[13]	Verification checking of excavated locations (analog or digital instrument)	2nd party checks open holes to determine: If MEC: 70% confidence <10% anomalies unresolved[14]	Rate varies depending on lot size. See Acceptance Sampling Table.[15]	Redo lot

Requirement	Limited Applicability (Specific to Collection Method/Use)	Performance Standard	Frequency	Consequence of Failure[2]
		If no MEC: 90% confidence <5% anomalies unresolved		
	Verification checking by DGM remapping[16]	Same as Detection & Recovery	Rate varies depending on lot size. See Acceptance Sampling Table.	Redo lot
Geodetic Equipment Functionality (*)	All	Position offset of known/temporary control point within expected range as described in the approved work plan.[17]	Daily	Redo affected work
Geodetic Accuracy	Points used for RTK or RTS base stations	Project network must be tied to HARN, CORS, OPUS or other recognized network[18]. Project control points that are used more than once must be repeatable to within 5cm	For points used more than once, repeat occupation[19] of each point used, either monthly (for frequently used points) or before re-use (if used infrequently[20]).	Re-set points not located at original locations or resurvey point following approved work plan.
Geodetic Repeatability (*)	Grid corners/transect points without anomaly reacquisition	Measured locations are reoccupied within 10m.[21]	1 per lot	Redo affected work

[1] These are the critical requirements for RI analog methods. Contractors shall use additional methods/frequencies that they deem beneficial and as required in their SOPs.
[2] All failures also require a Root Cause Analysis.
[3] The requirement is that each operator demonstrates positive detection on a daily basis of the smallest and largest expected MEC of interest when it is placed at both its best and worst orientations and buried between 95% and 100% of their respective maximum consistent detection depth. Maximum consistent detection depth is defined as producing any above background response on a minimum of the first three time gates of the EM61MK2 optimized for site conditions and having a $0.9m^2$ size or more as calculated using the Geosoft Oasis Montaj UCEAnalyseTarget.gx or equivalent routine.
[4] Random blind reconfiguration of test strip is also required (i.e. moving/adding items) at a frequency determined by the contractor and approved in the work plan, to address the potential for simply memorizing seed locations.
[5] Some examples of additional remedial measures are: removal of operator from mapping for one day, retesting on new blind strip meeting the same requirements for seed items (could move location of items in same area), 100% QC re-inspection of initial lanes by that operator, etc.
[6] Coverage seeds are small pieces of metal that will produce relatively large amplitude anomalies over small areas, such as small nails or ball bearings. Known location accuracy of placement is not critical. See endnote #8 for description of blind detection seeds.
[7] If MEC (or intact or partial training or practice rounds) are not detected in a grid/lot then the information from that grid/lot may be used to support certain decisions where the confidence in the results must be greater than that for grids where MEC are detected.

[8] Detection and recovery must be consistently demonstrated for the hard to detect items; therefore, the largest expected MEC and the smallest expected MEC shall be placed between 95% and 100% of their respective maximum consistent detection depth

[9] If MEC (or intact or partial training or practice rounds) are not detected in a lot then the information from that lot may be used to support certain decisions where the confidence in the results must be greater than that for grids where MEC are detected.

[10] This is a statistical test number. It does not imply there are 10% bad units. It tests there are fewer than 10% bad units, including zero bad units. Values for confidence levels will be determined by the PDT and are dependent on the information needed. Stopping rules will take precedence over this standard (i.e. for high MEC density, decision could be made to stop because the team has enough data for characterization)

[11] Unresolved anomaly for 'Detection & Recovery Testing' means a significant signal remains without a complete rationale for its presence. Default values for such a 'significant signal' are peak amplitude on sum channel >=30mv & anomaly width >=1.2m or anomaly size >=0.9m^2. This value may change but must be agreed upon by the PDT up front.

[12] The statistical calculations for this test are in progress. This is different from sampling of excavated holes, in that a portion of the acreage is re-mapped, and the amount re-mapped must be statistically valid to show, to some confidence level, that anomalies did not go undetected.

[13] This requires leaving flags at excavated locations until QC is complete. If shovel called to a flag during QC then the failure has already occurred—it is not important that something large or small comes out of the hole. Assumption here is "mapping coverage" is addressed through other means. It is up to the contractor to indicate which holes knowingly have metal left in them where the PDT has agreed such is acceptable. It is the contractor's responsibility to not put hot material back in the hole before QC is complete.

[14] Resolved is defined as 1) there is no geophysical signal remaining at the flagged/selected location, or 2) a signal remains but it is too low or too small to be associated with UXO/DMM, or 3) a signal remains but is associated with surface material which when moved results in low, or no signal at the interpreted location, or 4) a signal remains and a complete rationale for its presence exists.

[15] For example, if lot size is 500, to achieve a 90% confidence that there are less than 5% unresolved anomalies, 43 anomalies must be re-checked. If any one of the 43 is unresolved, then the confidence level has not been met , the lot submittal fails and all anomalies in that lot must be re-checked (i.e. accept on zero). The contractor shall propose the lot size for government concurrence (i.e. The contractor determines the amount of risk they are willing to take. The larger the lot, the less sampling needs to be done, but the larger the risk of increased costs/rework if failure occurs.) For anomaly resolution, in order to use statistics/confidence levels, it is based on number of anomalies, not grids.

[16] Mapping shall cover the required number of anomaly locations. This is used in-lieu of checking individual anomalies for those instances where it is quicker to re-map sections of land rather than return to individual anomalies. Only the data at the anomaly locations is reviewed for resolution.

[17] Most high-accuracy systems should demonstrate repeatability between 5cm and 10cm. Typical accuracies achievable for some high-accuracy systems are: 2cm to sub-centimeter for RTK DGPS and RTS units depending on manufacturer and site conditions. Less accurate systems should demonstrate repeatability within manufacturer published ranges. Typical accuracies for less accurate systems are 5m to sub-meter for WAAS or satellite correction service DGPS units depending on manufacturer, correction service and site conditions, and 30m to 1m for USCG beacon corrected units depending on manufacturer.

[18] The plan for tying the project network to a common reference network must be described in the approved work plan. If monumentation is part of the plan, specific monumentation procedures and data quality objectives will also need to be specified and installation of monumentation or network control points shall follow all guidance and accuracies specified in EC 1110-1-73 – "Standards and Specifications for Surveys, Maps, Engineering Drawings, and Related Spatial Data Products".

[19] Repeat occupation means demonstrate the control points being used can be recovered and reoccupied and that they have not moved more than the requirement specification. This can be accomplished using the same methodology used to initially tie the local network to a HARN, CORS, OPUS, or other recognized network, or it can be accomplished by other means that achieve this requirement.

[20] An example of frequently used control points would be points used as RTK DGPS base stations. Infrequently used points could be those used during RTS operations where the control point was used during mapping and then again at some later time for reacquisition and QC statistical sampling. Infrequently used points could also include grid corners they are used for line and fiducial positioning and then subsequently re-used for reacquisition or QC statistical sampling.
[21] The exact location of a single transect/grid is not critical when the information is used only for characterization by interpolating over large areas (e.g. transect spacings are larger than geodetic accuracies). The acceptable accuracy may be tightened by the PDT if more exact positioning is needed (e.g. trying to characterize extents of small MRS's). If specific locations must be recovered this metric must be revised to meet project needs and will likely have the same accuracy needs as the Geodetic Accuracy requirement, which is 30cm.

Table 7-3 Acceptance Sampling Table for Anomaly Resolution

	Lot size = **50** anomalies	**100**	**200**	**500**	**1000**	**2000**	**5000**	**10,000**
70% confidence <**10%** unresolved[1]	11	11	12	12	12	12	12	12
80% confidence <**10%** unresolved	14	15	15	16	16	16	16	16
90% confidence <**10%** unresolved	18	20	21	22	22	22	22	22
95% confidence <**10%** unresolved	22	25	27	28	29	29	29	29
70% confidence <**5%** unresolved	17	21	23	23	24	24	24	24
80% confidence <**5%** unresolved	21	27	30	31	31	32	32	32
85% confidence <**5%** unresolved	23	31	34	36	37	37	37	37
90% confidence <**5%** unresolved[2]	27	37	41	43	44	45	45	45
95% confidence <**5%** unresolved	31	45	51	56	57	58	59	59
80% confidence <**1%** unresolved	40	80	111	138	144	154	158	159
85% confidence <**1%** unresolved	43	85	123	158	172	181	186	187
90% confidence <**1%** unresolved[3]	45	90	137	184	205	217	224	227
95% confidence <**1%** unresolved	48	95	155	225	258	277	290	294

* Gray boxes show number of dug locations to check post-excavation. All must be shown to be resolved to meet confidence values (accept on zero)

[1] Default for RIFS where MEC has been recovered.

[2] Default for RIFS where no MEC has been recovered.

[3] Default for Removal Action.

8.0 GENERAL CONDITIONS:

8.1 The Contractor acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the work, and that it has assessed and satisfied itself as to the general and local conditions, which can affect the work or its cost, including but not limited to:

- conditions bearing upon transportation, disposal, handling, and storage of materials, explosives, or scrap;

- the availability of labor, facilities, water, electric power, communications, and roads;

- uncertainties of weather, river stages, tides, or similar physical conditions at the site;

- the conformation and conditions of the ground, soil, geology, and vegetation (type, height, density), the distribution of each, and the seasonal effects on each;

- the character of equipment and facilities needed preliminary to and during work performance;

- Personal Protective Equipment (PPE) requirements including all effects on cost or production due to the requirement to use PPE;

- exclusion zone requirements including all effects and costs of implementing and enforcing exclusion zones. The Contractor is responsible for evaluating, identifying the requirements of, and implementing/complying with all exclusion zones;

- responsibility for understanding and implementing the required safety and access control requirements and factoring them into its approach and price;

- the availability or cost of qualified labor, material, and/or equipment;

- the availability or cost of lodging for on-site personnel;

- the availability or location of explosives storage.

8.2 The Government has provided the Contractor with access to the site, which allowed the Contractor to become confident in its independent understanding of the site conditions. The Government strongly encourages prospective Contractors to use this time to perform the requisite site assessments necessary to ascertain the site conditions to a reasonable degree of accuracy The Contractor attests that the quantity and distribution of hot rocks, vegetation, terrain, soil condition, weather and other similar cost drivers are reasonably ascertainable from the Contractor's research and assessment of the site in conjunction with the contractor verified data provided by the Government. Contractors are strongly encouraged to perform this site assessment and use their experienced judgment and reasoned interpolation and extrapolation of all the available site information to assess the general and local conditions, which can affect the work or its cost. Contractors who do not perform a site assessment assume the risks associated with the decision to forgo this important source of information about the site. The Contractor is expected to apply due diligence in the research and development of its proposal and to know or reasonably estimate the conditions to be encountered that will affect the cost, quality, or schedule of the work included in this task order. The Government expects the Contractor to assess the risk and factor this risk into its proposal. The act of signing this task order signifies that the Contractor has been given ample opportunity to assess the conditions under which the work will be performed and the Contractor fully understands those conditions. The Contractor accepts full and sole responsibility for identifying and considering all factors that may affect the cost to execute the work. The Contractor attests that it has been provided the opportunity to make an independent assessment of the site, has gathered the information necessary to fully understand the conditions it will encounter during execution of this task order, and has used any data provided by the Government at the its own risk.

8.3 Government acceptance of the proposed technical approach and/or price does not relieve the Contractor from full responsibility for the viability, productivity, and efficiency of the approach used to perform the work and for meeting the performance requirements of the PWS at the price proposed.

8.4 Use of the data provided by the government as the basis of estimate for an accurate price proposal requires an experienced understanding of how the data of this type is collected, analyzed, interpreted, and presented. The Contractor is responsible for interpreting the data provided in the context of the conditions under which the data was collected and analyzed. The Contractor is responsible for recognizing the limitations of the data provided for assessments of this type. The Contractor is strongly encouraged to use the pre-proposal site visit to field verify its interpretation of the data and assumptions made during preparation of the proposal. The Government expects that Contractors will promptly notify the Contracting Officer (KO) if they have not been given adequate opportunity to assess the site conditions.

8.5 The Contractor attests that it has had sufficient opportunity to assess the conditions of the work and has used its experienced judgment and reasoned interpolation and extrapolation of all the available site information to assess the general and local conditions, which can affect the work or its cost. The Contractor attests that any exceptions to any of the conditions of this PWS were clearly marked in the proposal in bold type as “Exception to the RFP”. The Contractor certifies that its proposal is not qualified or contingent upon the site conditions.

Appendix A
Price Spreadsheet

Martha's Vineyard						
				If priced per unit		
Task	*Task Name*	Task Pricing	Unit Price	Units	Number of Units	Total Price
1	Technical Project Planning	FFP		LS		
	Additional meeting	Unit Price		per meeting		
2	RI/FS Work Plan	FFP		LS		
2a	Optional Explosive Siting Plan	FFP		LS		
2b	Optional Dive Plan	FFP		LS		
3	GIS	FFP		LS		
	Additional GIS	Unit Price		Per Month		
4	RI/FS Field Activities					
4a	Optional Ocean Area of Former Cape Poge Little Neck Bomb Target Site	T&M		LS		
4b	Optional Former Cape Poge Little Neck Bomb Target Site	FFP		LS		
4c	Optional Ocean Area of Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard	T&M		LS		
4d	Optional All Other Areas of Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard	FFP		LS		
4e	Optional Ocean Area of Tisbury Great Pond	T&M		LS		
4f	Optional Pond Area of Tisbury Great Pond	T&M		LS		
4g	Optional Tisbury Great Pond Land	FFP		LS		
4h	Optional Investigation of Anomalies Requiring Off-Shore Dive Support.	T&M		LS		
	Civil Survey	Unit Price		per acre		
	Vegetation Removal - Light	Unit Price		per acre		
	Vegetation Removal - Medium	Unit Price		per acre		
	Vegetation Removal - Heavy	Unit Price		per acre		
	MEC Reconnaissance - Light Brush	Unit Price		per acre		
	MEC Reconnaissance - Medium Brush	Unit Price		per acre		
	MEC Reconnaissance - Heavy Brush	Unit Price		per acre		
	EM/Mag & Dig Transects	Unit Price		per acre		
	Transect DGM	Unit Price		per acre		
	Grids DGM	Unit Price		per acre		
	Underwater Transects	Unit Price		per acre		
	Sonar	Unit Price		per acre		
	Mob/Demob Geophysical Team	Unit Price		round trip		
	Mob/Demob MEC Investigation Team	Unit Price		round trip		
	Mob/Demob Sonar Team	Unit Price		round trip		
	Mob/Demob Underwater Geo Team	Unit Price		round trip		
	Mob/Demob Underwater MEC Investigation Team	Unit Price		round trip		
	Underwater Investigation – On-shore support	Unit Price		per day		

Martha's Vineyard						
				If priced per unit		
Task	*Task Name*	Task Pricing	Unit Price	Units	Number of Units	Total Price
	Underwater Investigation – Off-shore support	Unit Price		per day		
	Underwater Investigation – On-shore support	Unit Price		per week		
	Underwater Investigation – Off-shore support	Unit Price		per week		
	Demolition Shot	Unit Price		per Demo Shot		
	Underwater Demolition Shot	Unit Price		per Demo Shot		
	Intrusive Investigation	Unit Price		per day		
	Intrusive Investigation	Unit Price		per week		
5	Remedial Investigation Report	FFP		LS		
6	Feasibility Study Report	FFP		LS		
7	Proposed Plan	FFP		LS		
8	Decision Document	FFP		LS		
9	Community Relations Support	FFP		LS		
	Additional Meeting	Unit Price		per meeting		
	Maintain Website	Unit Price		per month		
10	Public Involvement Plan	FFP		LS		
11	Administrative Record	FFP		LS		
12	Environmental Sampling & Analysis					
12a	Cape Poge Little Neck Bomb Target Site	FFP		LS		
12b	Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard	FFP		LS		
12c	Tisbury Great Pond	FFP		LS		
	Sampling and analysis - Soil	Unit Price		per 10 Samples + MS/MSD		
	Sampling and analysis - Water	Unit Price		per 10 Samples + MS/MSD		
	Multi-incremental Decision Unit (100'x100')	Unit Price		per Unit		
	Pre & Post Detonation	Unit Price		per Sample set		
	Groundwater sampling w/o perchlorate	Unit Price		per Sample		
	Groundwater sampling w/ perchlorate	Unit Price		per Sample		
	Groundwater sampling w/o purging	Unit Price		Per Sample		
	Groundwater Sampling – GeoProbe/shallow aquifer	Unit Price		Per Sample		
	Installation of monitoring well – Base Price	Unit Price		per well		
	Installation of monitoring well – Price per additional foot	Unit Price		per Foot		
	Subsurface Sampling, boring 0' - 10'	Unit Price		per boring		
	Subsurface Sampling, boring 10' - 15'	Unit Price		per boring		
13	Employee Awareness Training	FUP		per training session		

Martha's Vineyard						
				If priced per unit		
Task	*Task Name*	Task Pricing	Unit Price	Units	Number of Units	Total Price
13a	Employee Awareness Field Training	FUP		per training session		
13b	Optional Training Video	FUP		per video		
14	Optional Environmental and Cultural Compliance Support	T&M		LS		
					TOTAL	

Appendix B

1. REQUIREMENTS AND PROCEDURES:

a. General requirements for the development and review of FUDS MMRP decision documents and action memoranda are documented in references 3a and 3b. This interim guidance provides specific requirements for MMRP.

b. Format and content of ALL MMRP decision documents and action memoranda, regardless of signature authority shall be in accordance with Section 2. Each document will contain:

(1) A title page,

(2) A table of contents,

(3) Page numbers on each page indicating page number and total number of pages in the document, e.g., "1 of 25".

(4) Header in the upper right-hand corner of each page including; document type ("Decision Document", "Time Critical Removal Actions (TCRA) Action Memorandum", or "Non-time Critical Removal Action (TCRA) Action Memorandum"), project name ("Sitka Naval Operating Base"), project location ("Sitka, Alaska"), and project number to include MRS number.

c. All decision documents or action memoranda, regardless of level of signature authority, will be accompanied by an Executive Summary that Headquarters (HQ), USACE will forward to ACSIM-ISE and DASA (ESOH). The Executive Summary shall be kept to a single page, whenever possible, and will include:

(1) Title, including project name and project number, date DD (or AM) was signed and by whom,

(2) Brief description of the Munitions Response Sites (MRS), covered by the decision,

(3) Brief description of selected response action and its relationship to other cleanup actions,

(4) Degree of risk reduction,

(5) Present worth cost of selected response action, and the contribution to the cost-to-complete of all remedies for the FUDS Property,

(6) Amounts and fiscal year(s) that funds are required for remedial/removal action design and construction,

(7) Duration of any remedial action-operation (RA-O), removal action construction (RmA-C) and/or Long Term Monitoring (LTM) actions,

(8) Land use controls (LUC) required and means of maintaining them,

(9) Other potential response actions considered, and

(10) Expected result of the action.

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Remedial Action Decision Document Outline

PART 1: THE DECLARATION

The Declaration functions as the abstract and formal authorizing signature page for the DD.

1. PROJECT NAME AND LOCATION.
2. STATEMENT OF BASIS AND PURPOSE.
   Certify the factual and legal basis for the Selected Remedy.

3. ASSESSMENT OF PROJECT MRS.
   Certify that the MRS poses a threat to public health, welfare, or the environment.

4. DESCRIPTION OF SELECTED REMEDY.
   a. Describe the major components of the Selected Remedy in a bullet fashion.

   b. Describe the scope and role of this MRS.

   c. Describe how this remedial action addresses principal threats and other contamination at the MRS (i.e., what is being treated, what is being contained, and what is the rationale for each).

5. STATUTORY DETERMINATIONS.
   a. Describe how the Selected Remedy satisfies the statutory requirements of CERCLA §121 and discuss the applicability of the 5-year review requirements.

6. DATA CERTIFICATION CHECKLIST.
   The Declaration should certify that the following information is included in the DD (or provide a brief explanation for why this information is not included):

   a. Munitions and Explosives of Concern (MEC) and munitions constituents (MC) and their respective concentrations.

   b. Baseline risk represented by the MEC/MCs.

   c. Cleanup levels established for MEC/MCs and the basis for these levels.

   d. How MEC and MC will be addressed.

   e. Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and DD.

   f. Potential land and groundwater use that will be available at the MRS as a result of the Selected Remedy.

   g. Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.

   h. Key factor(s) that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision).

7. AUTHORIZING SIGNATURE.
   The following general paragraph and signature block. (*Note: Signature block may not appear alone on a page – it must be on the same page with the preceding paragraph*):

   "This Decision Document presents the selected response action at [place]. The U.S. Army Corps of Engineers is the lead agency under the Defense Environmental Restoration Program (DERP) at the [FUDS property name] Formerly Used Defense Site, and has developed this Decision Document consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, and the National Oil and

Hazardous Substances Pollution Contingency Plan (NCP). This decision document will be incorporated into the larger Administrative Record file for [FUDS property name], which is available for public view at [address]. This document, presenting a selected remedy with a present worth cost estimate of [$$], is approved by the undersigned, pursuant to Memorandum, DAIM-ZA, September 9, 2003, subject: Policies for Staffing and Approving Decision Documents (DDs), and to Engineer Regulation 200-3-1, Formerly Used Defense Sites (FUDS) Program Policy."

APPROVED:

(insert individual's signature block here) Date_____

For present worth cost estimate of $2M or less:
District Commander" Signature Block

For present worth cost estimate of more than $2M and less than or equal to $10M:
HQUSACE signature block for:
Chief, Department of Defense
Support Team
Directorate of Military Programs

For present worth cost estimate of more than $10M:
Signature block for ACSIM or DASA(ESOH) or both

PART 2: THE DECISION SUMMARY

The Decision Summary identifies the Selected Remedy, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

1. PROJECT NAME, LOCATION, AND BRIEF DESCRIPTION.
   a. Name and location.

   b. FUDS Project Number.

   c. Lead and support agencies (e.g., DoD, State, Tribes).

   d. Source of cleanup monies (e.g., ER-FUDS, ER-Army, ER-BRAC).

   e. Brief MRS description.

2. PROJECT HISTORY AND ENFORCEMENT ACTIVITIES.
   a. History of MRS activities that led to the current problems.

   b. History of federal, state, and local MRS investigations and removal and remedial actions conducted under CERCLA or other authorities.

   c. History of CERCLA enforcement activities at the MRS (e.g., results of PRP searches, issuances of special notices to PRPs).

3. COMMUNITY PARTICIPATION.
   a. Describe how the public participation requirements in CERCLA and the NCP were met in the remedy selection process (e.g., community relations plans, fact sheets, public notices, public meetings, public Restoration Advisory Board).

   b. Describe other community outreach and involvement efforts.

c. Describe efforts to solicit views on the reasonably anticipated future land uses and potential future land uses.

4. SCOPE AND ROLE OF RESPONSE ACTION.

a. The planned sequence of actions.

b. The scope of problems those actions will address.

c. The authorities under which each action will be/has been implemented (e.g., removal, remedial).

5. PROJECT MRS CHARACTERISTICS: (Include maps, a site plan, or other graphical presentations, as appropriate.)

a. Describe the conceptual site model (CSM) on which the risk assessment and response action are based.

b. Provide an overview of the MRS, including the following:

(1) Size of MRS (e.g., acres).

(2) Geographical and topographical information (e.g., surface waters, flood plains, wetlands).

(3) Surface and subsurface features (e.g., number and volume of tanks, lagoons, structures, and drums on-site).

(4) Areas of archaeological or historical importance.

c. Describe the sampling strategy (e.g., which media were investigated, what sampling approach was used, over what area, when was the sampling performed).

d. Describe known or suspected sources of contamination.

e. Describe types of contamination and the affected media, including the following:

(1) Types and characteristics of MEC/MCs (e.g., toxic, mobile, carcinogenic, non-carcinogenic).

(2) Quantity/volume of MEC/MC that needs to be addressed.

(3) Concentrations of MEC/MCs in each medium.

(4) RCRA hazardous wastes and affected media.

f. Describe location of contamination and known or potential routes of migration, including the following:

(1) Lateral and vertical extent of contamination.

(2) Current and potential future surface and subsurface routes of human or environmental exposure.

(3) Likelihood for migration of MEC/MCs from current location or to other media.

(4) Human and ecological populations that could be affected.

g. For MRSs with groundwater contamination, describe the following:

(1) Aquifer(s) affected or threatened by site contamination, types of geologic materials, approximate depths, whether aquifer is confined or unconfined.

(2) Groundwater flow directions within each aquifer and between aquifers and groundwater discharge locations (e.g., surface waters, wetlands, other aquifers).

(3) Interconnection between surface contamination (e.g., soils, sediments/surface water) and groundwater contamination.

(4) Confirmed or suspected presence and location of non-aqueous phase liquids.

(5) If groundwater models were used to define the fate and transport of MEC/MC, identify the model used and major model assumptions.

h. Note other site-specific factors that may affect response actions at the MRS.

6. CURRENT AND POTENTIAL FUTURE LAND AND WATER USES.

a. Land Uses.

(1) Current on-site land uses.

(2) Current adjacent/surrounding land uses.

(3) Reasonably Anticipated Future Land Uses and Basis for Future Use Assumptions (e.g., zoning maps, nearby development, 20-year development plans, dialogue with local land use planning officials and citizens, reuse assessment).

b. Groundwater and Surface Water Uses.

(1) Current groundwater and surface water uses.

(2) Potential beneficial groundwater and surface water uses (e.g. potential drinking water, irrigation) and basis for future use assumptions (e.g., Comprehensive State Groundwater Protection Plan, promulgated state classification guidelines).

(3) If beneficial use is potential drinking water source, identify the approximate time frame of projected future drinking water use (e.g., groundwater aquifer not currently used as a drinking water source but expected to be utilized in 30 to 50 years).

(4) Location of anticipated use in relation to location and anticipated migration of contamination.

7. <u>SUMMARY OF PROJECT MRS RISKS.</u>

a. Human Health Risks.

(1) Identify the concentrations of MEC/MC in each medium.

(2) Summarize the results of the exposure assessment.

(3) Summarize the results of the toxicity assessment for the MEC/MC.

(4) Summarize the risk characterization for both current and potential future land use scenarios and identify major assumptions and sources of uncertainty.

b. Ecological Risks.

(1) Identify the concentrations of MEC/MC in each medium.

(2) Summarize the results of the exposure assessment.

(3) Summarize the results of the ecological effects assessment.

(4) Summarize the results of the ecological risk characterization and identify major assumptions and sources of uncertainty.

c. Basis for Response Action.

(1) Clearly Present the Basis for Taking the Response Action at the Conclusion of this Section.

8. REMEDIAL ACTION OBJECTIVES.

a. Present a clear statement of the specific RAOs for the MRS (e.g., treatment of contaminated soils above health-based action levels, restoration of groundwater plume to drinking water levels, and containment of DNAPL source areas) and reference a list or table of the individual performance standards.

b. Discuss the basis and rationale for RAOs (e.g., current and reasonably anticipated future land use and potential beneficial groundwater use).

c. Explain how the RAOs address risks identified in the risk assessment (e.g., how will the risks driving the need for action be addressed by the response action?).

9. DESCRIPTION OF ALTERNATIVES: The objective of this section is to provide a brief understanding of the remedial alternatives developed for the MRS.

a. Remedy Components. Provide a bulleted list of the major components of each alternative, including but not limited to:

(1) Treatment technologies and the materials they will be used to address (e.g., principal threats).
(2) Containment components of remedy (e.g., engineering controls, cap, hydraulic barriers) and the materials they will be used to address (e.g., low concentration source materials, treatment residuals).

(3) Land use controls (and entity responsible for implementing and maintaining them).

(4) Operations and maintenance (O&M) activities required to maintain the integrity of the remedy (e.g., cap maintenance).

(5) Monitoring requirements.

b. Common Elements and Distinguishing Features of Each Alternative. Describe common elements and distinguishing features unique to each response option. Examples of these elements include:

(1) Key ARARs (or ARAR waivers) associated with each alternative (e.g., action- and/or location-specific groundwater treatment units, manifesting of hazardous waste, and regulating solid waste landfills).

(2) Long-term reliability of remedy (potential for remedy failure/replacement costs).

(3) Quantity of untreated MEC/MC to be disposed off-site or managed on-site in a containment system and degree of residual contamination remaining in such waste.

(4) Estimated time required for design and construction (i.e., implementation time frame).

(5) Estimated time to reach cleanup levels (i.e., time of operation, period of performance).

(6) Estimated capital, annual O&M, and total present worth costs, discount rate, and the number of years over which the remedy cost estimate is projected.

(7) Describe uses of presumptive remedies and/or innovative technologies.

c. Expected Outcomes of Each Alternative.

(1) Available land uses upon achieving performance standards. Note time frame to achieve performance standards (e.g., commercial or light industrial use available in 3 years when cleanup levels are achieved).

(2) Available groundwater uses upon achieving performance standards. Note time frame to achieve performance standards (e.g., restricted use for industrial purposes in technical impracticability [TI] waiver zone, drinking water use in non-TI zone upon achieving cleanup levels in 50 to 70 years).

(3) Other impacts or benefits associated with each alternative.

10. COMPARATIVE ANALYSIS OF ALTERNATIVES. Compare the relative performance of each alternative against the others with respect to the nine evaluation criteria (summarize in a table if appropriate).

11. PRINICIPAL MEC/MC ISSUES. Identify the MEC/MC issues at the MRS and discuss how the alternatives will address them.

Note: The *Statutory Determinations* section of the DD should explain whether or not the Selected Remedy satisfies the statutory preference for remedies employing treatment that reduces toxicity, mobility, or volume as a principal element. By indicating whether the principal threats will be addressed by the alternatives, this section of the *Decision Summary* should provide the basis for that statutory determination.

12. SELECTED REMEDY.

a. Summary of the Rationale for the Selected Remedy.

(1) Provide a concise discussion of the key factors for remedy selection.

b. Detailed Description of the Selected Remedy.

(1) Expand on the Description of the Selected Remedy from that which was provided in the Description of Alternatives section and provide a brief overview of the RAOs and performance standards.

c. Cost Estimate for the Selected Remedy.

(1) Present a detailed, activity-based breakdown of the estimated costs associated with implementing and maintaining the remedy (include estimated capital, annual O&M, and total present worth costs discount rate and the number of years over which the remedy cost estimate is projected).

d. Estimated Outcomes of Selected Remedy.

(1) Available land use(s) upon achieving cleanup levels. Note time frame to achieve available use (e.g., commercial or light industrial use available in 3 years when cleanup levels are achieved).

(2) Available groundwater use(s) upon achieving cleanup levels. Note time frame to achieve available use (e.g., restricted use for industrial purposes in TI waiver zone, drinking water use in non-TI zone upon achieving cleanup levels in 50 to 70 years).

(3) Final cleanup levels for each medium (i.e., contaminant-specific cleanup levels), basis for cleanup levels, and risk at cleanup levels (if appropriate).

(4) Anticipated socioeconomic and community revitalization impacts (e.g., increased property values, reduced water supply costs, jobs created, increased tax revenues due to redevelopment, environmental justice concerns addressed, enhanced human uses of ecological resources).

(5) Anticipated environmental and ecological benefits (e.g., restoration of sensitive ecosystems, protection of endangered species, protection of wildlife populations, wetlands restoration).

13. STATUTORY DETERMINATIONS.

a. Explain how the remedy satisfies the requirements of §121 of CERCLA to:

(1) Protect human health and the environment.

(2) Comply with ARARs, or justify a waiver.

(3) Be cost-effective.

(4) Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable (i.e., explain why the Selected Remedy represents the best option).

(5) Satisfy the preference for treatment as a principal element, or justify the selection of an alternative remedy.

b. Explain 5-year review requirements for the Selected Remedy.

14. DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN. If there are significant changes in the Selected Remedy from the Preferred Alternative:

a. Discuss the Preferred Alternative originally presented in the Proposed Plan.

b. Describe the significant changes in the Selected Remedy.

c. Explain the rationale for the changes and how they could have been reasonably anticipated based on information presented in the Proposed Plan or the Administrative Record file.

PART 3: THE RESPONSIVENESS SUMMARY

The Responsiveness Summary serves the dual purposes of: (1) presenting stakeholder concerns about the MRS and preferences regarding the remedial alternatives; and (2) explaining how those concerns were addressed and the preferences were factored into the remedy selection process. This discussion should cross-reference sections of the Decision Summary that demonstrate how issues raised by the community have been addressed.

1. STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES: Summarize and respond concisely to issues raised by stakeholders.

2. TECHNICAL AND LEGAL ISSUES: Expand on technical and legal issues, if necessary

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APPENDIX B:
SITE MAPS

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South Beach to Wasque Point, MA
Wasque Point
7.7 Acres
182.7 Acres
268.65 Acres
Katama Bay
Norton Point
South Beach
8.26 Acres
8.42 Acres
18.67 Acres

Tisbury Pond, MA
198.05 Acres
456.32 Acres
61.5 Acres
52.4 Acres
361000
362000
363000
4580000
4579000

Cape Poge Bay, MA

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APPENDIX C:
LOCAL POINTS OF CONTACT

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APPENDIX C

LOCAL POINTS OF CONTACT

NAME	RESPONSIBILITY	CONTACT NUMBER
Ralph Campbell	USAESCH PM	(256) 895-1621
Carol Ann Charette	CENAE PM	(978) 318-8605
John Winkelman	CENAE Dive Coordinator	(978) 318 8615
Mike Warminsky	UXB Project Manager	(908) 237-4592 (OFFICE)
Tom Rancich	VRHabilis (Diving)	(508) 410-1306
David Douthat	UXB Corporate Quality and Safety	(256) 426-1753 (OFFICE)
John J. Kierepka	Director, MEC and Range Services	(703) 395-0129
Patrick Fogleson	SUXOS	(719) 252.3811
Ambulance		911
Police (Emergency)		911
Fire Department		911

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APPENDIX D:
ACCIDENT PREVENTION PLAN

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APPENDIX D

Accident Prevention Plan, (APP)

APPROVALS

Plan Prepared by: John J. Kierepka Munitions Response Services (540) 443-0129	9/20/2010 Date
Plan Reviewed by: Mike Warminsky PE Project Manager (908) 237-4592	9/20/2010 Date
Plan Approval by: Richmond H. Dugger IV UXB President (540) 443-3706	9/20/2010 Date
Plan Approved by: David Douthat, CSP Safety and Health Manager (256) 426-1753	9/20/2010 Date

UXB International, Inc
2020 Kraft Drive, Suite 2100
Blacksburg, VA 24060
(540) 443-3700 (PH)
(540) 443-3790 (FAX)

1 Accident Prevention Plan

1.1 Background Information

Contractor:

UXB International, Inc (UXB)
2020 Kraft Drive, Suite 2100
Blacksburg, VA 24060
(540) 443-3700 (PH)
(540) 443-3790 (FAX)

1.1.1 Contract Number:

W912DY-04-D-0019, Task Order 0006

1.1.2 Project Name

Remedial Investigation Feasibility Study (RIFS)

Project Description

UXB International, Inc. (UXB) has been contracted by the US Army Engineering and Support Center, Huntsville (USAESCH) under contract W912DY-04-D-0009, Task Order 0006 to conduct an RIFS at:

Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick, MA

Former Moving Target machine Gun Site at South Beach, Martha's Vineyard, MA

Former Bombing Target Tisbury Great Pond, Martha's Vineyard, MA

This effort consists of placing two Instrument Verification Strips (IVS) and conducting an underwater anomaly reacquisition and intrusive investigation at Cape Poge, South Beach and Tisbury Great Pond. Additionally and concurrently two IVSs will be placed on land to support the land based RI efforts. For the underwater work, this Accident Prevention Plan will be supported by the Approved Dive Plan submitted by VRHabilis, UXB's Diving Contractor.

FIGURE 1-1

Cape Poge Little Neck Bomb Target Site RI Area

FIGURE 1-2

Former Moving Target machine Gun Site at South Beach RI Area

FIGURE 1-3

Former Bombing Target Tisbury Great Pond RI Area

(See Maps in Appendix B)

1.1.3 Accident Experience

Experience Modification Rate (EMR)

To substantiate this commitment UXB'S EMR for the last five years is at or well below the industry average of 1.00 per 100,000 hours of work and is illustrated in Table 1-1.

Table 1-1: UXB EMR for the Past 5 Years

Date	EMR
3/20/10	.89
3/20/09	.92
3/20/08	.83
3/20/07	1.00
3/20/06	.98

OSHA 300 Forms

OSHA 300 Forms for past 3 reporting periods are enclosure (1) to this plan.

Corporate Safety Trend Analysis

UXB has maintained a steady safety program over the last 2 years with no increase in lost time or other measurable indicators

1.1.4 Activities Requiring an Activity Hazard Analysis (AHA)

Activities under this task requiring an AHA are as follows:

- Brush Cutting
- DGM
- Anomaly Reacquisition
- Anomaly Excavation
- MEC Disposition
- Diving Operations

The AHA sheets corresponding to the activities identified above can be found in attachment 1 (SSHP). The AHAs for diving are located in enclosure 3a of Appendix D.

1.2 Statement of Corporate Health & Safety Policy

1.2.1 Corporate Safety Policy Statement is provided as enclosure (2).

1.2.2 Regulatory Compliance

1.2.2.1 UXB's Safety & Health Program complies with federal, state, and local laws, statutes, directives, and ordinances that relate to worker safety and health, and the protection of the environment, including:

- 29 Code of Federal Regulations (CFR) 1910.120 (Occupational Safety and Health Administration (OSHA) standards)
- 29 CFR 1926.65 (OSHA standards)

1.2.3 Corporate Safety & Health Plan

1.2.3.1 UXB's Corporate Health & Safety Plan (CHSP) provides the policies and procedures that implement UXB's Safety & Health Program. This is a general document that outlines the organization commitment to safety and establishes the corporate organization that is committed to ensuring that all operations are performed in a safe manner. The Corporate Safety and Health Plan, is available for review upon request. Figure 1-2 is included to certify that the plan has been developed and implemented.

Figure 1-2: Corporate Safety and Health Plan Signature Page

UXB International, Inc.
2020 Kraft Drive, Suite 2100
Blacksburg, VA 24060

CORPORATE HEALTH AND SAFETY PROGRAM

UXB INTERNATIONAL, INC. EMERGENCY TELEPHONE NUMBER

(540) 443-3700

Plan Approval by: Richmond H. Dugger IV — 5/01/09 Date
UXB President

Plan Approved by: C. David Douthat, CSP — 5/01/09 Date
Quality and Safety Manager

1.3 Responsibilities & Lines of Authority

1.3.1 Identification of Personnel Responsible for Safety & Lines of Authority

Direction and administration of our safety program is a corporate responsibility; implementation is the overall and direct responsibility of each individual and then collectively the project managers, Senior UXO Supervisor, Safety Officer, Quality Control Supervisor, Demolition Supervisors, Technicians and Workers who provide the guidance, support, and resources necessary to promote compliance with all aspects of the safety program. This section outlines the responsibilities of key personnel:

1.3.2 Corporate President: Mr. Richmond Dugger III

Overall responsibility for support of the UXB Corporate Safety Program

1.3.3 Project Manager (PM): Mr. Michel Warminsky, PE

Technical Responsibilities of the PM position for Safety:

- Advises UXB Senior Management of progress and provides updates on identified safety issues and resolution.
- Requests assistance from the SHM in resolving safety related issues.

- Responsible for reviewing and implementing disciplinary actions recommended by the SHM, or SUXOS.
- Ensures resource required to implement the APP and SHPP are available to the UXOSO and SUXOS

1.3.4 VRHabilis Dive Supervisor: Mr. Tom Rancich

The responsibilities of the Dive Supervisor with respect to the APP and SSHP are as follows:

- Implements the project's Dive Plan located in enclosure (3).
- Implements the project's SSHP
- Reviews Training records maintained by VRH to verify status of personnel
- Has stop work authority
- Assists the SUXOS in daily site management as required
- Documents and investigates mishaps, injures, accidents or incidents
- Monitors suppliers performance and conformance to AAP/SSHP requirements
- Ensures compliance with all parts of this plan
- Reviews all Dive logs
- Assists as liaison with government officials regarding safety and health-related site matters applicable to diving operations
- Recommends changes to PPE levels to the UXB CIH (as site conditions warrant)
- Evaluates potential safety problems and implements safety-related corrective actions
- Conducts random safety audits of the operations and documents findings in the Safety Inspection Log (UXB Form 1.0-00.1-2)
- Conducts safety inspections to include evaluation of the condition of PPE in use, documents findings, and implements corrective actions
- Provides weekly safety updates to the UXB Project Manager, investigates and reports accidents/incidents as soon as possible; maintains daily safety log
- Provides and documents employee training regarding site specific hazards
- Provides morning safety meetings
- Conducts and documents visitor briefings
- Completes UXB Emergency Information Sheet (UXB Form 09-03-11) on VRH employees
- Provides recommendations to the PM for changes to this APP and associated SSHP
- Recommends actions to the SUXOS and PM to ensure compliance by UXB employees to this APP and associated SSHP

1.3.5 Senior UXO Supervisor (SUXOS) (Mr. Pat Fogleson)

Safety Responsibilities - As the most senior UXO-qualified on-site representative, the SUXOS is responsible for the overall safety and efficiency of the Project. The SUXOS reports directly to the Project Manager. Specific duties related to this APP and associated SSHP include the following:

- Coordinating with the UXB UXOSO to ensure all site safety considerations are being enforced
- Ensuring compliance with all safety and work related Standard Operating Procedures (SOPs)
- Ensuring compliance with this SSHP
- Recommending any actions required to ensure conformance to the APP and SSHP by UXB employees.

1.3.6 UXO Safety Officer:

The responsibilities of the UXOSO with respect to the APP and SSHP are as follows:

- Implements the project's AAP
- Implements the project's SSHP
- Reviews Training records maintained by UXB HRO to verify status of personnel
- Has stop work authority
- Assists the SUXOS in daily site management as required
- Documents and investigates mishaps, injures, accidents or incidents
- Monitors suppliers performance and conformance to AAP/SSHP requirements
- Ensures compliance with all parts of this plan
- Reviews site safety logs and air monitoring logs/interpret air sampling results
- Assists as liaison with government officials regarding safety and health-related site matters
- Recommends changes to PPE levels to the UXB CIH (as site conditions warrant)
- Evaluates potential safety problems and implements safety-related corrective actions
- Conducts random safety audits of the operations and documents findings in the Safety Inspection Log (UXB Form 1.0-00.1-2)
- Conducts safety inspections to include evaluation of the condition of PPE in use, documents findings, and implements corrective actions
- Provides weekly safety updates to the UXB Project Manager, investigates and reports accidents/incidents as soon as possible; maintains daily safety log
- Provides and documents employee training regarding site specific hazards
- Provides morning safety meetings

- Conducts and documents visitor briefings
- Completes UXB Emergency Information Sheet (UXB Form 09-03-11) on UXB employees
- Provides recommendations to the PM for changes to this APP and associated SSHP
- Recommends actions to the SUXOS and PM to ensure compliance by UXB employees to this APP and associated SSHP

1.3.7 Safety and Health Manager: (David Douthat),

Technical Responsibilities - The SHM is responsible for developing, maintaining, and overseeing the SSHP.

- The SHM will perform periodic site visits as necessary to audit the effectiveness of the SSHP
- Will be available for emergency site visits (within 24 hours of notification) and telephone consultation continuously throughout the project.
- Will develop all necessary modifications to the SSHP.
- Evaluate occupational exposure monitoring/air sampling data and adjust SSHP and PPE as necessary.
- Will serve as a QC staff member for all matters relating to the SSHP.
- Will approve the SSHP.

1.3.8 UXO Technician III Team Leader and Dive Team leader

Technical Responsibilities – The UXO Technician III and Dive team leader reports directly to the Senior UXO Supervisor. The UXO Technician III and Dive Supervisor are responsible for managing individual teams of workers on discrete work tasks. Specific responsibilities for this APP and associated SSHP include:

- Ensures team compliance with all safety and work-related SOPs
- Ensures team compliance with this SSHP
- Coordinates with the UXOSO to ensure all site safety considerations are being enforced
- Report field conditions or activities that may require changes to the APP or SSHP to the UXOSO

1.3.9 UXO Technicians and other Team Members

Comply with the provisions of this APP and associated SSHP

Inform the UXOSO and SUXOS of field conditions that may require modification to this APP or associated SSHP

1.3.10 Personnel Qualifications

All assigned personnel are trained, qualified, and experienced. Verification of their qualifications is located in Appendix H. Copies of required certifications and certificates will be maintained on site by the SUXOS and Dive Supervisor.

1.4 Subcontractors and Suppliers

1.4.1 Identification of Subcontractors and Suppliers

VRHabilis is UXB's diving subcontractor and will be responsible for the development of the dive plan and its strict implementation.

UXB will obtain explosives for this Task Order from Jet Research, Inc. from Alvarado, Texas.

1.4.2 Means for Controlling Suppliers

The SUXOS, UXOSO and Dive Supervisor have the authority to stop the work of any supplier for any suspected unsafe work practice, for unqualified personnel, and/or unsafe or inoperable equipment. The USAESCH, through UXB, has the right to stop the work of any supplier for the same reasons.

In the event that UXB staff directs a supplier to stop work, the UXB Project Manager will be immediately notified. The Project Manager will coordinate with UXB's Contracts Manager and the supplier representative to resolve any unsafe work practice.

1.4.3 Safety Responsibilities of Suppliers

Suppliers are required to abide by all site safety directives and applicable sections of this Plan as well as their own safety procedures and all applicable laws and regulations.

All visitors to the site are required to sign the Site Visitors Log and will require escort and a safety briefing when visiting any areas other than the administrative areas of the site.

1.5 TRAINING

1.5.1 Introduction

The UXO Safety Officer and Dive Supervisor will conduct initial site specific safety training during the first 2 days of site operations prior to the start of activities at Martha's Vineyard. Attendance at these sessions is mandatory for all assigned personnel. The SSHP and Dive Plan will form the basis for this training. All employees will be required to sign UXB Specialized Training Form (UXB Form 10-00.1-1) in order to properly document the training. The following topics will be addressed during this initial safety indoctrination:

- Site Specific procedures for anomaly investigation
- Underwater operations –Dive Plan
- Accident Prevention
- Hearing Conservation and Protection
- Site Required PPE
- Animal Stings and Bites
- Sever Weather Related Activities
- First Aid Procedures and Supplies to include Bloodborne Pathogens
- Emergency Evacuation Routes
- Emergency Contact Numbers
- Location of Nearest Hospital

- HAZCOM Information related to site specific chemicals and exposures
- Fire Presentation and Wildfire Control Procedures

1.5.2 Mandatory Training

The following training is mandatory for all UXB employees and their subcontractors working on this site:

Initial OSHA 1910.120 40 hour course

Current OSHA 19110.20 8 hour refresher(defined as having completed the refresher course in the last year)

1.5.2.1 UXO Technician Training

Graduate of approved EOD training program(documentation of this training is maintained by UXB and VRH HRO):

- U.S. Naval Explosive Ordnance Disposal School, Indian Head, Maryland
- U.S. Army Bomb Disposal School, Aberdeen, Maryland
- EOD Assistant Course, Redstone Arsenal, Alabama, or Eglin AFB, Florida
- DOD certified equivalent
- Certified diver in accordance with U.S. Naval Regulations
- Technicians qualified IAW DDESB TP-18

Explosive Safety Training

- In the process of certification or certified by the Bureau of Alcohol, Tobacco, Firearms, and Explosives in accordance with ATF P 5400.7 Employee Possessor Certification.
- An active state blaster, license/permit will fulfill the training requirement.

1.5.2.2 Site Supervisor Training SUXOS/Dive Supervisor

The SUXOS, UXOSO, UXOQCS and the Dive Supervisor will complete the OSHA 1910.20, Hazardous Waste Site Supervisors 8-hour Course.

1.5.3 Operational Specific Training Certifications and Records

The SUXOS maintains current records of site training and verifies the training status of all on-site personnel. Records are kept to ensure identified personnel receive appropriate initial health and safety training and annual refresher courses. Mandatory records for initial OSHA 1910.20 and 8 hour annual refresher training, EOD qualification certificates and any licenses or certificates associated with the use of explosives will be maintained on site for regulator and CEHND review. Response action contractors and visitors also provide the SUXOS evidence of health and safety training before site entry is authorized.

1.5.4 Emergency Response Training

The Initial Training session will address those areas required for risk and procedures associated with this TO. A formal spill plan, as required under 40CFR112.1, or its associated procedures and test is not required for this TO as the quantities of materials and containers do not meet the

threshold requirements. No containers larger that 5 gallons and no tanks meeting the definition of above ground storage tanks (AST 40CFR112.1) or underground storage tanks (UST 40CFR280) will be used by UXB at this job site. Spill Prevention and Control will be discussed in the initial sessions and address as needed in the weekly briefings. There is also no shipboard work associated with this TO there for no requirement for man overboard/abandon ship training. The following Emergency Reponses Areas will be address during the onsite sessions:

Fire Prevention and Fighting Plan SOP is enclosure 4 to this APP.

Wild land fire prevention is addressed as part of the Fire Prevention Plan.

Spill Response and Notification. A formal plan is not required as per 1.4.3.1. The subject will be addressed during the initial Safety training and reviewed during the weekly safety briefings. Details on site specific information is in the SSHP

The UXOSO will post Emergency Telephone Numbers in the work office and make copies available to the work crews.

1.6 Safety & Health Inspections

1.6.1 Inspections

An essential element in preventing accidents is an aggressive inspection program. Upon mobilization, the UXO Safety Officer and Dive Supervisor will establish an inspection schedule that will efficiently cover the inspection requirements for UXO and Dive operations, as outlined in Table 1-3. The UXOSO will be responsible for conducting the required inspections as outlined in Table 1-3 with the support of the UXO QC Officer.

Table 1-3: UXOSO UXO Operation Inspections

DESCRIPTION	AMOUNT	TYPE	FREQUENCY
Dive Equipment/Operations	2x	Visual Observation	Daily
Anomaly reacquisition	1	Visual Observation	Daily
Anomaly Investigation/Excavation	2x	Visual Observation	Daily
Transportation of Explosives	1	Visual Observation	During Operations
UXO Disposition	1	Visual Observation	During Operations
Inert UXO and Related Scrap Turn-In	1	Visual Observation	Daily
Personal Protection	1	Visual Observation	Daily
Work Practices	1	Visual Observation	Daily
Site Control	1	Visual Observation	Daily
Emergency Response/First Aid Equipment	1	Visual Observation	Weekly

1.7 Safety & Health Expectations, Incentive Programs, and Compliance

1.7.1 Corporate Commitment to Safety

UXB places the highest priority on a safe working environment. To substantiate its commitment, UXB has developed and implemented a Corporate Safety and Health Plan (SHP) that provides general health and safety guidance to:

- Qualified individuals performing Munitions Response (MR) Munitions and Explosives of Concern (MEC) operations
- Qualified individuals performing Hazardous, Toxic, and Radiological Waste (HTRW) operations
- Approved visitors to a site potentially containing MEC or HTRW

The UXB Safety Policy is to have a Safety Program that meets federal (29CFR1910.120 (b) and 29 CFR 1926.65 (b)), Virginia State, and or other local regulations as applicable. The policy, purpose, and goal of UXB's Safety and Health Program are the elimination and/or reduction of accidents that endanger worker, public, and environment.

1.7.2 Safety Program Goals and Policy

The following is the UXB Safety Program Goal and Policy(SHP-2005)

The policy, purpose, and goal of UXB's Safety and Health Program is the elimination and/or reduction of accidents that endanger workers, public, and the environment thus, UXB ensures that all federal, state, local, and contract Safety and Health Program requirements flow down to all subcontractors. UXB policy requires the development and implementation of a written safety and health program for industrial, construction, hazardous, or hazardous waste operations.

No job is so urgent or so important that we will knowingly risk injury or illness to accomplish the job. Every UXB employee shall adopt this philosophy.

1.7.3 Safety Program Compliance

Compliance to the CHSP is mandatory, individuals determined to be responsible for unsafe acts or conditions may be disciplined and/or released from employment

1.7.4 Safety Program Inspections, Audits, and Surveillance

Safety Program Inspections, audits, and surveillance shall be accomplished at the direction of the CHSPD. These inspections, audits, and surveillance may be at frequency directed by the CHSPD.

1.7.5 Safety Performance Discipline

Discipline actions for Unsafe Acts or for perpetuating an Unsafe Condition shall be recommended by the next in line supervisor to the Sector Director. The Sector Director shall coordinate with CHSPD to determine the appropriate action. Following is provided from the UXB Corporate Health and Safety Program (SHP 2005 revision) Safety Performance Discipline 1.4.1.3:

Disciplinary actions for unsafe acts or for perpetuating an Unsafe Condition shall be recommended by the next-in-line supervisor to the sector Director. The Sector Director shall coordinate with the CHSPD to determine appropriate action.

1.7.6 Safety Performance Corrective Actions

Corrective actions shall be in accordance with recommendations by the CHSPD

1.7.7 Safety Program Incentives/Awards

UXB shall, as required, offer safety incentives for outstanding performance by a project, team, or individual. These incentives may be for periods, completion of a task, or for obtainment of a certification. Incentives may be monetary or material as selected by the UXB Program Manager for the sector. Awards are individual recognizing attitude, attendance, conformance, and proactive accident prevention. Awards are monetary.

1.8 Accident Investigation, Reporting, and Record Keeping

All on-site and off-site accidents, regardless of severity, will be reported, investigated, and analyzed. The UXB Senior staff members (selected by UXB's President) will investigate the accident, analyze the cause, and identify the corrective action to be implemented to prevent similar occurrences.

Employees are responsible for immediately reporting all injuries, occupational illnesses, abnormal conditions, or disorders caused by exposure to environmental factors associated with the work site. The immediate supervisor will notify the Senior UXO Supervisor, document the report; and provide medical treatment regarding the nature and cause of the illness. Within 24-hours, the Senior UXO Supervisor will notify UXB Headquarters.

The SUXOS shall complete ENG Form 3394 (the U. S. Army Corps of Engineers Accident Investigation Report) and UXB's Employee Injury/Property Damage Report Form (UXB Form 10-4-02) and to the Corps of Engineers and UXB Headquarters within two working days of the injury.

The following reporting criteria will be used:

- Death (regardless of the length of time between the injury and death)
- One or more lost workdays
- Restriction of work or motion
- Loss of consciousness
- Accident-related transfer to another job site
- Medical treatment required (other than first aid)

The UXO Safety Officer will maintain records on all health and safety issues and assure reportable accident and incident reports are submitted in a timely manner – Spot Report Form (UXB Form 11-00.1-3). Injury and illness records will be maintained at UXB's Human Resources Department in Blacksburg, Virginia.

Accident data and exposure data (man-hours worked, miles driven, etc), will be collected by the UXO Safety officer and forwarded to UXB's Human Resources Department, who is responsible for the preparation of exposure and accident rate reports.

1.9 Medical Support

1.9.1 On-site medical support

First aid kits will be supplied at the work site, within project vehicles, and at the administrative office.

1.9.2 Off-Site Medical Support

The nearest hospital is Martha's Vineyard Hospital, located at 1 Hospital Road, Vineyard Haven, MA.

1.10 Personal Protective Equipment

This section addresses UXB's policies and procedures for providing personnel protective equipment (PPE) to reduce the frequency and severity of injury. This section addresses the requirements of 29 CFR 1910.120(g) (5), 29 CFR 1910.134, and 29 CFR 1910.132.

Personnel will be physically able, medically qualified, and trained to wear the PPE and dive equipment required at the project site. Personnel will be proficient in proper PPE and dive wear, maintenance, inspection, and testing. They must be knowledgeable of the PPE and dive equipment limitations and reduced performance levels.

Protective and dive equipment must be maintained in a serviceable condition at all times. Defective equipment will not be used. Before being stored or reissued to another person, equipment must be cleaned, disinfected, inspected, and repaired (if necessary).

Hearing protection will be required during operation of machinery or equipment that present a risk of exposure to noise that exceeds permissible exposure limits. Noise protection is considered part of the job site PPE and the UXO Safety Officer will be responsible for ensuring it is correctly and appropriately worn.

1.10.1 Selection Criteria

The minimum level of PPE has been determined by the SHM, with assistance from the UXO Safety Officer to be Level D for all surface tasks expected to be performed under this contract. The Dive Plan specifies the equipment to be worn for all dive operations. The selection of Level D is based on site research and task hazard analyses. The following were evaluated in selecting appropriate PPE levels.

- Routes of Potential Exposure
- Eye and skin contact
- Inhalation
- Performance and durability of PPE materials
- Skin absorption
- Task specific conditions
- Ingestion
- Noise Exposure

1.10.2 Minimum Levels of Protection

PPE reduces contaminant levels below Permissible Exposure Levels (PEL). The goal, however, is no exposure. If operations proceed as planned, the concentration of contaminants will

always be less than PEL. PPE is necessary in case there is a leak or system failure. As a conservative measure, PPE shall be worn at any time there is a potential for exposure.

Each task was analyzed by the UXO Safety Officer and the SHM for hazards prior to PPE selection.

The UXOSO will verify hazard conditions prior to allowing personnel to begin work on each task and provide a written concurrence for the use of Level D PPE. If hazard levels appear to have changed from the original assessment, the UXOSO will contact the SHM for consultation and PPE level changes/adjustment.

No increase in PPE level or adjustment is expected based on site research and task hazard analyses.

PPE requiremetns are outlined in Section 5, Table 5-3.

1.10.3 PPE Upgrade/Downgrade Criteria

It is not anticipated that PPE upgrades will be required. If site conditions change and warrant an upgrade, personnel will stop work, evacuate the area, and the UXOSO and Dive Supervisor (in conjunction with the UXBCIH and in consultation with the CEHNC On-Site Safety Specialist) will direct required PPE upgrades.

There will be no downgrade from Level D.

1.10.4 Employee-Provided Equipment

Employee-provided equipment must meet or exceed the standards UXB is required to meet at the job site.

Employee-provided equipment:

- Low Metal Content Work Boot,
- Inclement weather outer clothing and rain protection

1.10.5 Inspection and Maintenance of PPE

The UXOSO and Dive Supervisor will be responsible for inspecting PPE in use at the site and making replacement or repair as needed.

1.11 Plans, Programs, and Procedures

1.11.1 Layout Plans

The IVS will be emplaced under water between Cape Poge and South beach and next to Tisbury Pond by VRHabilis for evaluation of equipment to be used during underwater RI investigations.

The land based IVS will be placed at Cape Poge and Tisbury Pond for evaluating equipment used during land based RI investigations.

1.11.2 Procedures and Tests

The underwater and land based IVS will be placed as directed by UXB, for the both RI operations.

1.11.3 Emergency Response/Spill Plans

The quantity and nature of the materials to be stored on site does not require the development of a site specific spill plan. Spill Prevention and response will be address as part of the on site safety training.

1.11.4 Firefighting Plan

Fire fighting is covered in the fire fighting plan in enclosure (4) to this APP.

1.11.5 Posting of Emergency Telephone Numbers

The 911 system is in use in the area. Other emergency phone numbers are listed in the Table – 12 in the SSHP. The USACE PM is the primary POC for any communication with outside agencies and the NECE. Contact with other agencies shall not occur except as directed by the CEHND PM or designated representative.

1.11.6 Wild land fire prevention plan

Wild fire prevention is covered in the fire fighting plan in enclosure (4) for this APP

1.11.7 Man overboard/abandon ship

Man overboard information covered in the Dive Plan attached

1.11.8 Hazard Communication Program

Specific MSDS for hazardous materials when available will be maintained in the Project Office located on site. For those materials where specific MSDSs can not be obtained (MEC) generic MSDSs for the most probable material will be made available. The most probable hazardous material for this TO are;

- Gasoline 5 gallons or less
- Motor oil 5 quarts or less
- Explosives stored for day use
- Commercial Cleaning supplies
- Explosive Contaminated Residues resulting from anomaly excavation

A specific inventory of hazardous materials will be developed on site and maintained in the project office.

The UXB Hazard Communication SOP is attached as enclosure (5) to this appendix

1.11.9 Respiratory Protection Plan

Not Applicable. No respiratory hazards are associated with efforts to be preformed under this TO.

1.11.10 Health hazard control program

Health Hazards discussed in SSHP, Par 3.3 Attachment 1 to this Plan.

1.11.11 Lead Abatement plan

Not Applicable. Lead abatement activities are not associated with efforts to be performed under this TO.

1.11.12 Asbestos Abatement plan

Not Applicable. Asbestos Abatement activities are not associated with efforts to be performed under this TO.

1.11.13 Confined Space Plan

Not Applicable. Confined Space Entry activities are not associated with efforts to be performed under this TO.

1.11.14 Hazardous Energy Control Plan

Not Applicable. Hazardous Energy activities are not associated with efforts to be performed under this TO.

1.11.15 Critical Lift Procedures

Not Applicable. Critical Lift Procedure activities are not associated with efforts to be performed under this TO.

1.11.16 Contingency Plan for Severe Weather

Severe Weather discussed in SSHP, Attachment 1 Par 3.5.2 to this Plan.

1.11.17Access and Haul Road Plan

Not Applicable. No haul roads are planned under TO.

1.11.18 Demolition Plan (Construction Demolition)

Not Applicable. Neither Construction nor demolition activities are associated with efforts to be performed under this TO.

1.11.19 Emergency Rescue (Tunneling)

Not Applicable. Tunneling activities are not associated with efforts to be performed under this TO.

1.11.20 Underground Construction Fire Prevention and Protection Plan

Not Applicable. Underground construction activities are not associated with efforts to be performed under this TO

1.11.21 Compressed Air Plan

Compressed air plan is covered in the Dive Plan attached as enclosure (3).

1.11.22 Formwork and Shoring Erection and Removal Plan

Not Applicable. Excavations requiring Formwork and Shoring Erection are not associated with efforts to be performed under this TO.

1.11.23 Jacking Plan (lift) Slab Plans

Not Applicable. Activities requiring Jacking (lift) or slabs are not associated with efforts to be performed under this TO.

1.11.24 Blasting Plan

SOP for electric blasting included in enclosure (5) to this APP.

1.11.25 Diving Plan

The approved Diving Plan is included as enclosure (3) to this APP

1.11.26 Plan for Prevention of Alcohol and Drug Abuse

Purpose: To provide guidance regarding UXB's drug, alcohol, and tobacco policies.

Applicability: This Policy Memo is applicable to all UXB personnel, office buildings, and owned and leased vehicles.

Policy: In accordance with FAR Clause 52.223-5, Certification Regarding a Drug-Free Workplace and Code of Federal Regulation, Title 49, Parts 40, 382, 385, 391, and 392, UXB certifies that it provides a drug-free, alcohol misuse-free, and smoke-free workplace policy.

Tobacco Policy. UXB is a smoke-free company and, as such, the use of tobacco and tobacco products are banned from the premises of all UXB owned or leased buildings, and owned or leased vehicles. UXB is aware of the move to have tobacco classified as a drug or as a controlled substance. UXB will closely monitor the progress of the laws being considered and will immediately comply with the spirit and intent of the law in regard to tobacco and tobacco products. This smoke-free policy is a step in the right direction for the protection of the health and well being of all employees.

Drug and Alcohol Policy. In the workplace, UXB prohibits the unlawful possession, use, dispensation, distribution, or manufacture of controlled substances. Consequently, the use of controlled drugs by an employee is prohibited. Further, an employee shall not abuse the use alcohol or engage in "prohibited conduct," as defined herein, while performing safety-sensitive functions as defined in Title 49 CFR 382:

> *"Safety sensitive functions shall include: (1) All time at an employer or shipper plant, terminal, facility, or other property, or on any public property, waiting to be dispatched, unless the driver has been relieved from duty by the employer; (2) All time inspecting equipment as required by Secs. 392.7 and 392.8 of this subchapter or otherwise inspecting, servicing, or conditioning any commercial motor vehicle at any time; (3) All time spent at the driving controls of a commercial vehicle in operation; (4) All time, other than driving time, in or upon any commercial motor vehicle except time spent resting in a sleeper berth; (5) All time loading or unloading a vehicle, supervising, or assisting in the loading or unloading, attending a vehicle being loaded or unloaded, remaining in readiness to operate the vehicle, or in giving or receiving receipts for shipments loaded or unloaded; and (6) All time repairing, obtaining assistance, or remaining in attendance upon a disabled vehicle."*

The overall goal of this policy is to ensure a drug-free and alcohol misuse free work environment aimed at reducing the potential for accidents, injuries and fatalities.

Consequences of Policy Violations. An employee who becomes unqualified or engages in prohibited conduct, as set forth herein, may be subject to disciplinary action -- up to and including termination of employment.

Site Monitoring and Enforcement

The SUXOS and Dive Supervisor are responsible for monitoring work activities and conformance to these policies. The SUXOS and Dive Supervisor shall direct removal from the worksite and forward recommendations for adverse actions if in their determination personnel violating this policy constitute a risk to themselves or others. Personnel that are determined to be involved in the operations of motor vehicles that are subject of be under the influence of drugs or alcohol will be referred to local law enforcement for action.

1.11.27 Fall Protection Plan

Activities requiring coverage under this section are not planned for this TO.

1.11.28 Steel Erection Plan

Not Applicable. Steel erection activities are not associated with efforts to be performed under this TO.

1.11.29 Night Operations Lighting Plan

Not Applicable. Night Operations activities are not associated with efforts to be performed under this TO.

1.11.30 Site Sanitation Plan

It is the intent of UXB to supply each work site with potable water, toilet facilities, washing facilities, and where feasible, showers, change rooms, and all necessary materials for housekeeping in accordance with 29 CFR 1926.51 and EM 385-1-1 Details of the site sanitation plan is addressed in 6.12.1 of the attached SSHP.

Potable Water

UXB will provide workers and visitors with an adequate supply of potable water approved by federal, state or local authorities. Disposable cups will be provided for all sources of drinking water; no common drinking cups will be used. A waste receptacle for soiled cups will also be supplied. Potable drinking water containers will be labeled as such and not used for any other purpose. Potable drinking water containers will be cleaned and sanitized daily, contain only ice and water, and be fitted with a tight-fitting lid and tap. Additional details are found in the attached SSHP, Par. 6.12.14.

Non-Potable Water

The on site use of Non-potable water is not planned at this work location In the event it is used use will be limited to washing equipment and general housekeeping/cleaning, provided the water does not contain substances that may pose a threat to the employees' health. There will not be any cross-connection, open or potential, between systems furnishing potable and non-potable water. All outlets for non-potable water will be conspicuously posted **CAUTION - Water unfit for drinking, washing, or cooking**.

Toilet Facilities

A single portable chemical toilet facility will be provided at the areas to be investigated. The providing subcontractor, based on usage, will routinely maintain portable chemical toilets.

Food Handling

UXB personnel will not perform food-handling services at any site.

Temporary Sleeping Quarters

UXB will provide all employees with temporary sleeping quarters at a local hotel, motel, or other suitable habitable quarters.

Washing Facilities

Normal washing facilities will not be provided on this work site. Emergency facilities will be established if required.

Showers and Change Rooms

UXB will not supply a shower or changing room on this work site. Personnel contact and access to formally identified chemically contaminated areas are not to occur.

Housekeeping

Housekeeping is of great importance on every job. A neat, orderly area reduces the chance of accidents or fires, and is a more satisfactory place to work. Every job site must be left clean and orderly at the end of the day. UXB will be solely responsible for establishing and maintaining good housekeeping at the job site.

UXB personnel are responsible for providing all general housekeeping of temporary office areas and work areas during the project. The floors of the temporary office area will be swept clean daily and kept as dry as practical (with consideration to weather conditions). Office trash will be removed on a daily basis and disposed in either government or municipal systems.

In removing debris from areas above ground level, material must not be thrown from the windows or down floor openings, hoist ways, or safety chutes.

Protruding nails must be removed or hammered flat before discarding lumber. Oily waste and refuse are subject to spontaneous combustion and must not be discarded at random, but placed in waste cans designed for this purpose.

Where permitted, materials must be stacked or piled neatly near the job site (no pile to exceed six feet in height). Care must be taken not to block roads, aisles, stairwells, exits, fire fighting equipment, electric panels, switches, or valves.

1.11.31 Fire Prevention Plan

Fire Prevention and Wildfire Control SOP is found in enclosure (4) to this APP.

APPENDIX D
ATTACHMENT 1

Site Safety & Health Plan (SSHP)

APPROVALS

Plan Prepared by: John J. Kierepka, Munitions Response Services (540) 443-0129	9/20/2010 Date
Plan Reviewed by: Mike Warminsky P.E Project Manager (908) 237-4592	9/20/2010 Date
Plan Approval by: Richmond H. Dugger IV UXB President (540) 443-3706	9/20/2010 Date
Plan Approved by: David Douthat, Safety and Health Manager (256) 426-1753	9/20/2010 Date

1. CORPORATE COMMITMENT TO SAFETY

UXB Corporate Safety Policy and procedures are addressed in Section 1.1 of the APP.

1.1. SITE SAFETY & HEALTH PLAN

This Site Safety & Health Plan (SSHP) is applicable to the site-specific working environment anticipated for Former Cape Poge Little neck Bomb Target Site, Chappaquiddick Island, MA; Former Moving Target Machine Gun Range Site at South Beach, Martha's Vineyard, MA; and Former Bombing Target at Tisbury Great Pond, Martha's Vineyard, MA considering the level of effort required to accomplish the tasks as outlined in the Scope of Work (SOW) and the anticipated hazards associated with on-site operations. The SSHP describes the procedures and control measures to protect personnel from these hazards. Adherence to these procedures is mandatory. Should operational circumstances substantially differ from those described and/or anticipated, operations shall be temporarily terminated until the suspect hazards are evaluated and appropriate health, safety, and operational precautions are implemented.

A SSHP is required on sites regulated by 29 CFR 1910.120(b)(4), 29 CFR 1926.65(b)(4), and ER 385-1-92. This SSHP complies with the requirements of:

- CFR 1910, 109 Explosives and Blasting Agents
- CFR 1910.120 (OSHA - Hazardous Waste Operations and Emergency Response)
- CFR 1926 Construction
- CFR 27 Alcohol, Tobacco, and Firearms
- CFR 49 (171-173) Transportation
- ATF P 5400.7 (2000) Federal Explosives Law and Regulations
- NFPA 495 Explosives Materials Code (2001)
- ER 385-1-92 (U.S. Army Corps of Engineers' Safety and Occupational Health Document for Hazardous, Toxic, and Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OE) Activities
- EM 385-1-1 (U.S. Army Corps of Engineers' Safety and Health Requirements Manual)
- EM 385-1-97 (Munitions and Explosives of Concern (MEC) Activities
- UXB Safety Polices and Safe Practices Policies:
- Corporate Safety Policy
- Substance Abuse Policy
- CWM Reporting Policy

- Physical Security Policy
- In Case of Emergency (ICE) Policy
- Emergency Contact Information Policy
- Notification of Allergies and Medications Policy
- Buddy System Policy
- Material Handling Equipment (MEH) Policy
- Back Safety and Heavy Lifting Policy
- Blood borne Pathogen Policy
- Confined Space Entry Policy
- Hot Work(s) Policy
- Flammable Liquids Policy
- Material Safety Data Sheets (MSDS) Policy
- Motorized Vehicle Policy
- Overhead Work Policy
- Energized Equipment Lockout/Tag-out Policy
- Working Safely at Heights (Fall Protection) Policy
- Safety Glasses Policy
- Foot Protection Policy
- Hand Protection Policy
- Hearing Conservation Policy
- Utility Clearance Policy

2. SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

2.1. SITE DESCRIPTION & HISTORY

The former Cape Poge little Neck Bomb Target Site consists of 141 acres on Little Neck and Cape Poge Beach on Chappaquiddick Island in the town of Edgartown, Massachusetts on Martha's Vineyard. The site is part of the Cape Poge Wildlife Refuse.

Munitions reportedly used on this property were Mk23 practice bombs

The former Moving Target machine Gun Range at South Beach location which is comprised of approximately 264.3 acres was leased by the U. S. Navy for military training during World War

II. The gunnery range was used by Naval Air Station Quonset Point, Rhode Island for aerial machine gun and rocket fire practice. An observation bunker, an oval shaped target and other support features were constructed within a few yards of the ocean. A large part of this beach has eroded away since 1947.

The munitions reportedly used at south beach include .30, and .50 caliber small arms, and 2.25 inch, 3 inch and 5 inch practice aircraft rockets.

The former Bombing target at Tisbury Great Pond is comprised of approximately 500 acres, the majority of which is within tidal waters. The site was used as a dive bombing and strafing range between August 1943 and July 1947. Tisbury Pond is located between the towns of West Tisbury and Chilmark

The munitions reportedly used at Tisbury Pond were .30 and .50 caliber small arms ammunition and practice bombs (AN-Mk5, AN Mk23, AN Mk43, Mk 15 and Mk 21)

Appendix B illustrates the locations of the areas to be investigated.

2.2. PREVIOUS STUDIES

Table 2-1 chronologies the past investigation and removals that have been performed at South Beach.

Table 2-1: Chronology of Site Events

Event	Date
TCRA Cape Poge Little Neck Target Site	23 Apr – 25 Sep 2009
TCRA South Beach underwater	23 Apr – 25 Sep 2009
SI Reconnaissance Tisbury Pond	2008

2.2.1. Previous MEC Investigations

During 2009 a Time Critical Removal Action (TCRA) in the waters just off south beach, was cleared and approximately 617 MEC items and 933 lbs of cultural debris. No clearance or investigation has been done within the proposed Task Order.

2.2.2. CWM Hazards

A review of the available documentation indicates that there are no chemical weapon hazards associated with the three sites. In the event any CWM hazard is encountered, procedures below will be followed.

Prior to the start of land based and diving operations the SUXOS and the Dive Supervisor shall establish safe egress routes and rally points (safe locations) for personnel evacuation. These safe locations shall be determined by the SUXOS based on wind direction, tide, and reasonable safe controlled movement from the work area.

If an event should occur where suspect CWM is encountered on land, the technician finding the suspect item will flag it and if possible GPS the location and cordon off the area to a distance of 450 meters, keeping all personnel away from the site. If found underwater, the VRHabilis employee finding the suspect CWM will mark the location with a buoy and notify the Dive Supervisor immediately. At least two (2) UXO qualified personnel will visually monitor (24/7) the suspect site from a safe distance (450 Meters) on surface from the suspect location, and remain in place until relived by other qualified UXB UXO person(s), or in writing by US Army Corps of Engineers Safety Specialist or active duty military personnel.

UXB personnel shall not authorize the return of control of a suspect CWM item or site to property owners, renters, or state, county, or local officials without written authorization from the US army Corps of Engineers Contracting Officer. UXO personnel are to secure, warn, inform, and control access to a suspect CWM item and site to all persons. UXO personnel may only grant access to US Army Corps of Engineers Safety Specialist(s) or active duty military Explosive Ordnance Disposal (EOD) and US Army Technical Escort Unit (TEU) qualified personnel. UXB UXO qualified personnel shall stand by for follow-on instructions from the US Army Corps of Engineers Contracting Officer (CO).

2.2.3. Consideration of Chemical Hazards

The work effort to be conducted at Martha's Vineyard does not involve entry into or exposures to any chemical hazards.

2.2.4. Radiological Hazards

A review of the available documentation indicates that there are no radiological hazards associated with this site.

3. PLAN DESCRIPTION

The objective of this plan is to communicate safe processes and procedures for UXB International Inc. (UXB) personnel, subcontractors (VRHabilis), and visitors to intrusively investigate anomalies detected during land based and underwater Remedial Investigation (RI) activities. Operational results shall be prepared and documented in a Site Specific Final Report to document findings for Munitions and Explosives of Concern (MEC) during the underwater RI.

The following work Areas shall be accomplished in the sequence presented in**Table 3-1** below.

Table 3-1: Work Areas to be characterized under this Task Order

Number	Area of Concern
1	2 IVS (1 between Cape Poge and South Beach) and the second at Tisbury Great Pond
2	Geophysical Investigation
3	Reacquisition
4	Intrusive investigation
5	Disposal

This Task Order is broken into subtasks; each which represent a logical element of the work to be completed in support of the project. The subtasks associated with this Task Order are shown in **Table 3-2**.

Table 3-2: Subtask Associated with this Task Order

Task Order breakdown by Task Number:
Task 1 – Establish the IVS
Task 2 - Conduct land based and underwater Remedial Investigations
Task 3 Site Specific Final Report

A description of the expected hazards associated with these tasks is included in the Activity Hazard Assessment and Risk Analysis in Section 4.2 of this plan.

3.1. DURATION OF PLANNED ACTIVITIES

It is expected that these tasks will be conducted during the period of October 2010 - January 2011.

3.2. ON-SITE HAZARDS

Based upon a review of available information, the hazards listed in **Table 3-3** are expected to be encountered by personnel working in support of this Task Order.

Table 3-3: Hazards Expected On-Site

Hazard	Concentration Range	Media	Estimated Quantity/ Volume
Ordnance/explosives			
2.25- inch practice rocket		Underwater and land	Unknown
3-inch practice rocket		Underwater and land	Unknown
5.0-inch practice rocket		Underwater and land	Unknown
MK1 Practice Rocket		Underwater and land	Unknown
MK 4, MK5, MK6, MK15, MK 21, MK23, MK43 Practice Bombs; MK 26 Parachute Flares		Underwater and land	Unknown
300 pound general purpose bomb, non-HE		Underwater and land	Unknown
Non Electric Basting Caps (PETN)	Zero	Commercial product	100
Detonating Cord (Primer X) 80 grains PETN	Zero	Commercial product	500 feet
Jet Perforators 19.5 grams RDX	Zero	Commercial product	1000
Chemical			
Based on a review of the Scope of Work and available documentation, there are no			

Hazard	Concentration Range	Media	Estimated Quantity/ Volume
chemical hazards associated with this site.			
Radiological			
Based on a review of the Scope of Work and available documentation, there are no radiological hazards associated with this site.			
Biological			
Insects (Ticks, Bees, Wasps, Hornets) – On land)			
Spiders (Black Widow and Brown Recluse) – On Land			
Poison Ivy – On Land			

3.3. HAZARD ASSESSMENT AND RISK ANALYSIS

All known or potential chemical, physical, safety, biological, and radiological hazards that may pose a threat to the health and safety of site workers have, to the extent possible, been identified and the risk of exposure assessed to ensure workers are adequately informed and protected. Emphasis has been placed on identifying situations and tasks that have known or may create Immediately Dangerous to Life or Health (IDLH) conditions, or any other condition with the potential for serious safety or health effects.

The overall hazards and risks associated with participation in operations on this site are Moderate to Low. MEC (if encountered) with propellant (large and small caliber ammunition) will be demilitarized for recovery and separation of propellant from primer casings for packaging and transport to an off-site RCRA permitted thermal treatment facility.

The anticipated hazards and the risks are discussed in this section and summarized in the Certification of Activity Hazard Analysis Forms in Attachment 1. These forms ensure compliance with the revised OSHA standard 29 CFR 1910.132, which requires assessment of tasks and operational hazards where personal protective equipment (PPE) is required to protect personnel. Each form contains task-specific information related to hazard control and mitigation, including: specific engineering control measures; specific standard operating procedures; equipment requirements; specialized training requirements; and the PPE requirements.

Evaluation of work site characteristics and hazards is an ongoing process, and on-site personnel will play a major role in continuing this evaluation throughout the duration of the project. All site workers must be vigilant in identifying and informing their supervisor of hazards. This section will be modified whenever new hazards are encountered.

3.3.1. Task-Specific Hazards

Table 3-4 illustrates the hazards that are present when conducting the project-specific tasks.

Table 3-4: Task-Specific Hazards

Tasks	Hazards														
	Chemical	Radiological	Physical					Safety				Biological			
			Underwater Hypothermia	Heat/Cold Stress	Thunderstorms, Lightning	Exertion	Repetitive Motion	UXO	Slips, Trips, Falls	Cuts	Wildlife	Snakes	Biting Insects	Stinging Insects	Poison Ivy/Oak/Sumac
Anomaly Detection			✔	✔	✔	✔	✔	✔							
Anomaly Excavation			✔	✔	✔	✔	✔	✔		✔					
MEC Disposition				✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔
Disposal of MD and Related Scrap				✔	✔	✔	✔		✔	✔		✔	✔	✔	✔
Quality Control			✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔

3.4. CHEMICAL HAZARDS

Based on a review of the Scope of Work and available documentation, this is not a suspected CWM site. However, if personnel encounter suspected CWM, they shall immediately withdraw upwind of the anomaly and notify the US Army Corps Safety Specialist, who will coordinate appropriate support. UXB personnel shall not handle explosive ordnance that contains or is suspected to contain chemical agent or CWM.

If UXB personnel encounter unknown or unanticipated substance, perceived to be hazardous, UXB will immediately stop work. UXB will evaluate the situation and take actions required or request assistance, as applicable.

3.5. PHYSICAL HAZARDS

3.5.1. Heat Stress/Cold Stress

Heat/Cold Stress disorders and monitoring procedures are detailed in Section 5.8 of this plan.

3.5.2. Weather Hazards

Weather hazards as listed below may occur during working hours on this project. The UXOSO and Dive Supervisor will be responsible for monitoring the weather for hazardous potential by

monitoring the local weather broadcasts by radio at least twice daily. In the event of an impending hazardous weather event, the UXOSO and the Dive Supervisor may have all personnel discontinue work and seek shelter or evacuate the site based on the hazard and local radio weather response suggestions or protocols.

3.5.3. Thunderstorm

Severe thunderstorms are one of the most common natural hazards. Large hail can cause serious injury, so avoid the outdoors while a storm is in progress. Shelter vehicles to prevent costly damage.

Flash floods can occur without warning following heavy upstream rainfall. Drainage canals, streambeds, or flat areas downstream from a hill are potential flood areas. Monitor current weather conditions and review evacuation plans. Roads and trails that parallel existing drainage systems may be swept away by floodwaters. When a flash flood warning is issued, or you realize a flash flood is coming, go to high ground immediately, don't drive through already flooded areas, and do not attempt to cross-flowing water on foot where the water is above your knees.

3.5.4. Lightning

Electrical storms occur during the spring, summer, and fall. Since the storms are often fast moving, field personnel should watch for indications of electrical storms (forecasts should be covered in the morning safety briefing).

The distance to an electrical storm can be estimated by observing the interval between the lightning flash and the sound of the thunder. Since sound travels approximately 1,100 feet per second, an interval of 5 seconds corresponds to a storm distance of approximately 1-mile. UXB will employ a lightening detection meter to assist the UXOSO in determining distances and for stop work calls.

If caught in the open by an electrical storm, all personnel will immediately seek shelter in their vehicle and proceed to a safe area for further instructions. In the event that their vehicle is inaccessible, personnel should follow these rules:

- Move to a topographically low area, away from tall objects and conductors (trees, transformers, fences, pipelines, power lines, metal sheds) and wait for the storm to leave the area.
- If you feel your hair stand on end (an indicator that lightning is about to strike), drop to your knees and bend forward, putting your hands on your knees. Do not lie flat on the ground.

3.5.5. Tornadoes

Each year about a thousand tornadoes touch down in the US. Only a small percentage actually strike occupied buildings, but every year a number of people are killed or injured. The chance that a tornado will strike a building that you are in is very small. However, you can greatly reduce the chance of injury by doing a few simple things.

One of the most important things you can do to prevent being injured in a tornado is to be ALERT to the onset of severe weather. Most deaths and injuries happen to people who are unaware and uninformed. Those who ignore the weather because of indifference or overconfidence may not perceive the danger. Stay aware and you will stay alive!

Be alert to what is happening outside as well. Here are some of the things that people describe when they tell about a tornado experience:

- A sickly greenish or greenish black color to the sky.
- A strange quiet that occurs within or shortly after the thunderstorm.
- Clouds moving by very fast, especially in a rotating pattern or converging toward one area of the sky.
- A sound a little like a waterfall or rushing air at first, but turning into a roar as it comes closer.
- The sound of a tornado has been likened to that of both railroad trains and jets.
- Debris dropping from the sky.
- An obvious "funnel-shaped" cloud that is rotating, or debris such as branches or leaves being pulled upwards, even if no funnel cloud is visible.

If you see a tornado and it is not moving to the right or to the left relative to trees or power poles in the distance, it may be moving towards you! Remember that although tornadoes usually move from southwest to northeast, they also move towards the east, the southeast, the north, and even northwest.

3.5.6. Exertion

Upon mobilization, the UXOSO and Dive Supervisor shall establish a work/rest regimen that is conducive to the on-site conditions. Personnel are to adhere to this regimen to alleviate impacts from over exertion. For underwater activities the Dive Plan will also be adhered to.

3.5.7. Repetitive Motion

Repetitive motion injuries, or--more specifically--occupationally related motion disorders, are now common problems. Numerous terms, including cumulative trauma disorder, overuse

syndrome, repetitive stress injury, and repetition strain injury, have been used to describe this disorder. In the United States, cumulative trauma disorder (CTD) is the preferred label.

Many different symptoms can arise from the accumulation of small injuries or stresses to the body. CTD is not so much a disease as it is a response to excessive demands that we place on our bodies - without giving them adequate time to recover between. CTD results form a combination of muscle tension, repetitive motion, over use, and incorrect motion.

Forward head posture is one of the leading risk factors for CTD. It is also known as slouching, or rounded-shoulders. In this posture, the weight of the head is no longer being carried directly over the spine. Instead, the head is moved forward ahead of the spine. This mechanically increases the weight of the head on the neck by about 300 percent. The rounding forward of the shoulders produces a stretch weakness of the posture muscles of the upper back which must also work to hold the head upright. Therefore, the load on these muscles is dramatically increased while their strength is significantly decreased. This can lead to several chronic muscle problems in the upper back.

When the upper back is rounded forward, the head must bend backward slightly on the neck to restore level vision. This can cause pressure to the soft tissues at the base of the skull and can lead to chronic headaches.

The forward posture of the head on the neck causes the muscles under the chin to be pulled tight, which can pull the jaw back, causing pressure and irritation in the joint where the jaw attaches to the skull. Forward head posture also moves the shoulder joint from the side of the body toward the front of the body, causing pressure on the shoulder joint tendons, risking shoulder tendonitis. Finally, this position of the head on the neck can cause the lateral neck muscles to shorten, causing pressure on the nerves and blood vessels passing through these muscles on their way to the working arm.

Another commonly overlooked but very significant CTD risk factor is lack of upper extremity support. Some tasks require the holding of arms up slightly all day, fighting gravity. This is hard work for the neck and shoulder muscles and magnifies the stresses described for forward head posture. One of the best ways to reduce excessive work fatigue and forward head posture stresses is to arrange the work so that there is some space available for the arms to rest, even if only for a split second. This can greatly reduce the physical work of sustained posture.

Posture plays a significant role in CTD. Slouching with the spine or leaning with the head puts the body out of balance and causes the limbs to be stretched or bent awkwardly. The neutral spine position starts with the three natural curves of the spine - the inward curve of the neck (cervical) region, the outward curve of the mid back (thoracic) region, and the inward curve of the lower back (lumbar) region. Too much bending (flexing) or straightening (extension) in either the cervical or the lumbar region takes the spine out of its neutral position and increases the risk of injury.

In summary, to avoid CTD, exercise the following precautions:

- Instead of leaning with the head, rotate the upper body forward at the hips.
- Instead of slouching, rotate the upper body forward at the hips.
- Instead of bending or lifting with a flexed lumbar spine, rotate the upper body forward at the hips.
- Take breaks as required
- Avoid standing in a stationary period for extended periods of time.
- Avoid caffeine and tobacco

3.6. SAFETY HAZARDS

This section discusses safety hazards under this Task Order and steps to mitigate these hazards.

3.6.1. Unexploded Ordnance (UXO)

Safety is a primary concern. The most obvious safety requirements are to protect personnel, the public, and the environment from the effects of fire, blast, noise, fragmentation, premature detonation, and toxic releases.

UXO escort is required for non-UXO personnel in areas that have not been previously cleared of UXO. Non-UXO personnel will follow the directions of their UXO escort.

Refer to the following sections for safety precautions related to:

- Location Surveying and Mapping
- UXO Safety
- UXO Excavation Safety
- UXO Disposition Safety

The UXO work exclusion zone corresponds to the exclusion zone for chemical investigation and removal sites. All other areas correspond to the safe zone for chemical investigation sites

Site Specific Explosives Hazards and the procedures for mitigating them are address in the Explosive Management Plan Section 3 of the Site work Plan.

3.6.2. Slips, Trips, and Falls

Protruding objects, careless movements, and placement of materials on pathways can cause slips, trips, and falls. To prevent these injuries:

- Be alert to obstacles in your path
- Maintain proper footing

- Remove tripping hazards, when encountered
- Maintain three points of contact when working on elevated equipment

3.6.3. Cuts

Personnel shall wear, inspect, and maintain designated PPE equipment and supplies. Personnel shall ensure cutting devices are properly stored when not in use.

The following shall be used to control minor bleeding:

- Wear surgical gloves or some other barrier, place sterile gauze/cloth over the bleeding area and apply direct pressure. Do not removed blood-soaked bandage; add more to the top.
- If bleeding persists, elevate the area to help reduce blood flow and continue applying direct pressure to the bleeding area.
- If bleeding continues, apply pressure at a pressure point (brachial or femoral) and continue with direct pressure over the wound.
- If unable to control bleeding with the steps shown above, seek medical attention.

3.6.4. Mechanical Equipment and Vehicle Operations

Hazards and procedures to mitigate these hazards are addressed in sections 4.12.22-4.12.27

3.7. BIOLOGICAL HAZARDS

Biological hazards include those hazards associated with biological organisms (plants, animals, and bacteriological). This section discusses these hazards is and provided steps to minimize the risk of these hazards.

3.7.1. Wildlife

Wild animals usually avoid people. However, unhealthy or threatened wildlife may be aggressive. Potential hazards due to animal bites are best controlled by cautiously entering new areas and avoiding animals when they are spotted. If bitten, immediately transport the victim to the nearest medical center. The condition and behavior of the animal should be noted and reported to the physician.

Note that UXB's Environmental Protection Plan Chapter 7 also directs employees to "walk gently" and avoid unnecessary contact with Wildlife. By simply avoiding contact with wild animals that are seen in the field, the chances of being bitten or attacked are greatly reduced.

3.7.2. Venomous Snakes

A poisonous snakebite is usually characterized by pain and swelling at the site of the bite and a general skin discoloration. The manifestations of the bite include general weakness, rapid pulse,

nausea, vomiting, and shortness of breath. An untreated snakebite can cause severe illness or death.

Venomous snakes typically have identifying features as listed in **Table 3-5**. However, when encountering any type of snake, the employee should ***Leave it Alone!!*** Most snakes are frightened of humans are prone to attack when threatened. If a snake is provided a path to escape, it will almost certainly take it.

Table 3-5: Snake Identification Features

Feature	Poisonous	Non-Poisonous
Eye Pupils	Elliptical, or cat-like	Round
Sensing Pits	Pit between the eyelids and nostrils	No pit between the eyelids and nostrils
Teeth	Two enlarged teeth (fangs) in front of the upper jaw	All teeth are approximately the same size
Scales	Form a single row on the underside and below the tail	Arranged in a double row on the underside of the tail
Head	Head much wider than the neck	Head slightly wider than the neck
Tail	Single anal plate	Divided anal plate

Copperhead Snake (Agkistrodon Contortrix) - The copperhead is a poisonous snake with a broad triangular head, vertically elliptical pupils and a heat sensitive pit between each eye and nostril. The body is pinkish to grayish brown with brown or reddish-brown cross-bands that are narrow on the back and widest on the sides. Small dark spots commonly occur between cross-bands on the back. The un-patterned head is dull orange, or rusty-red. Body scales are keeled and the belly is pink or light brown with dark blotches along the sides. When young, a copperhead has a yellow-tipped tail.

Copperheads prefer rocky, forested hillsides and wetlands for habitat. Wet areas are particularly sought out in the hot summer months. Small mammals and frogs account for most of the prey items taken, but birds, insects and other snakes are also important parts of their diets. When approached, they will either move away quietly or lay motionless, relying on camouflage to protect them. Occasionally, they will vibrate their tails. Bites usually occur when people unknowingly step on or touch unseen snakes.

Figure 3-1: Copperhead Snake

Prevention of Snakebite—The best snakebite treatment is to avoid being bitten. The following suggestions will help in this process:

- Watch where you sit, and where you put your hands and feet.
- Avoid rock piles, stacks of old boards, and brush in wooded areas. If movement is necessary, use a remote means to initially relocate the material. Prior to entering a heavily wooded or brush area, look and listen carefully.
- Never handle "dead" snakes; they may not be completely dead.
- Do not attempt to capture or kill snakes.

First Aid for Snakebites– Get the victim to the hospital and professional medical care. Meanwhile, the following first aid measures should be taken:

- Calm and reassure the patient. Keep the patient as still as possible and do not allow him to run, or move about unnecessarily.
- Remove any constricting items, such as jewelry, from the affected limb.
- When practical immobilize the affected limb approximately at or above heart level.
- The victim should remain in a comfortable prone position and body temperature should be stabilized to minimize shock.
- The bitten area may be washed with soap and water and blotted dry with sterile gauze. Dressings and bandages applied for pain relief.
- Transport to a medical facility for evaluation and treatment.

3.7.3. Ticks

Lyme Disease is caused by a bacterium, which may be transmitted by the bite of a tick. Ticks carrying Lyme Disease may be found throughout the U. S. living in grassy and wooded areas, and feeding on mammals such as mice, shrews, birds, raccoons, opossums, deer, and humans. Not all ticks are infected with the bacterium. When an infected tick bites, the bacterium is passed into the bloodstream of the host, where it multiplies. If detected early, Lyme Disease can be treated with antibiotics.

The illness typically occurs in the summer months and is characterized by a slowly expanding red rash that develops a few days to a few weeks after the bite of an infected tick. The illness can be accompanied by flu-like symptoms, headache, stiff neck, fever, muscle aches, and/or general malaise. At this stage, treatment by a physician is usually effective; but if left alone, these early symptoms may disappear and problems that are more serious may follow. The most common late symptom of the untreated disease is arthritis; other problems include meningitis, neurological, and cardiac abnormalities. NOTE: some people do not get the characteristic rash but progress directly to the later manifestations. Treatment of follow-on symptoms is more difficult than early symptoms and is not always successful.

Rocky Mountain Spotted Fever is another tick-borne disease. Nearly all cases of infection occur in the spring and summer, generally several days after exposure to infected ticks. The onset of illness is abrupt and often accompanied by high fever, headache, chills, and severe weakness. After the fourth day of fever, victims develop a spotted pink rash that usually starts on the hands and feet and gradually extends to most of the body. Early detection and treatment significantly reduces the severity of illness.

Precautions against tick bite:

- Wear long pants and long sleeved shirts that fit tightly at the ankles and wrists; tape cuffs if necessary.
- Wear light colored clothing so ticks can be easily spotted.
- Tick repellents should be used. (Recommend the application of vapor active repellent such as "DEET" to any exposed skin surface [except eyes and lips] and application of a repellent spray such as permethrin to field clothing). Apply and use following manufacturer's instructions.
- Inspect clothing frequently while in tick habitat.

Removal of ticks should be performed with small tweezers. Do not squeeze the tick's body. Grasp it where the mouthparts enter the skin and tug gently, but firmly, until it releases its hold on the skin. Save the tick in a jar labeled with the date, body location of the bite, and the place where it may have been acquired. Wipe the bite with antiseptic and seek medical attention as soon as possible.

3.7.4. Stinging Insects (Bees, Wasps, and Hornets)

Symptoms of an insect sting are normally a sharp, immediate pain in the body part stung. Some individuals are highly allergic to insect stings. In such cases, insect stings can be life threatening.

Site personnel will comply with the following work practices:

- Personnel with a known hypersensitivity to bee, wasp, or hornet stings will inform the UXOSO of this condition prior to performing site activities
- Personnel with a known hypersensitivity will keep emergency medication in their possession
- All personnel will remain vigilant for the presence of these stinging insects. Discovered nests will be flagged and their location reported to other site personnel
- If stung, immediately inform the UXOSO to receive treatment, per **Figure 3-2.**

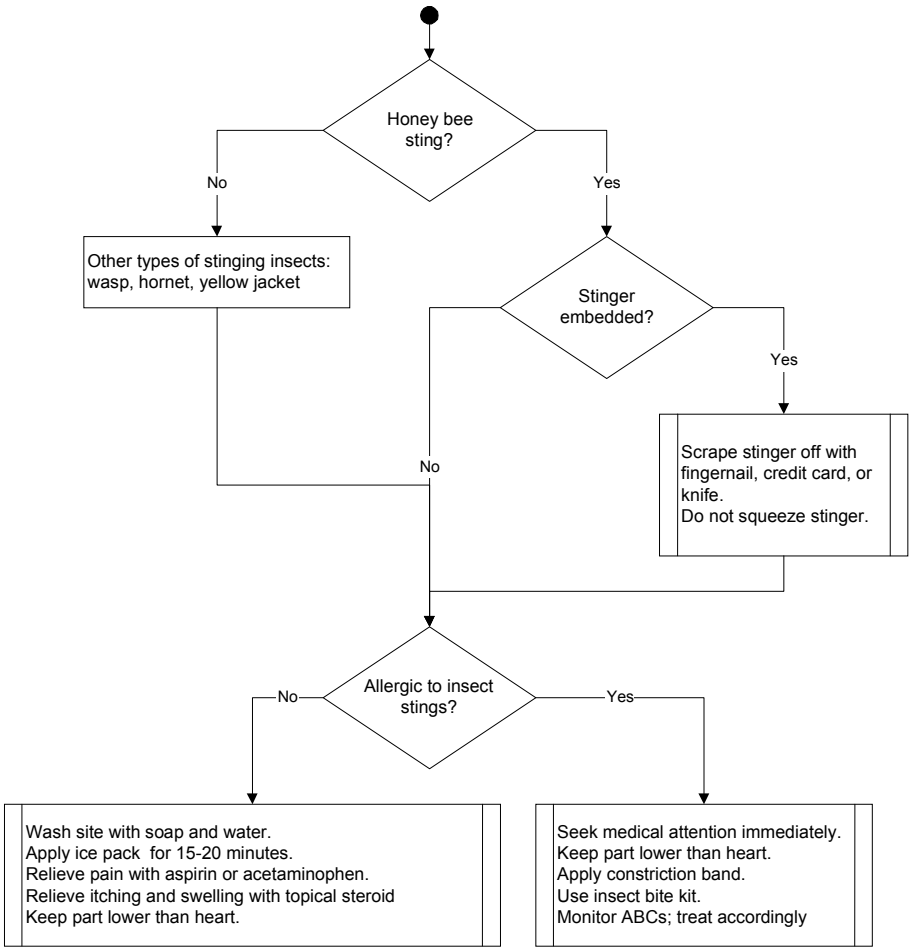


Figure 3-2: Decision Diagram for Stings from Flying Insects

3.7.5. Spiders

Use extreme caution when lifting covers, opening sumps/pits, etc., since spiders are typically found in these areas.

Black Widow Spider (Latrodectus Mactans) – Varies from dark brown to black in color. Body is ¼ inch wide and overall size is 1-½ inches with legs extended. Female has a red or yellow hourglass marking on the underside of the abdomen. Only the female is poisonous.

Signs and Symptoms -- Determining whether a person has been bitten by a Black Widow Spider is difficult. The victim will experience:

- A sharp pinprick of the spider's bite may be felt, although some victims are not even aware of the bite. In no more than 15 minutes, a dull, numbing pain develops in the bitten area.
- A faint red bite mark appears.
- Muscle stiffness and cramps -- usually affecting the abdomen when the bite is in the lower part of the body or legs, and affecting the shoulders, back, or chest when the bite is on the upper body or arms.
- Headache, chills, fever, heavy sweating, dizziness, nausea, vomiting, and severe abdominal pain.

Brown Recluse or Violin Spider (Lox Osceles Reclusa) - has a brown, possibly purplish, violin-shaped figure on its back.

Signs and Symptoms of the Brown Recluse Spider bite are as follows:

- The initial pain may be slight enough to be overlooked.
- A blister at the bite site, along with redness and swelling, appears after several hours.
- Pain, which may remain mild but can become severe, develops within two to eight hours at the bite sight.
- Fever, weakness, vomiting, joint pain, and a rash may occur.
- An ulcer forms within a week; gangrene may develop in some cases.

First Aid for Spider Bites:

- If possible, catch the spider to confirm its identity; even if the body is crushed, save it for identification.
- Clean the bitten area with soap and water or rubbing alcohol. Do not apply a constricting band because the black widow venom's action is swift; there is little to be gained by trying to slow absorption with a constriction band.
- To relieve pain, place an ice pack over the bite.

- Keep the victim quiet and monitor breathing
- Seek immediate medical attention.

3.7.6. Poison Ivy

Poison Ivy and Oak may cause severe skin reaction on contact. The plants are poisonous to the touch, frequently producing severe inflammation and blisters. These are woody shrubs or vines, and the leaves are arranged in an alternate pattern on the vine.

These plants grow throughout the United States, and they are woody shrubs or vines that sometimes run horizontally and underground for several yards. Their most distinctive features are their leaves, which are composed of three leaflets that are 1-2 inches long and pointed at the tip (**Figure 3-3**). They may be toothed, smooth, or lobed -- all occurring on the same plant. In the fall, the foliage turns bright red or reddish yellow.

Figure 3-3: Poison Ivy/Poison Oak

Poison Ivy	Poison Oak

Avoid contact with these plants. If contact is made, the majority of skin reactions are allergic in nature, characterized by headache, fever, itching, redness, and rash. Ordinarily, the rash begins within a few hours after exposure, but may be delayed for 24 to 48 hours.

3.8. ENGINEERING CONTROLS AND PRACTICE CONTROLS

Each work area will have access points (roads) protected by barricades to inform personnel and restrict entry through controlled locations. Caretakers, property renters, road maintenance, rail workers, and other public members during the project area may be exposed to hazards from both outside and inside the work zone. Explosion, material handling equipment or excavation equipment, and caught between common hazards found in this type of work such as driving, storage, and transport of commercial explosives. Guidance for the set-up of work zone signs, barricades, flagging, etc. are found in the Department of Transportation's "Manual on Uniform Traffic Control Devices (MUTCD)." The MUTCD is referenced in 1926 Subpart G. The

SUXOS shall use this guidance or equivalent when establishing barricades and signs to warn the public and deter entry.

3.8.1. Emergency Evacuation

In the unlikely event that an emergency evacuation is required, notification will be communicated by radio or one long steady blast for 30 seconds or more on a horn, which indicates an evacuation, is imminent. UXB personnel will immediately assemble at the UXOSO morning safety briefing named Entry Control Point (ECP) or alternate designated upwind safe area and identify themselves for accountability purposes. UXB personnel will then proceed as directed by the SUXOS.

3.8.2. Prevention/Minimization of Public Exposure

The UXO team will report unauthorized personnel entering the work area to the SUXOS, who in turn will request assistance from the local project authority in removing the unauthorized personnel from the area. UXO operations will halt until unauthorized personnel have vacated the work area.

4. STAFF ORGANIZATION, QUALIFICATION, AND RESPONSIBILITIES

Direction and administration of our safety program is a corporate responsibility; implementation is the overall and direct responsibility of each individual and then collectively the Project Managers, SUXOS, UXOSO, Quality Control Supervisor, Demolition Supervisors, Technicians and Workers who provide the guidance, support, and resources necessary to promote compliance with all aspects of the safety program. The rolls and responsibilities of key personnel are addressed in the APP under 1.2.0 Identification of Personnel Responsible for Safety & Lines of Authority. As a subcontractor, VRHabilis is responsible for the safe conduct of all diving operations.

All assigned personnel will be properly trained, qualified, and experienced.

5. ACCIDENT PREVENTION

This Accident Prevention Plan outlines occupational safety and health policy, responsibilities, and requirements that will be followed during the execution of work under this Task Order.

5.1. ACCIDENT INVESTIGATION, REPORTING, AND RECORD KEEPING

All on-site and off-site accidents, regardless of severity, will be reported, investigated, and analyzed. The UXB Senior staff members (selected by UXB's President) will investigate the accident, analyze the cause, and identify the corrective action to be implemented to prevent similar occurrences.

Employees are responsible for immediately reporting all injuries, occupational illnesses, abnormal conditions, or disorders caused by exposure to environmental factors associated with

the work site. The immediate supervisor will notify the Senior UXO Supervisor, document the report; and provide medical treatment regarding the nature and cause of the illness. Within 24-hours, the Senior UXO Supervisor will notify UXB Headquarters.

The ENG Form 3394 (the U. S. Army Corps of Engineers Accident Investigation Report) and UXB's Employee Injury/Property Damage Report Form (UXB Form 10-42-2) will be completed and forwarded to the Corps of Engineers and UXB Headquarters within two working days of the injury.

The following reporting criteria will be used:

- Death (regardless of the length of time between the injury and death)
- One or more lost workdays
- Restriction of work or motion
- Loss of consciousness
- Accident-related transfer to another job site
- Medical treatment required (other than first aid)

The UXOSO and the Dive Supervisor will maintain records on all health and safety issues and assure reportable accident and incident reports are submitted in a timely manner – Spot Report (UXB Form 11.-00.1-3). Injury and illness records will be maintained at UXB's Human Resources Department in Blacksburg, Virginia.

5.2. INSPECTIONS

An essential element in preventing accidents is an aggressive inspection program. Upon mobilization, the UXOSO will establish an inspection schedule that will efficiently cover the inspection requirements for UXO operations, as outlined in **Table 5-1**.

Table 5-1: UXOSO UXO Operation Inspections

DESCRIPTION	AMOUNT	TYPE	FREQUENCY
Underwater Dive Operations	2x	Visual Observation	Daily
Land Based Operations	2x	Visual Observation	Daily
Reacquisition	1	Visual Observation	Daily
Anomaly Investigation/Excavation	2x	Visual Observation	Daily
Transportation of Explosives	1	Visual Observation	During Operations
UXO Disposition	1	Visual Observation	During Operations
Inert UXO and Related Scrap Turn-In	1	Visual Observation	Daily
Personal Protection	1	Visual Observation	Daily
Work Practices	1	Visual Observation	Daily
Site Control	1	Visual Observation	Daily
Emergency Response/First Aid Equipment	1	Visual Observation	Weekly

5.3. TRAINING

All personnel will receive safety and health indoctrination, site-specific training, and continuing training to enable them to perform their assigned tasks safely and efficiently, as noted in **Table 5-2.** Applicable training certificates for on-site personnel are kept on site and available for review. Documentation for site-specific attendance will be maintained on-site and available to the Contracting Officer for review.

Table 5-2: Training Requirements for On-Site Personnel

Training/Content	Duration	Frequency	Personnel Categories								
			Client	UXO Supervisors	UXO Specialists	Technical	LCPM	Operational Support	Office Personnel	Visitors	As Mandated By Exposure
Health and Safety for Hazardous Waste Operations and Emergency Response 29 CFR 1910.120	40-Hours	Once	✔	✔	✔	✔	✔	✔			
Excavations, Fall Protection, Permit-Required Confined Space, and Misfire Pits (as required) 29 CFR 1926 Subpart B, Subpart M 29 CFR 1910.146	2-Hours	Mobilization	✔	✔	✔	✔	✔	✔		*	
Health and Safety for Hazardous Waste Operations and Emergency Response 29 CFR 1910.120	8-Hours	Annual	✔	✔	✔	✔	✔	✔			
Supervised Field Experience	3-Days	Once in Career			✔	✔		✔			
Site-Specific SSHT, Responsibilities, Hazards, PPE, Safe Work Practices & Equipment Use, Medical Surveillance, Decontamination, Emergency Response, UXO Refresher	2-Hours	Mobilization		✔	✔	✔	✔	✔			
Supervisor's Health and Safety for Hazardous Waste Operations and Emergency Response 29 CFR 1910.120	8-Hours	Once		✔							
Hazard Communications (hazards of materials used/encountered) 29 CFR 1910.120	30-Minutes	Mobilization		✔	✔	✔	✔	✔			
Hearing Conservation 29 CRF 1910.95 - Physical/psychological effects of noise levels - Noise exposure limits - Selection/use/limitations of protection	30-Minutes	Mobilization	✔	✔	✔	✔	✔	✔		*	✔
First Aid and CPR (minimum of 1 trained UXB personnel on-site) - Equivalent to American Red Cross training	3-Days	Every 3 years		✔	✔						
Bloodborne Pathogen 29 CFR 1910.1030 - Protective equipment - Containment and Disposal of Waste	2-Hours	With First Aid/CPR		✔	✔						
Visitor - Operational Activities & Hazards - Boundaries of Work Area and Entry/Exit - Emergency Evacuation & Assembly Points - PPE	15-Minutes	Once Per Visit	✔							✔	
Morning Safety Meetings - Potential hazards and risks - Encounters with hazardous materials to date	15-Minutes	Daily, Prior to Operations		✔	✔	✔	✔	✔			
Supervisor's Safety Meeting	30-Minutes	Weekly		✔							

5.4. PERSONNEL PROTECTIVE EQUIPMENT (PPE)

This section addresses UXB's policies and procedures for providing personnel protective equipment (PPE) to reduce the frequency and severity of injury. This section addresses the requirements of 29 CFR 1910.120(g) (5), 29 CFR 1910.134, and 29 CFR 1910.132.

Personnel will be physically able, medically qualified, and trained to wear the PPE required at the project site. Personnel will be proficient in proper PPE wear, maintenance, inspection, and testing. They must be knowledgeable of the PPE limitations and reduced performance levels.

Protective equipment must be maintained in a serviceable condition at all times. Defective equipment will not be used. Before being stored or reissued to another person, equipment must be cleaned, disinfected, inspected, and repaired (if necessary).

5.4.1. Selection Criteria

PPE reduces contaminant levels below Permissible Exposure Levels (PEL). The goal, however, is no exposure. If operations proceed as planned, the concentration of contaminants will always be less than PEL. PPE is necessary in case there is a leak or system failure. As a conservative measure, PPE shall be worn at any time there is a potential for exposure. The following were evaluated in selecting appropriate PPE levels.

- Routes of Potential Exposure
- Eye and skin contact
- Inhalation
- Performance and durability of PPE materials
- Skin absorption
- Task specific conditions
- Ingestion

5.4.2. Minimum Levels of Protection

The minimum levels of protection for each task are noted in **Table 5-3**.

Table 5-3: Minimum Levels of Protection

Tasks	PPE	Supplied air dive equipment	Long trousers, Long Sleeve shirt	Protective Boots (composite toe)	Work Gloves	Hearing Protection (Near Machinery)	Protective Eyewear	Face Shield or eye protection	Hard Hat (Near Overhead Hazards) or Back-hoe
Underwater Operations	D	✔			✔				
Land based Operations	D		✔	✔	✔	✔	✔	✔	✔
Characterization									
Brush Clearing	D		✔	✔	✔	✔	✔	✔	
Reacquire	D	✔	✔	✔	✔		✔	✔	
Anomaly Detection	D	✔	✔		✔		✔		
Excavation	D	✔	✔	✔	✔	✔	✔		✔
Disposition	D		✔	✔	✔	✔	✔		
Disposal of MD and Related Scrap	D		✔	✔	✔	✔	✔	✔	✔
Quality Control	D		✔	✔		✔			

NOTE: Office personnel are exempt from PPE requirements when performing routine non-field administrative duties in the office.

5.4.3. PPE Upgrade/Downgrade Criteria

It is not anticipated that PPE upgrades will be required. If site conditions change and warrant an upgrade, personnel will stop work, evacuate the area, and the UXOSO (in conjunction with the UXBCIH and in consultation with the CEHNC On-Site Safety Specialist) will direct required PPE upgrades.

There will be no downgrade from Level D.

5.4.4. Employee-Provided Equipment

Employee-provided equipment must meet or exceed the standards UXB is required to meet at the job site.

Employee-provided equipment:

- Low Metal Content Work Boot,
- Inclement weather outer clothing and rain protection

5.5. EMERGENCY FIRST AID EQUIPMENT

The following emergency and first aid equipment shall be immediately available in the event of an emergency.

First Aid Equipment and Supplies (ANSI Z308.1) -- will be located at each operational area; per the USACE Safety and Health Requirements Manual (EM 385-1-1) there will be one first aid kit for 25 persons on-site. The SUXOS and Dive Supervisor will maintain one kit at all times. Kits will be inspected on a weekly basis, and missing components immediately replaced, incomplete kits will not be used until updated and complete.

Eye Wash Stations (ANSI Z-358.1) – An eye wash station is applicable to this delivery order. One portable eyewash station shall be present and accessible in the work area.

Emergency Showers (per ANSI Z-358.1) – Emergency shower requirements are not applicable to this delivery order.

Emergency Use Respirators – Not applicable to this delivery order. Based on the ASR and available information, neither HTW nor CWM presents a concern at this site requiring an emergency respirator.

Fire Extinguishers – Classification 2-A: 10-B: C fire extinguishers (5 pound) will be maintained in the personnel transport vehicles at each work location and in the dive tender .

Eye and Face Protection (ANSI Z87.1) – When mandated by PPE requirements, personnel must wear appropriate eye and face protection; personnel requiring corrective lenses will wear eyeglasses with approved corrective lenses, goggles over normal eyeglasses, or goggles fitted with corrective lenses.

Hearing Protection Personnel conducting site preparation with chain saws and weed whackers, and personnel operating or near heavy equipment and loud diesel trucks are required to wear hearing protection.

Head Protection (ANSI Z89.1) -- Personnel working in or visiting a hard hat area will be issued and required to wear protective headgear. Hard hats will not be required during ordnance operations unless when working with a back-hoe or when head injury is possible. Hard hats will be inspected daily for signs of cracks, dents, or other defects that may reduce effectiveness.

5.6. MEDICAL SURVEILLANCE

All on-site personnel will participate in medical surveillance, in accordance with 29 CFR 1910.120. The program will consist of a baseline examination and an annual re-examination. The nature of this removal action does not warrant examinations during or upon completion of the project.

Medical examinations will be conducted under the supervision of a licensed physician who is board eligible in Occupational Medicine by the American Board of Preventive Medicine and

certified by the American Board of Independent Medical Examiners. An occupational physician will review the exam/test results. UXB headquarters personnel will have their examinations performed at a location close to their work.

UXB and the physician shall determine the minimum content and frequency of the medical examinations/tests, based upon probable site conditions, potential occupational exposures, and required protective equipment. At a minimum, examinations will consist of a medical and occupational history review, blood tests, and urine tests for contaminants of interest, electrocardiogram, pulmonary function tests, chest x-ray, and general physical examination (including hearing and vision).

Exposure monitoring is not required due to the nature of this RI, which is not located in a CWM environment.

The written opinion of the attending physician will be maintained on-site and made available to the Contracting Officer for review. Examination results of employees who terminate employment or who have worked on a hazardous waste project are also maintained at UXB's Corporate Office.

5.7. MONITORING

This section outlines the monitoring that will be established in support of providing a safe working environment. Environmental Sampling is not covered in this section. No environmental sampling will be done for this project.

5.7.1. Air Monitoring/Sampling Types and Frequency

Sampling is not applicable to this delivery order. Based upon a review of available documentation, CWM or other airborne chemical hazards are not expected at this site.

Continuous air monitoring is not required.

5.7.2. Personal Samples

Personal Samples are not applicable to this delivery order. Based upon a review of available documentation, CWM is not a hazard at this site and airborne HTW is not a potential hazard.

5.7.3. Meteorological Monitoring

Meteorological monitoring for this project will consist of the SUXOS tuning to a local radio station and/or calling the weather station for weather reports and forecasts.

5.7.4. Noise Monitoring

Noise monitoring will not be performed on this Task Order.

5.7.5. Radiation Monitoring

Radiological monitoring is not applicable to this delivery order. Based upon a review of available documentation, radiation is not a hazard at this site.

5.7.6. Monitoring/Sampling Protocol

Not applicable to this delivery order. Based on a review of available documentation, CWM is not hazards at this site.

5.7.7. Corrective Actions

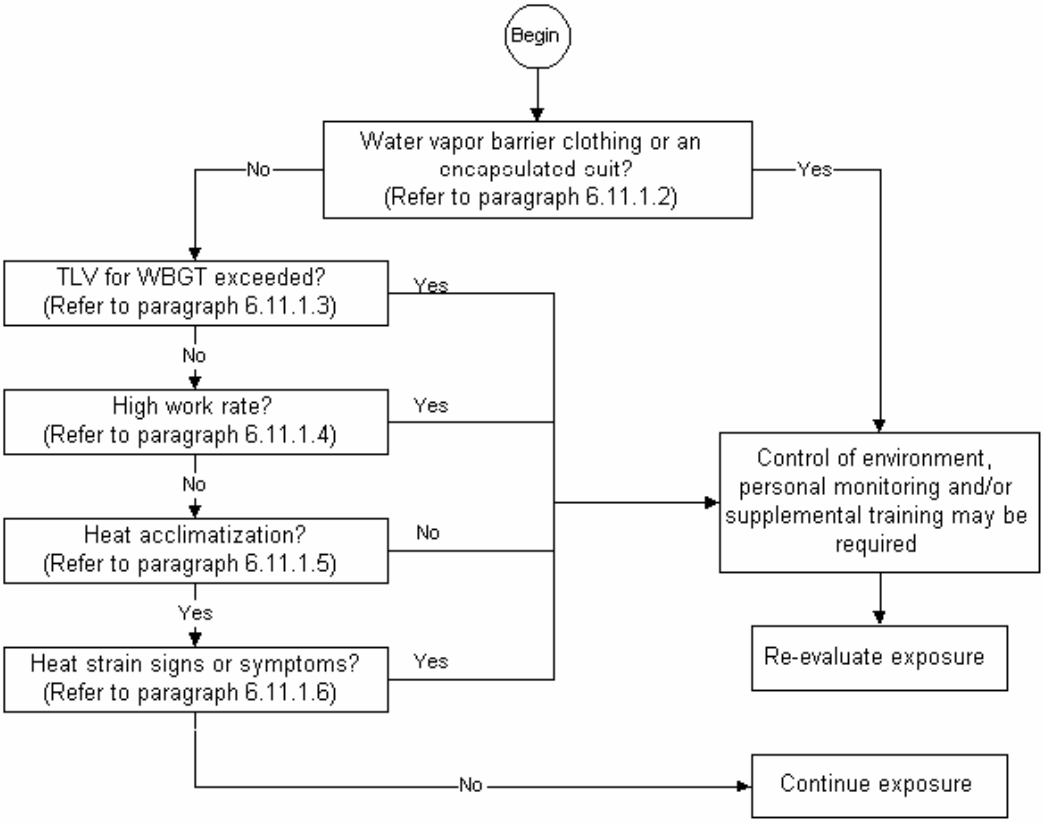
The SUXOS will administer corrective safety actions, when necessary, as directed by the UXB Project Manager or the UXB CIH. Should a changed condition arise, the requirements for monitoring will be re-evaluated based upon the increase or decrease of hazards attributable to the changed condition.

5.8. HEAT/COLD STRESS MONITORING

5.8.1. Thermal Stress Monitoring and Work Cycle Management

Both heat stress and heat strain must be assessed in evaluating worker safety and health, using the decision tree diagram shown in **Table 5-4**.

Table 5-4: Heat Stress Decision Diagram



Heat stress is the net load on the body with contributions from both metabolic heat production and external environmental factors including temperature, relative humidity, radiant heat transfer, and air movement, as they are affected by clothing.

Heat strain is the net physiological load resulting from heat stress.

TLVs specified in Table 5-5 refer to heat stress conditions under which it is believed that nearly all heat acclimatized, adequately hydrated, un-medicated, healthy workers wearing light-weight summer clothing may be repeatedly exposed without adverse health effects. The work areas are assumed to have at least some air movement. When the WBGT values in **Table 5-5** must be exceeded, the guidelines in **Table 5-6** must then be followed.

Table 5-5: TLVs for Heat Exposure

Hourly Activity	Work Rates		
	Light	Moder ate	Heavy
100% Work	30.0°C/86.0°F	26.5°C/80.0°F	25.0°C/77.0°F
75% Work - 25% Rest	30.5°C/87.0°F	28.0°C/82.5°F	26.0°C/79.0°F
50% Work - 50% Rest	31.5°C/89.0°F	29.5°C/85.0°F	28.0°C/82.5°F
25% Work - 75% Rest	32.0°C/89.5°F	31.0°C/88.0°F	30.0°C/86.0°F
Temperature values in WBGT Refer to Table 6-10 for work rates. Work and rest environments are assumed to be the same. If different, hourly time-weighted average WBGTs must be calculated.			

5.8.2. Physical Barriers to Heat Loss

Evaporation of sweat from a person's skin can be an important means of dissipating heat from the body. Also, the free movement of cool, dry air over the skin's surface optimizes heat loss.

Water vapor impermeable or thermally insulating clothing, encapsulating suits, and similar convective and evaporative barriers can severely restrict heat loss and produce life-threatening heat strain, even when the ambient air temperature, radiant heat, and humidity are low.

Whenever workers wear such restrictive clothing, it is essential that extra caution be exercised. Since such impervious clothing will not be worn during this ordnance and explosive survey, this step of the heat stress and strain decision tree can be skipped.

Table 5-6: Guidelines for Heat Exposure Limits

Always monitor signs and symptoms of heat-stressed workers (refer to Table 5-7). When WBGT-TLV criteria (Table 5-5) are exceeded or water vapor impermeable clothing is worn, discontinue any environmentally induced or activity-induced heat stress for a person when any one of the following indicators is exhibited.
Sustained heart rate is greater than 160 beats per minute for those under 35 years of age Sustained heart rate is greater than 140 beats per minute for those 35 years of age or older Complaints of sudden and severe fatigue, nausea, dizziness, lightheadedness, or fainting Periods of inexplicable irritability, malaise, or flu-like symptoms Sweating stops and the skin becomes hot and dry
Good physical fitness and adequate hydration are the first lines of defense against heat strain

5.8.3. Wet-Bulb Globe Temperature (WBGT)

Since measurement of deep body temperature is impractical for monitoring the workers' heat load, the measurement of environmental factors is required to correlate with deep body temperature and other physiological responses to heat. The Wet Bulb Globe Temperature (WBGT) Index is the simplest and most suitable technique to measure the environmental factors.

Measurement of WBGT offers a useful, first-order index of heat stress by assessing the net effects of dry air temperature, radiant heat transfer, and ambient humidity. It may not, however, sufficiently reflect the effects of air movement on convective heat transfer or evaporative heat loss (typically major avenues of heat loss) and it does not by itself account for heat produced by physical work, often a major source of heat strain.

WBGT values are calculated using the following equation:

$$\mathbf{WBGT = 0.7\ NWB + 0.2\ GT + 0.1\ DB}$$

WBGT = wet bulb globe temperature index
NWB = natural wet-bulb temperature
GT = globe temperature
DB = dry-bulb temperature

The WBGT requires the use of a black globe thermometer, a natural (static) wet-bulb thermometer, and a dry-bulb thermometer.

- The wick of the natural wet-bulb thermometer should be kept wet with distilled water for at least ½ hour before the temperature reading is made. The wick should extend over the bulb of the thermometer, covering the stem about one additional bulb length.
- The dry bulb thermometer must be shielded from the sun and the other radiant surfaces of the environmental without restricting the airflow around the bulb.
- The globe thermometer should be exposed at least 25 minutes before it is read.
- A stand should be used to suspend the three thermometers so that they do not restrict free airflow around the bulbs, and the wet-bulb and globe thermometers are not shaded.

As Table 5-6 indicates, acceptable WBGT exposures depend on the rate of metabolic heat production and the balance of work and rest periods.

5.8.4. Work Rate

As shown in **Table 5-7**, physical activity can impose high rates of heat production. It is commonly the major source of heat strain, even when there is little or no environmental heat stress. The metabolic heat resulting from such activity can be an especially serious threat for someone wearing water-vapor-barrier or heat-insulating clothing, or an encapsulated suit. Even in cool and dry ambient conditions, high work rates or wearing such clothing requires that the guidelines in **Table 5-7** be followed.

Table 5-7: Examples of Metabolic Heat Production

Work Rates	Activity	Watts
Resting	Sitting quietly	130
	Sitting with moderate arm movements	150
Light	Sitting with moderate arm and leg movements	175
	Using table saw	215
	Standing with light work at machine or bench and some walking about	220
	Standing with light work at machine or bench while using mostly arms	250
	Replacing tires	255
	Standing with moderate work at machine or bench and some walking about	260
Moderate	Walking about with moderate lifting or pushing	360
	Carpenter sawing by hand	475
	Shoveling dry sand	480
	Heavy assembly work on a non-continuous basis	500
Heavy	Intermittent heavy lifting with pushing or pulling (pick and shovel work)	520
	Shoveling wet sand	535

5.8.5. Heat Acclimatization

Periodic physical activity performed under heat stress conditions normally induces physiological changes, including those in **Table 5-8** that allow a worker to withstand heat stresses with reduced heat strain. Heat acclimatization is acquired gradually over weeks of continued physical activity under heat stress conditions. Its loss begins when the activity under heat stress conditions is discontinued.

Table 5-8: Heat Acclimatization Benefits

Someone with heat acclimatization exposed to environmentally or activity-induced heat-stress has:
• Improved productivity and safety • More stable and better regulated blood pressure which promotes lower pulse rates, less fatigue, improved alertness, and focus of attention • More finely tuned sweating reflexes with increased sweat production rate at lower electrolyte concentrations, when needed • Fewer and less severe signs and symptoms of heat strain for the same level of heat stress

5.8.6. Heat Strain

Heat Strain manifests itself in four disorders – Heat Stroke, Heat Exhaustion, Heat Cramps, and Sunburn. The symptoms, treatments, warnings, and prevention of each of these disorders and a work/rest schedule are noted in **Table 5-9**.

Table 5-9: Heat Strain Monitoring

HEAT STRAIN (In descending order of severity)	
HEAT STROKE (Sun Stroke) results from the disruption of the body's heat regulating system, producing excessively high body temperature. Can be caused by continuous exposure to high temperatures for as little as three hours. **RAPID COOLING IS URGENT TO PREVENT DEATH.**	
SYMPTOMS:	Extremely high body temperature, often 106° Fahrenheit (F) or above Skin is red, hot, and dry; sweating is absent Pulse is rapid and strong Convulsion or collapse is possible Delirium, disorientation, or unconsciousness is possible
EMERGENCY TREATMENT:	Immediately call for emergency help Place person in an air-conditioned room, vehicle, or in a shaded area (at a minimum) **COOL THE PERSON RAPIDLY** -- remove the person's clothing, bathe the body in cool water, and massage continuously (submerge in cool water, or at least administer a sponge bath). Fans or air currents (such as hand fanning) also assist in the cooling process. When the back of the hand held against the victim's cheek indicates normal skin temperature, or when internal body temperature reaches 102°F or less, discontinue the cooling process and wrap the person in a blanket to prevent shock. Victim may sip liquids
WARNINGS:	**Do not administer alcoholic beverages or stimulants (coffee, tea)** **If the body temperature begins to rise again, repeat the cooling process**
PREVENTION:	Protect the body from radiant heat Break the workday into short work/rest periods Drink enough fluids to replace those lost by sweating
HEAT EXHAUSTION (Heat Prostration or Heat Collapse) results when the circulatory system fails to sufficiently compensate for increased blood flow demands imposed by the need to cool the body and dehydration caused by profuse sweating. Failure to provide quick treatment can lead to heat stroke.	
SYMPTOMS:	Body temperature is normal or slightly elevated Skin is clammy and pale, and there is a moist, profuse sweating Pulse may be weak with low blood pressure Victim is tired and weak Victim may complain of dizziness or giddiness, and fainting is possible Possible muscle cramps Possible nausea or vomiting Mental state is generally rational
EMERGENCY TREATMENT:	Place person in an air conditioned room, vehicle, or in a shaded area (at a minimum) Have person lie down; elevate feet 8 - 12 inches Loosen tight fitting clothing If conscious, have victim sip a glass of electrolyte replacement solution (Gatorade, ERG, or Squincher). Repeat every 15 minutes to 1 hour; stop fluids if vomiting occurs. If symptoms persist or return, immediately summon medical assistance
PREVENTION:	Schedule frequent rest periods Drink electrolyte liquids every 15 minutes to 1 hour to replace body fluids
HEAT CRAMPS are muscle pains and spasms caused by loss of electrolytes (due to sweating over an extended period). Not life threatening, but heat cramps may hinder work or cause a potential hazardous situation.	
SYMPTOMS:	Painful muscle cramps and spasms Heavy sweating, vomiting, and/or convulsions Normal, or near normal, pulse and blood pressure Irrational behavior
EMERGENCY/MEDICAL TREATMENT:	Quiet rest in a cool, shaded area Gently massage affected area If person is not vomiting, give electrolyte fluids every 15 minutes to 1 hour If symptoms persist, victim should be transported to the nearest medical facility.
PREVENTION:	Salt food more heavily than normal Drink electrolyte solutions Eat salty foods during heavy sweat-producing activities
WARNING:	If on a low sodium diet or taking diuretics, consult your physician regarding the replacement of salts prior

HEAT STRAIN (In descending order of severity)		
	to field activities. Be sure to explain any problems to the Senior UXO Supervisor.	
SUNBURN is the most common of the heat disorders. It is usually a first-degree burn of the epidermis (first layer of skin), and the affects may not be noticed or felt until several hours after exposure.		
	SYMPTOMS:	Skin redness Pain Swelling Blisters, nausea, vomiting, chills (in severe cases)
	EMERGENCY/MEDICAL TREATMENT: Put cold water on the burned area as quickly as possible Submerge severe burns in cold water or soak with wet cloths Elevate burned limbs Do not break a blister (this increases the chance of infection)	
	PREVENTION:	Cover exposed parts of the body Gradually expose the skin to the sun for 20 minute intervals per day; extending the time as the skin builds its own natural protection in the form of a tan Use sun lotion, sun block, and sun shields (reapply every hour, even on cloudy days)
HEAT STRESS MONITORING AND WORK/REST CYCLE		
	The following will be implemented during field activities when the temperature exceeds 70°F. The Senior UXO Supervisor will determine the appropriate work/rest schedule and ensure all personnel take the appropriate breaks; additional breaks will be approved, as necessary. Measure Heart Rate: To be conducted for 30 seconds as early as possible during the rest cycle. The rate should not exceed 110 beats per minute for most people. If the heart rate is higher during the next rest period, the following cycle should be shortened by 33 percent. The reduction of the work cycle will continue until the pulse rate reaches 110 beats per minutes. Measure Body Temperature orally with a clinical thermometer as early as possible in the resting period. If oral temperature (OT) at the beginning of the rest period exceeds 99.40°F, the worker will be prohibited from continuing work until the OT is maintained below 99.4°F (37.4°C). The next work cycle will be reduced by 33% if the oral temperature exceeds 99.68 °F (37.6°C). Establish Work/Rest Schedule: The SUXOS will monitor personnel every two hours at temperatures above 70°F, and every hour at temperatures above 90°F. Cool drinks will be available for consumption during rest periods.	

People who are least endangered while workings in heat stress conditions are young and appropriately clothed, in good general health and physical condition, not obese, and adequately hydrated with electrolyte concentrations in normal ranges. To help assure that safe and healthy conditions are maintained, the guidelines in **Table 5-10** should be followed.

Table 5-10: Guidelines for Optimizing Safety and Health

For people working in hot conditions:
Encourage drinking small volumes (approximately 1 cup) of cool or tepid water about every 20 minutes Provide work settings with good ventilation and shielding from radiant heat sources Assure co-worker observation to detect signs and symptoms of heat strain Pay extra attention to those who take medications that compromise normal cardiovascular, blood pressure, body temperature regulation, renal, or sweat gland functions
Never ignore anyone's signs or symptoms of heat strain

5.8.7. Cold Stress Monitoring and Work Cycles

Cold Stress disorders include Hypothermia, Frostbite, and Chilblain. The symptoms, treatment, and prevention of these disorders, plus work/rest cycles are detailed in **Table 5-11**.

Table 5-11: Cold Stress Monitoring

COLD STRESS (In descending order of severity)		
HYPOTHERMIA is characterized by a significant loss of body heat. Moderate cases may exhibit the first 7 symptoms below. Severe cases are indicated with extremely cold skin; loss of consciousness; faint pulse; and shallow, infrequent, or apparently absent respiration – death may result.		
	SYMPTOMS:	1. Severe shivering 2. Abnormal behavior 3. Slowing of movements 4. Stumbling 5. Weakness 6. Repeated falling 7. Inability to walk 8. Collapse 9. Stupor 10. Unconsciousness
	EMERGENCY/MEDICAL TREATMENT:	• A severely shivering worker shall immediately terminate work and exposure to cold • Seek qualified medical help immediately • Remove the victim from the hypothermia-producing environment • Keep handling to a minimum; DO NOT rub or massage the victim • Cover the victim lightly with blankets; plastic may be used for further insulation. DO NOT cover face. • If victim is conscious, administer hot drinks, encourage activity (walking while wrapped in a blanket), and DO NOT administer any form of sedative, tranquilizer, or analgesic (pain reliever), as they may facilitate further heat loss.
	PREVENTION: Wear insulated garments in a layered fashion.	
FROSTBITE includes localized injury resulting from exposure to cold temperatures, and includes several degrees of severity.		
	SYMPTOMS:	• frostnip or incipient frostbite is a sudden blanching or whitening of the skin • superficial frostbite has a waxy or white appearance and is firm to the touch, but the tissue beneath is resilient • deep frostbite is an extremely serious condition in which tissues are cold, pale, and solid.
	EMERGENCY/MEDICAL TREATMENT: **DO NOT** rub effected part with snow. Slow re-warming in water at 103° - 105°F. Give warm nutritious drinks (no alcohol). Victim should not smoke.	
	PREVENTION: Wear insulated garments in a layered fashion.	
CHILBLAIN is an inflammation caused by exposure to cold moisture.		
	SYMPTOMS:	• Localized itching • Swelling • Inflammation of fingers, toes, or ears • Severe spasms • Pain
	EMERGENCY/MEDICAL TREATMENT: Warm gradually by placing parts in lukewarm water or with warm hands. Do not rub. Place victim in warm but not hot room. Give warm nutritious drinks (no alcohol).	
	PREVENTION: Wear insulated garments in a layered fashion.	
COLD STRESS PREVENTION AND WORK/REST CYCLE		
	• A work/rest regime and a heated shelter shall be provided, as needed. A change of clothing for each worker shall be on hand. Warm, non-alcoholic drinks (avoid caffeine) and soup will be available, if required. • Use the heated shelter at regular intervals when temperatures below 20°F or equivalent wind chill are present. Frequency of breaks is dependent on environmental conditions (Table 6-12) and each worker's needs. • When entering shelter, remove outer layer of clothing and loosen remaining clothing to permit sweat evaporation. Do not return to work with wet work clothing. • Heavy shivering, frostnip, excessive fatigue, drowsiness, irritability, or euphoria indicate an immediate return to the heated shelter. • The equivalent chill temperature (Table 6-12) should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the deep body core temperature. • If conditions are below 10°F or an equivalent wind chill, the following shall apply: Work under constant supervision and the buddy system (refer to paragraph 4.15.4.1) Reduce work rate to avoid heavy sweating Instruct workers in warming procedures, first aid, clothing, eating/drinking, and recognition of signs and symptoms of impending frostbite, hypothermia, or excessive cooling without shivering.	

The ACGIH cold stress standard shall be the minimum protocols for cold stress. The cooling power of wind on exposed flesh is depicted in **Table 5-13**. The TLVs Work/Warm-up Schedule for Four-Hour Shifts are given in **Table 5-12**.

Table 5-12: Work/Warm-up Schedule for Four-Hour Shift

Air Temp. Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
C (approx.)	F (approx.)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26 to -28	-15 to -19	Norm.	1	Norm	1	75 min	2	55 min	3	40 min	4
-29 to -31	-20 to -24	Norm.	1	75 min	2	55 min	3	40 min	4	30 min	5
-32 to -34	-25 to -29	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35 to -37	-30 to -34	55 min	3	40 min	4	30 min	5	Non-emergency work should cease			
-38 to -39	-35 to -39	40 min	4	30 min	5	Non-emergency work should cease					
-40 to -42	-40 to -44	30 min	5	Non-emergency work should cease							
-43 & below	-45 & below	Non-emergency work should cease									

Notes for Table: Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten (10) minutes in a warm location and with an extended break (e.g., lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule on step lower. For example, at –35C (-30F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).

The following is suggested as a guide for estimating wind velocity if accurate information is not available:

- 5 mph: light flag moves
- 10 mph: light flag fully extended
- 15 mph: raises newspaper sheet
- 20 mph: blowing and drifting snow

If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: 1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 W/m2: 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m2. In general, the warm up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly over-compensates for the actual temperatures in the colder ranges because windy conditions rarely prevail at extremely low temperatures.

TLVs apply only for workers in dry clothing.

Table 5-13: Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature

Estimated Windspeed (in mph)	Actual Temperature Reading (° F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (° F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
Wind speeds greater than 40 mph have little additional effect.	Little Danger In < 1 hr with dry skin. Maximum danger of false sense of security.				Increasing Danger Danger from freezing of exposed flesh within one minute.				Great Danger Flesh may freeze within 30 seconds.			
	Trench foot and immersion foot may occur at any point on this chart.											

5.9. SITE CONTROL

The goal of this section is to outline the requirements needed to protect on site personnel, the environment, and the general public from task hazards and exposures to hazardous conditions. The effectiveness of these procedures shall be assessed by the SUXOS and Dive Supervisor as each task is conducted, and reassessed if new site information becomes available.

5.9.1. Work Zone Delineation and Access Points

Operations will be conducted at designated locations throughout the entire area of each MRS. Once work zones are established, the access point will be controlled by the SUXOS for land based operations and the dive Supervisor for underwater operations. The entry points will be designated and announced at the morning safety meetings.

One of the most effective methods for reducing or eliminating the potential for employee exposure to site hazards is through the use and enforcement of site control zones and access control points. Establishment of work zones and control of their access can prevent site personnel and the general public from entering hazardous areas where the potential for exposure to site hazards exists.

The boundaries and access control point for the underwater work zone shall be clearly identified with dive flags, or sign with access restricted to prevent accidental intrusion by personnel who are not authorized to be in the area during site operations. The land based boundaries and access control points will be clearly identified with signs restricting access from pedestrian and vehicular traffic. It shall be the responsibility of the SUXOS to ensure that the control zones

and access control points are known to personnel to ensure that hazards found inside the zone do not migrate outside the zone.

5.9.2. On-Site Communications

The on-site communications system will be the Motorola HT 1000 (5-watt) portable radio or equivalent.

5.9.3. Off-Site Communications

Off-site communications will consist of the office radio/telephone system. A cellular telephone will complement hard-line telephone communications.

5.9.4. Access Control

The UXO team will report unauthorized personnel within the work area to the SUXOS. In turn, the SUXOS will request assistance from the Trustees of the Reservation and the USACEH representative in removing the unauthorized personnel from the work area. In order to access a work area, authorized visitors must participate in a site-specific safety briefing and sign the visitor log prior to entering the work area. UXO-related operations must cease prior to visitor entry to the work area.

5.9.5. Security

The UXO Team will be alert to anyone entering without proper authorization and shall stop work should unauthorized personnel enter the exclusion areas.

5.9.6. Personnel and Equipment Decontamination

Personnel and equipment decontamination are not applicable to this delivery order. Based on a review of available documentation and the Scope of Work, CWM does not present a concern at this project work area.

5.10. EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Personnel must be prepared to immediately respond to emergency situations, and all required equipment must be readily available, in proper working order, and ready for use. To ensure rapid, effective response to an emergency, these emergency response and contingency procedures (developed in accordance with 29 CFR 1910.120) shall be implemented prior to and during operations.

5.10.1. Pre-Emergency Planning and Procedures

The following will ensure appropriate pre-emergency planning and procedures are in place:

- Upon mobilization, and weekly during the morning safety meetings, personnel will be briefed on:

- Location of the nearest means of off-site communications
- Evacuation routes (these will change as the project progresses)
- Assembly points (these will change as the project progresses)
- Location of maps depicting the route to the hospital – stationed in vehicles.
- Emergency telephone numbers (stationed in vehicles)

- First Aid and PPE equipment shall be readily available (stationed in vehicles)

5.10.2. Personnel Roles, Lines of Authority, Communications

Immediate control will reduce jeopardizing on-site personnel and the surrounding community. The SUXOS will assume the responsibilities of the On-Scene Incident Commander (OSIC). If the SUXOS is unavailable or incapacitated, the UXB UXOSO will assume the role. The OSIC will direct all on-site and off-site response personnel and the level of response being dictated by the severity of the situation. The SUXOS will notify the COE On-Site Safety Specialist of the situation as soon as possible.

Communications consist of a combination of hand-held radios, commercial telephones, and cellular telephones.

5.10.3. Emergency Contacts

Table 5-14 is a list of Emergency Telephone Numbers that will be posted in the project vehicles and available for all personnel in case of an emergency.

Table 5-14: Emergency Telephone Numbers

AGENCY	NAME	TELEPHONE NUMBER
Medical Facility		911
Hospital		911
Fire Department		911
Police		911
State Police		911
Ambulance Service		911
Environmental Agencies Federal	U.S. ENVIRONMENTAL PROTECTION AGENCY	1-800-535-0202
Environmental Agencies MA State	Emergency Management Agency	(800)858-0368 For Reporting Emergencies Only
Poison Control Center	No contact name	800-451-1428 (804)-924-5543
UXB Headquarters	Mike Warminsky	(908) 237-4592 (office) (908) 878-7389 (cell)

AGENCY	NAME	TELEPHONE NUMBER
US Army Engineering and Support Center, Huntsville, Center of Expertise for Ordnance and Explosives	(Contact via CEHNC Safety)	**REGULAR HOURS** (256) 895-1582
Report Suspected CWM or CWM Discovery of actual/ Suspected CWM	CEHNC Safety	(256) 895-1582

5.10.4. Emergency Recognition and Prevention

At the morning safety meetings, employees will be briefed on new developments, tasks, hazards, hazard recognition, and appropriate prevention procedures. These meetings will include:

- Tasks to be performed
- Specific hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals
- Transportation routes along which hazardous substances move
- Additional hazards as a direct result of site activities, and prevention and control techniques
- Emergency procedures

5.10.5. Site Topography, Layout, and Prevailing Weather Conditions

Martha’s Vineyard is relatively flat open topography surrounded by the Atlantic Ocean to the south, Vineyard sound to the east and Nantucket sound to the west. The average summer temperatures in Martha's Vineyard peak in July at around 26°C / 79°F, when the island's beaches are at their busiest. The climate is known for being quite hot and humid during the summer on Martha's Vineyard, cooled by the pleasant ocean breezes. Although most days in the summer are fairly sunny, being an island, Martha's Vineyard is prone to foggy weather, which can dramatically cool the climate.

Winters in Martha's Vineyard are warmer than the nearby mainland, as a direct result of the Gulf Stream. December, January and February are the coldest winter months, when the weather can be chilly. Martha's Vineyard is at its most quiet during the winter, although many people choose to take advantage of the reduced hotel rates at this time of the year.

The average annual rainfall / precipitation in Martha's Vineyard are 111 cm / 44 inches, and the Cape's average annual snowfall is approximately 101 cm / 40 inches.

5.10.6. Site Evacuation

The evacuation of the site will be at the direction of the SUXOS or UXOSO to a location determined by local conditions and announced by the SUXOS.

The SUXOS will determine the need to evacuate the work area based on the following criteria:

- Discovery of suspected CWM
- Discovery of suspected HTRW that pose a threat
- Change in site conditions that would require an upgrade of PPE beyond Level D
- Fire and/or explosion

5.10.7. Emergency Alerting Procedures

Emergency notification will normally be conducted via hand-held radios. The following horn system will supplement the radio notification system.

- ***One long blast on the horn (30 seconds)*** – immediately evacuate the site and proceed to the designated place of refuge.
- ***Two short blasts (5 seconds at 1-second intervals*)** -- "all clear" signal indicating that personnel can once again re-enter the site.

5.10.8. Emergency PPE and Equipment

Each UXB vehicle, will be supplied with at least one 2A: 10B:C fire extinguisher (5 pounds).

First aid kits, complying with 29 CFR 1910.151 and ANSI Z308.1, will be located at each operational site. The SUXOS will maintain one kit in his vehicle at all times. Kits will be inspected on a weekly basis and missing components immediately replaced.

The SUXOS vehicle will also carry drinking water and first aid kit.

5.10.9. Safe Distance for Evacuations

Safe distances are established after considering the amount and type of substance(s) at the site, as well as the potential impact on workers and the public. Actual safe distances can only be established at the time of an emergency, based on a combination of site-specific and incident-specific factors. Some factors that need to be considered are:

- The toxicological/radiological properties of the substance
- The physical state of the substance
- The quantity and rate of release
- The method of release
- The atmospheric conditions
- Local topography

5.10.10. Place of Refuge

In the unlikely event that an evacuation is required, personnel will immediately proceed to the designated location by the SUXOS and the Dive Supervisor. The dive tender will make way for the Edgartown Harbor where personnel accountability will occur, The SUXOS will drive from the land based area of operations, to the Edgartown Harbor to verify that the boat has arrived safely, accounting for all personnel and to assure no one has sustained injuries as a result of the accident or incident. Once all personnel are accounted for, the SUXOS will assess the situation and outline the actions to be taken.

5.10.11. Evacuation Routes

Evacuation routes will vary depending upon the location of the affected teams and the scope and severity of the emergency. Daily, the team supervisor will brief the team concerning the applicable evacuation route for that day.

5.10.12. Site Security and Control

The UXO team will report unauthorized personnel within the work area to the SUXOS. In turn, the SUXOS will request assistance from the COE in removing the unauthorized personnel from the work area. In order to access a work area, authorized visitors must participate in a site-specific safety briefing and sign the visitor log prior to entering the work area. UXO-related operations must cease prior to visitor entry to the work area.

5.10.13. Decontamination and Medical Treatment of Injured Personnel

Decontamination of injured personnel is not expected to be required for this project. UXB personnel will provide assistance and first aid immediately to any injured personnel. All injuries will be reported to the SUXOS. Any personnel who require treatment beyond first aid will be transported to the nearest medical facility as soon as possible. An outline of procedures to follow if there is an injury can be found in **Table 5-15** and the approved Dive Plan at enclosure 2 of the APP.

Table 5-15: Procedures for Treating Injured Personnel

Enforce the Buddy System: No one will enter a contaminated/hazardous area without a partner; personnel in the EZ should be in line-of-sight or in communication with the OSIC or assigned appointee.
Survey Casualties: Locate all victims and assess their condition; determine resources needed for stabilization and transport.
Assess Existing and Potential Hazards and Determine:
Whether and how to respond
The need for evacuation of site personnel and off-site population
The resources needed for evacuation and response
Contact the required off/on-site personnel or facilities: Ambulance, fire department, police

department, COR, etc.

Allocate Resources: On-site personnel/equipment to rescue and initiate incident response operations

Control: Assist in preventing the spread of the emergency, i.e., cover hole with tarp/plastic or wood, control fire, secure site, etc.

Assign PPE: The SUXOS will assign the appropriate level of PPE for rescues not involving a chemical release.

Extricate: Remove or assist victims from the area.

Decontaminate: Not applicable to this delivery order.

Stabilize:

Administer any medical procedures that are necessary before the victims can be moved

Stabilize or permanently fix the hazardous condition

Attend to what caused the emergency and anything damaged or endangered by the emergency (e.g., drums, tanks)

Transport: No one will be transported without being decontaminated; minimize chemical contamination of the transport vehicle, ambulance, and hospital personnel

Casualty Logging: Record the victim's name, time, destination, and condition upon transport

Evacuate: Relocate personnel a safe distance upwind of the incident; monitor incident for significant changes – hazards may diminish (permitting re-entry), or increase (requiring public evacuation)

Casualty Tracking: Record disposition, condition, location

5.10.14. Route Maps to the nearest Pre-Notified Medical Facility

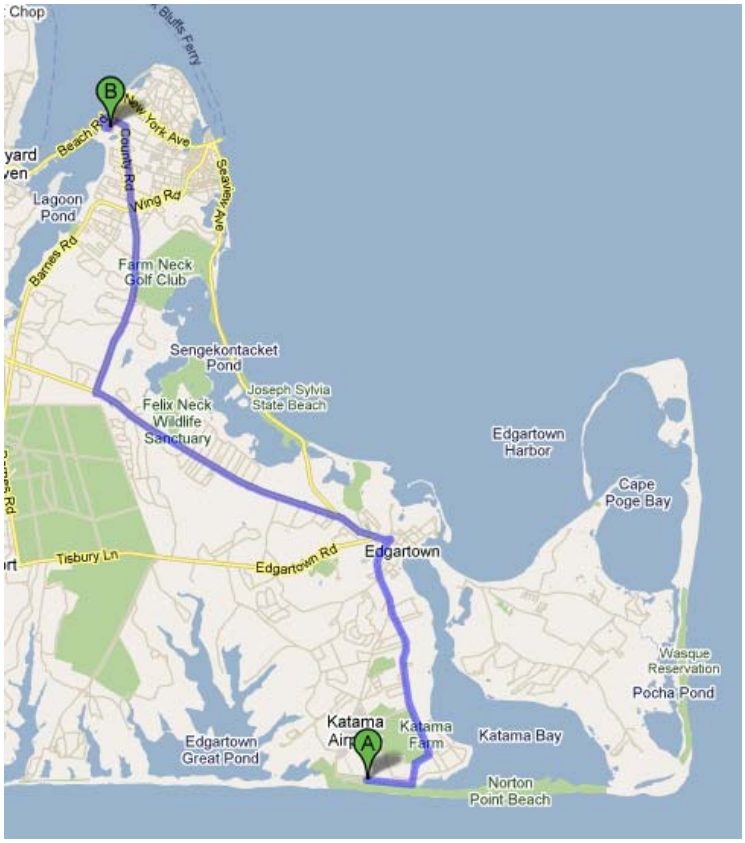
Directions to the Regional Medical Center from South Beach are located in **Table 5-16**Table 5-14**.**

Table 5-16: Directions to Regional Medical Center

South Beach	Head east on Atlantic Drive toward Katama Road
	Turn left at Katama Road
	Slight left to stay on Katama Road
	Continue onto Peases Point Way S
	Sharp left at Main Street
	Continue onto Upper Main Street
	Turn left at Edgartown Road
	Turn right at Country Road
	Turn left at Eastville Avenue
	Continue straight onto Beach Road
	Turn left at Hospital Road
	Turn left
Hospital	Turn right; hospital will be on the right

The route map to the Martha's Vineyard Hospital is as shown in **Figure 5-1.**

Figure 5-1: Map to the Hospital



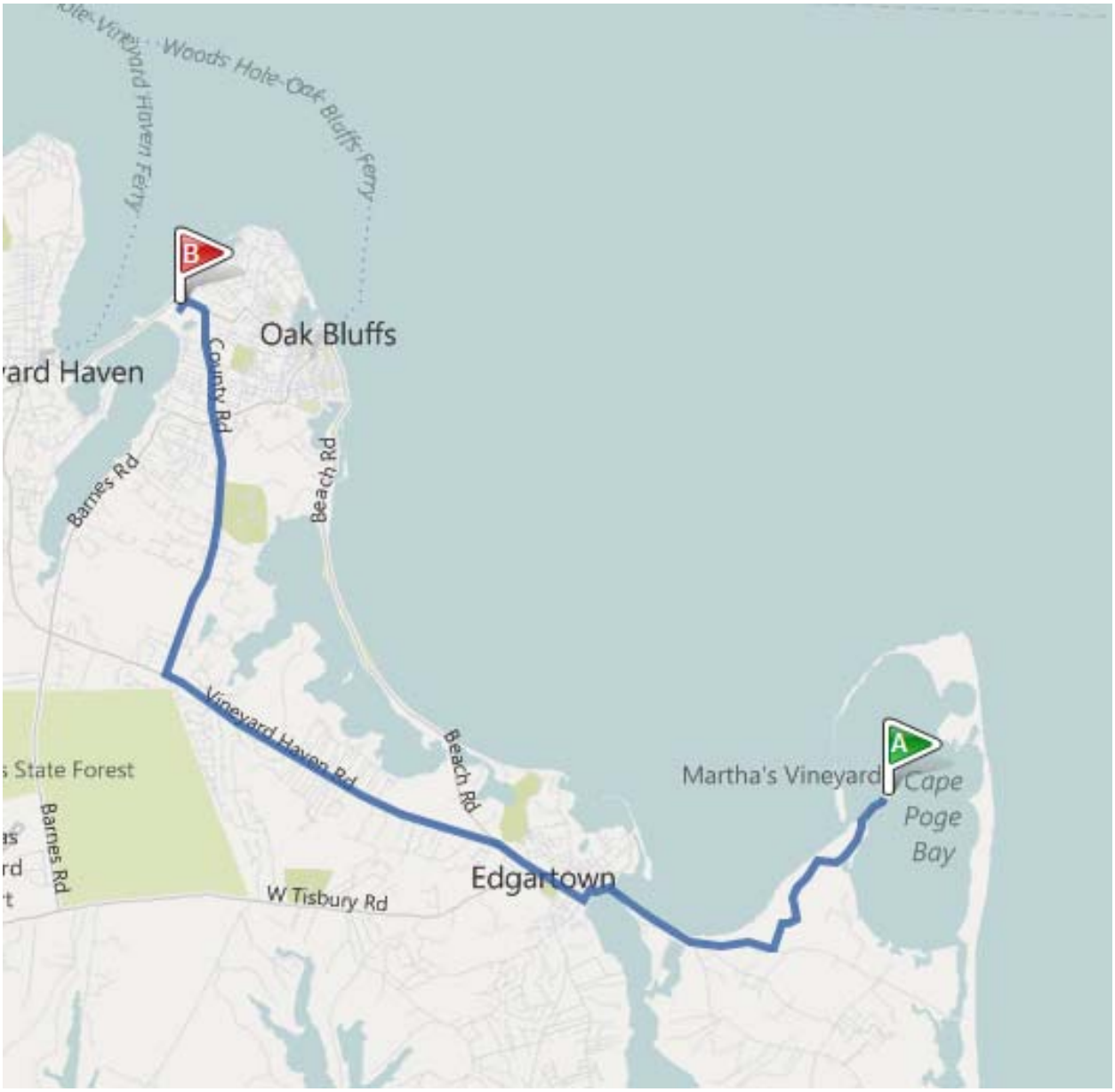
Directions to the Regional Medical Center from Cape Poge are located in **Table 5-17**

Table 5-17: Directions to Regional Medical Center from Cape Poge

Cape Poge	Depart N Neck Road
	Turn right onto Chappaquiddick Rd
	Take Edgartown-Chappaquiddick Ferry
	Take Dagget St
	Turn left onto Dock St
	Road name changes to Main St
	Turn left onto S Water St
	Turn right onto Cook St
	Keep straight onto Upper Main St
	Road name changes to Edgartown Vineyard Haven Rd
	Turn right onto Country Rd
	Turn left onto Eastman Ave
Hospital	Turn left; hospital will be on the right

The route map to the Martha's Vineyard Hospital is as shown in **Figure 5-2.**

Figure 5-2: Route Map from Cape Poge to the Martha's Vineyard Hospital



Directions to the Regional Medical Center from Tisbury Great Pond are located in **Table 5-18**

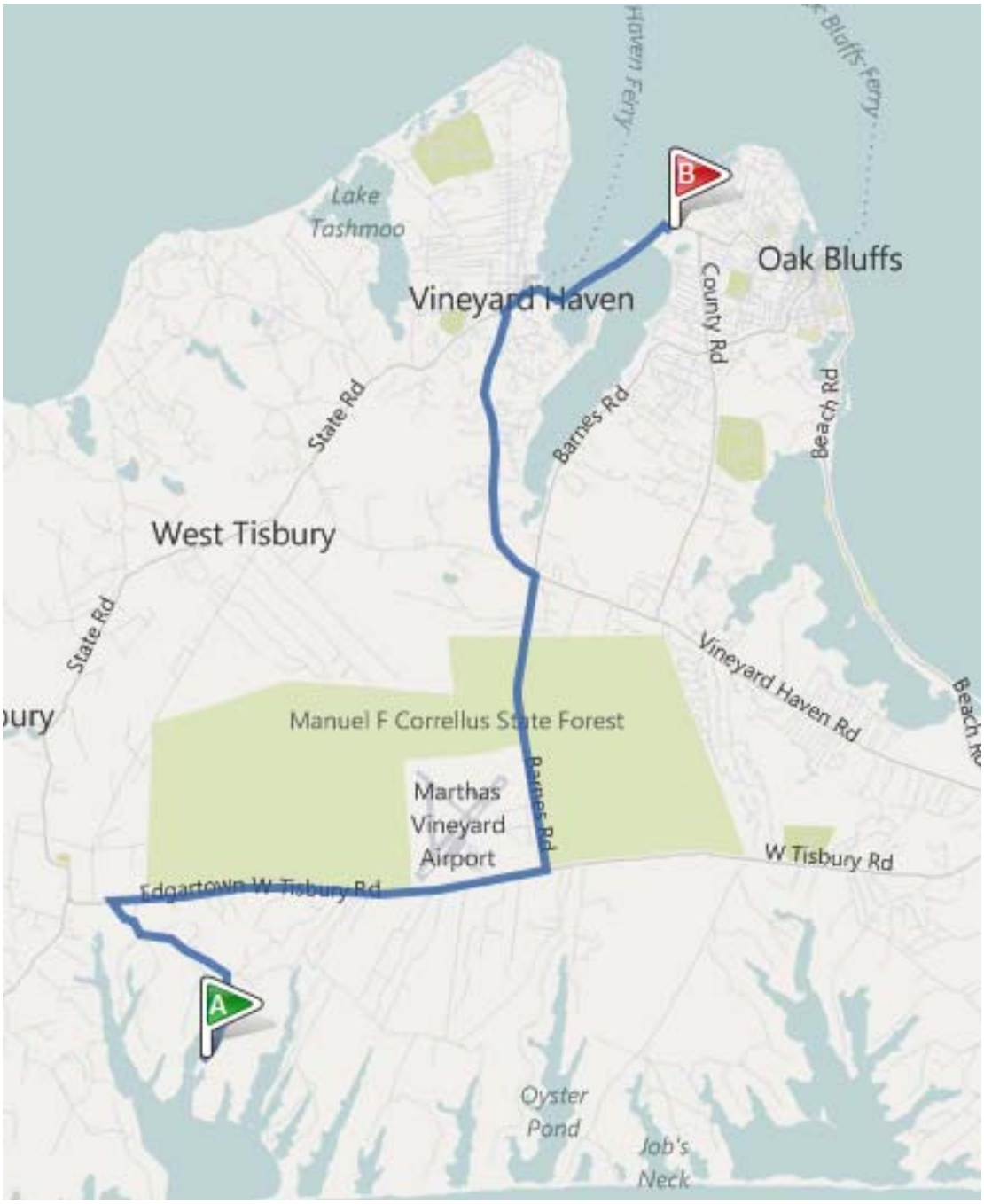
Table 5-18: Directions to Regional Medical Center from Tisbury Great Pond

Tisbury Great Pond	Depart Clam Point Rd toward Tiah's Cove Rd
	Turn left onto Tiah's Cove Rd
	Turn right onto Great Neck Rd
	Road name changes to New Ln
	Turn right onto Edgartown W Tisbury Rd
	Road name changes to W Tisbury Rd
	Turn left onto Barns Rd
	Road changes to Air Rd
	Road name changes to Airport Rd

	Road name changes to Barnes Rd
	Turn left onto Country Rd
	Turn left onto Eastville Rd
Hospital	Turn left; hospital will be on the right

The route map to the Martha's Vineyard Hospital is as shown on **Figure 5-3.**

Figure 5-3: Route Map from Tisbury Great Pond to Martha's Vineyard Hospital



5.10.15. Community Alert Program

The US Army Corps of Engineers will determine the criteria for alerting the community of conditions that threaten the public, coordinate said notification, maintain a contact listing, and establish follow-up procedures. UXB will provide assistance as requested by the Corps of Engineers.

5.10.16. Documentation

Documentation related to the emergency shall be recorded in an accurate, authentic, and complete fashion. Documentation shall be recorded as soon as possible after the emergency to ensure it is recorded while the events are vivid in the minds of the personnel involved. The information will include:

- A chronological record of events
- A listing of the personnel involved, including personnel on-site, site personnel who responded, personnel in charge, and off-site groups or agencies that responded
- A listing of the actions taken to minimize the effects of or mitigate the emergency
- The results of air monitoring conducted during the emergency, and if applicable, results of environmental samples
- An assessment of the potential exposures received by site personnel and the surrounding public
- A record of the injuries or illnesses that occurred as a result of the emergency

5.10.17. Commencement of Normal Operations

Site operations can re-commence when all federal, state, and local regulatory agencies have been notified and when the site and personnel are prepared and equipped to respond to another emergency. The following activities must be conducted prior to commencing operations:

- The UXB Project Manager or a Vice President shall be notified as appropriate to the emergency:
- OSHA - any fatalities or three or more personnel are hospitalized
- Bureau of Alcohol, Tobacco, and Firearms (BATF) - if emergency involved illegal use of explosives
- The SUXOS will restock and clean all equipment and supplies utilized or damaged in the emergency
- The President of UXB will request an accident investigation to determine the cause of the emergency and what preventative measures can be implemented to ensure a similar emergency does not occur again

- UXB safety and health personnel, in conjunction with the SUXOS and UXB CIH, shall conduct an emergency response critique to assess the effectiveness of the emergency response procedures, and identify areas requiring improvement
- The SUXOS shall complete the USACE Accident Investigation Report (ENG Form 3394) and UXB's Employee Injury/Property Damage Report Form (UXB Form 10-04-2)
- The SUXOS, in conjunction with the UXB CIH, shall review and revise, as needed, the site operational and emergency response procedures, and if necessary, update the SSHP to reflect the new procedures

5.11. STANDARD OPERATING PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES

At a minimum, the following standard operating procedures (SOP), engineering controls, and work practices shall be adhered to.

5.11.1. General Safety Precautions

- Do not carry fire or spark-producing devices on-site
- Do not apply cosmetics, eat, drink, chew gum or tobacco, or smoke in work areas
- Do not have fires for heating or cooking, except in authorized areas
- Do not conduct operations without approved operating procedures and proper supervision
- Do not become careless because of familiarity with ammunition
- Do not conduct UXO operations during electrical, sand, dust, or snow storms
- Avoid contact with suspect chemical hazards
- Be aware of monitoring equipment, wind direction, nearest water source, evacuation routes, emergency communication, and notification procedures
- Keep a first aid kit and fire extinguisher readily available while in the work area
- 29 CFR 1926.100 requires personnel to wear protective helmets in areas where there is the possibility of head injury from impact, falling objects, or flying objects. During field activities on ordnance projects, hard hats need not be worn unless a head injury threat is present.
- All personnel should be aware of the potential for slips, trips, and falls; always be aware of the placement of your feet. When working off the ground on large pieces of equipment, maintain at least three points of contact with the equipment.
- A UXO Specialist (or higher level) must be present when excavation operations are being performed

- Alert team personnel of a suspected or potentially dangerous situation. If an alarm sounds, a strong nauseating odor is detected, or you see fire or smoke, all personnel are to evacuate the site and notify the Senior UXO Supervisor or UXOSO.
- UXB-generated waste will be controlled and held for disposal by UXB
- Operational activities will only be conducted during daylight hours.
- For water operations – don't rock the boat.

5.11.2. UXO Safety

- Only those UXB and VRHabilis personnel absolutely necessary to the operation and the OE On-Site Safety Specialist (if present) shall be allowed within the Minimum Safe Distance during UXO activities.
- Only personnel who have graduated from the U.S. Naval EOD School, Indian Head, Maryland, or other USACOE recognized training body, are authorized to handle UXO.
- Detection and identification of suspect explosive materials will be accomplished in accordance with CEHNC Safety Concepts and Basic Considerations for UXO Operations.

5.11.3. Geophysical Safety

- Devices used to mark contacts will not be placed directly on the point of magnetic disturbance
- Personnel will maintain a sweep line and follow the directions of the UXO Supervisor to assure proper coverage of the area
- Instrument probes will not be permitted to make contact with a suspected hazardous item, but probes will be placed as close as possible to the ground
- Probe must remain free of dirt and debris that can comprise instrument readings
- Instruments will be properly calibrated prior to use and field tested on a daily basis
- Time Domain Electromagnetic (TDEM) instruments must be kept a minimum of 0.42 meters (1.37 feet) above the ground.
- Frequency Domain Electromagnetic (FDEM) instruments must be kept a minimum of 0.3 meters (0.98 feet) above the ground.
- Electronic packages, data loggers and battery packs will not be stored on the ground in work areas.
- Electronic packages, data loggers and battery packs will be kept a minimum of 1 meter (3.28 feet) from the ground during operations for Flux Gate Gradiometers, Cesium Vapor Magnetometers, Total Field Magnetometers.

- Ground penetrating radar (GPR) will not be used for UXO activities.

5.11.4. Buddy System

The buddy system requires work crews consisting of teams of at least two, and is required during all operations. Team members will maintain visual contact with each other and be alert for signs of a medical emergency, such as:

- Changes in complexion or skin color
- Changes in coordination or demeanor
- Excessive salivation and pupillary response
- Changes in speech pattern
- Mention of headaches, dizziness, blurred vision
- Nausea, cramps
- Irritation of eyes, skin, or respiratory tract

5.11.5. Smoking Restrictions

Smoking is prohibited in the work areas. Upon mobilization, the SUXOS will designate a smoking area.

5.11.6. Material Handling

Material handling is applicable to this delivery order. Movement of palletized materials (material handling) is anticipated. Personnel driving or operating material handling equipment shall do it in accordance with manufacture safe practices.

5.11.7. Confined Space Entry

Confined Space Entry SOPs are not anticipated.

5.11.8. UXO Evacuation Safety

- Every effort shall be made to identify the presence of subsurface excavation hazards (i.e., sewer, telephone, water, fuel, electric, and pipe services).
- Keep materials or equipment that might fall or roll into an excavation at least 2 feet from the edge of excavations, unless a retaining device is provided.
- Personnel will not work on the sloped or benched excavations at levels above other personnel.
- Excavations are not expected to exceed four feet in depth. If, however, an excavation exceeds five feet in depth and employees need to enter an excavation, a recognized method to

prevent cave-ins will be implemented. Appendix B to Subpart P, OSHA Safety and Health (29 CFR 1926), which sets forth the standards to be applied, contains specifications for sloping and benching when used as methods of protecting employees from cave-ins. The requirements of this appendix apply when sloping and benching protective systems are to be performed. Tabulated data will include:

- identification of the parameters that affect the selection of a sloping or benching system
- identification of the limits of the data (to include the magnitude and configuration of slopes determined to be safe)
- explanatory information as may be necessary to aid the user in correctly selecting a protective system from the data
- identity of the registered professional engineer who approved the data
- A copy of the design will be maintained at the work site during excavation.

- Excavations greater than 4 feet may constitute a confined space. If a situation arises where confined space entry is necessary, work will be halted until confined space entry procedures can be developed and approved.

5.11.9. UXO Disposition Safety

UXO disposition operations will be conducted in compliance with the U.S. Army Engineering and Support Center's *Safety Concepts and Basic Considerations for Unexploded Explosive Ordnance (UXO) Operations* (February 16, 1996) and the Explosives Management Plan (Chapter 5).

5.11.10. Heat/Cold Stress

Heat/Cold Stress SOPs are detailed in Section 5.8

5.11.11. Illumination

All operations will be performed during daylight hours; illumination will not be necessary.

5.11.12. Potable Water

UXB will provide workers and visitors with an adequate supply of potable water approved by federal, state, or local authorities.

Disposable bottles will be provided for all sources of drinking water; no common drinking cups will be used.

A waste receptacle for empty bottles will be supplied.

Potable drinking water containers will be labeled as such and not used for any other purpose. Potable drinking water cooler containers will be cleaned and sanitized daily, containing only ice and water, and will be fitted with a tight fitting lid and tap.

5.11.13. Non-Potable Water

Non-potable water may be used for washing equipment and general housekeeping/cleaning, provided the water does not contain substances that may pose a threat to the employees' health.

There will not be any cross-connection, open or potential, between systems furnishing potable and non-potable water.

All outlets for non-potable water will be conspicuously posted "**CAUTION - Water unfit for drinking, washing, or cooking**."

5.11.14. Toilet Facilities

UXB will have on-site portable toilet facilities located near the entry point for the work areas.

5.11.15. Food Handling

UXB personnel will not perform food-handling services at this site.

5.11.16. Temporary Sleeping Quarters

UXB will provide per diem eligible employees (per Joint Travel Regulations) with temporary worker sleeping quarters at a local hotel, motel, or other suitable habitable quarters.

5.11.17. Washing Facilities

Washing facilities, including hot and cold running water, soap, necessary decontamination products, materials and individual means of drying are located in the project administrative office. UXB will have ambient temperature water for washing hands and face at the entry point.

5.11.18. Showers and Change Rooms

During this delivery order, there is no need for provision of showers or change rooms.

5.11.19. Housekeeping

Every job site must be left clean and orderly at the end of the day. UXB personnel are responsible for providing all general housekeeping of temporary office areas and work areas during the project. The floors of the temporary office area will be swept clean daily and kept as dry as practical (with consideration to weather conditions). Office trash will be removed on a daily basis and disposed in either a municipal systems or one provided by UXB.

5.11.20. Personal Hygiene

An adequate water and soap supply will be provided to allow personnel to wash hands and face prior to leaving the project site. Personnel will be reminded to wash prior to eating or drinking in the work area.

5.11.21. Safety Meetings

AM tailgate safety meetings will be performed daily. Meeting attendance is mandatory for site personnel.

5.11.22. Equipment Safety

Equipment safety will be in accordance with the most current revision of the USACE Safety and Health Requirements Manual (EM 385-1-1) and the equipment's Operators Manual.

5.11.23. Motor Vehicles and Trailers

Motor vehicle safety will be in accordance with the most current revision of the USACE Safety and Health Requirements Manual (EM 385-1-1), UXB's Corporate Safety Manual and safe driving practices.

5.11.24. Power Equipment

Section 16 (Machinery and Mechanized Equipment) of the USACE Safety and Health Requirements Manual (EM 385-1-1) shall be followed when using power tools. These guidelines include but are not limited to:

- Power tools will be procured from a manufacturer listed by a nationally recognized testing laboratory; the tools will be designed for the specific application for which they are to be used.
- Power tools will be used, inspected, and maintained in accordance with the manufacturer's specifications.
- Equipment will be inspected, tested, in good repair, and equipped with all safety devices to assure it is in safe operating condition prior to use.
- PPE (Table 5-3) will be made available and used by the operator while operating power equipment. Loose and frayed clothing, loose long hair, or dangling jewelry will not be worn while operating power tools.
- Chain saw operators will not raise the chain saw above shoulder height.

5.11.25. Hand Tools

Section 13 (Hand and Power Tools) of the USACE Safety and Health Requirements Manual (EM 385-1-1) shall be adhered to in selecting and using hand tools:

- Hand tools will be used, inspected, and maintained in accordance with the manufacturer's specifications
- Tools will be inspected, tested, in good repair, and equipped with all safety devices to assure they are in safe operating condition prior to use
- Only non-sparking tools will be used in locations where sources of ignition may cause a fire or explosion
- Protective clothing recommended for use while using the equipment will be made available and used by the operator
- Throwing tools from one person to another is not permitted

5.11.26. Brush Cutting

Vegetation in work areas may impede effectiveness of conducting visual and geophysical surveys of the suspect area. Tree removal less than 6 inches in diameter with, pruning, and brush clearance may be required to permit a thorough search or access to the location. Bush hogs, chain saws, and trimmers may be used.

Brush Cutting General Safety Precautions:

- Operators will mix fuel and fuel the equipment in safe areas and not under conditions conducive to fire -- near personnel smoking or hot engines. Operators will start the equipment at least ten feet away from refueling area.
- Fuel shall only be stored in approved, well-marked containers, located for safe access for fueling equipment, at a safe distance from all fire hazards.
- Engines will be shut down during fueling, servicing, and repairs, except where operation is required for adjustment.
- Special precautions shall be taken to prevent felling trees or limbs into power lines. If a tree does make contact with a power line, the power company shall be immediately notified and all personnel shall remain clear of the area until the power company advises that conditions are safe.
- Equipment will be inspected prior to and during operation to assure that blades are sharp, handles are secure, and guards are in place and adjusted properly.
- Operators will maintain sufficient clearance from other personnel to prevent injury or damage in case of loss of control of the equipment.

PPE for brush cutting is shown in Table 5-3. The use of chain saws and/or blade-equipped trimmers (weedwackers) will require the use of protective chaps as well as protective work boots (if a foot hazard exists).

Brush cutting procedures are located in Section 15 of the Work Plan.

5.11.27. Bloodborne Pathogens

Bloodborne Pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV). Personnel administering care must have successfully completed bloodborne pathogens training in accordance with Table 6-6 and must implement exposure control measures.

Personal Protective Equipment is the first line of defense against bloodborne pathogens. The following protective equipment will be available on-site for personnel administering first aid.

- Surgical Gloves - must be worn when hand contact with blood or other body fluids is possible or the care provider has non-intact skin areas on their hands.
- Masks/Eye Protection/Face Shields - will be worn when slashes, sprays, or droplets of blood or body fluids are likely to occur and contaminate the eyes, nose, or mouth of the care provider.
- Coveralls/Jacket - will be donned if the possibility exists for contamination of the body of the caregiver.

To insure that equipment is used effectively, employees will adhere to the following practices when using personal protective equipment:

- Any garments penetrated by blood or other suspect infectious materials are to be removed immediately, or as soon as feasible.
- All personal protective clothing/equipment shall be removed prior to leaving the site and placed in a suitable container for decontamination and/or disposal.
- Disposable gloves are to be replaced as soon as practical after contamination or if they are torn, punctured, or otherwise lose their ability to function as an "exposure barrier."
- Potential exposure to the body of the caregiver will require donning a coat or coveralls to provide protection.

5.12. LOGS, REPORTS, AND RECORD KEEPING

Table 5-19 lists the safety-related logs, reports, and records that will be maintained during on-site operations, the criteria, and the personnel responsible for maintaining the information.

Table 5-19: Safety-Related Record Keeping Requirements

Reporting Requirement	Criteria	Responsible Personnel
Site-Specific Training	Specialized Training Form (UXB Form 1.0037) Work Plan Acknowledgment Form (UXB Form 1.0040)	Senior UXO Supervisor
Employee/ Visitor	Site Visitor's Log (UXB Form 1.0012) Part of final contract file	Senior UXO Supervisor
Medical Surveillance	Certificates and Records	SUXOS Dive Supervisor
Safe Dive Practices Manual	Surface supplied air checklist Equipment certification and checklist	Dive Supervisor
Personal Exposure Monitoring	IAW applicable OSHA standards, 29 CFR 1904, 1910, and 1926	Senior UXO Supervisor
QC Reports	Daily QC Reports (UXB Form 1.0020)	SUXOS
Accidents	Accident Investigation Report (ENG Form 3394 and UXB Form 1.0034) Submit within 2 working days (IAW AR 385-40 and USACE Supplement 1	SUXOS Dive Supervisor
Morning Safety	Conducted Daily Safety Meeting Attendance Log (UXB Form 1.0023)	SUXOS Dive Supervisor (underwater ops)
Visitor Safety Briefings	Safety Meeting Attendance Log (UXB Form 1.0023)	Senior UXO Supervisor
Equipment Maintenance	Heavy Equipment Inspection Log (UXB Form 1.0046) Daily Calibration and Quality Control Log (UXB Form 1.0002) Vehicle Condition Inspection Log (UXB Form 1.0038) Daily Truck Inspection Log (UXB Form 1.0041)	Senior UXO Supervisor
Daily Activities	Official record of operational activities, will contain, as a minimum, the following information: Date and start and stop times Daily weather conditions Personnel on-site, company, and title or classification Record of Site Safety Meeting Proposed and actual work activities Equipment use (type and length of time) Injuries, incidents, or any other health and safety-related issues or situations, including as many facts concerning the accident/incident as possible Official communications, written and verbal	Senior UXO Supervisor

5.13. RECOVERED CHEMICAL WARFARE MATERIAL (RCWM) SITE SPECIFICS

Recovered Chemical Warfare Material (RCWM) site specifics are not applicable to this delivery order. Based on a review available documentation, Chemical Warfare Materials do not present a concern at this project work area.

ATTACHMENT 1
HAZARD ANALYSIS FORMS
Note: Enclosure 3A to Appendix D contains the Activity Hazard Analysis for Underwater UXO Operations

ACTIVITY: Brush Cutting **ANALYZED BY/DATE:** JJK 8-6-10

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Establish work area boundaries. 2. Establish grids.	1. Physical exertion. 2. Heat/cold stress. 3. Slip, trip, and fall. 4. unintentional detonation 5. Poisonous plants. 6. Poisonous/hazardous animals. 7. UXO/OE. 8. Hand/Power tools. 9. Puncture/Laceration.	1. Safe Work Practices. 2. Wear the correct PPE for weather conditions (i.e. mud, rain, uneven surfaces). 3. Carry small loads instead of large ones. 4. Slow down instead of being in a hurry.
EQUIPMENT TO BE USED	***INSPECTION REQUIREMENTS***	***TRAINING REQUIREMENTS***
1. Level D PPE. 2. Magnetometers 3. Leather gloves. 4. Safety glasses required if an eye hazard exists. 5. Steel or composite-toed shoes are adequate unless a toe crush hazard exists. 6. Hand held brush cutters 7. Mechanical Brush hog/Skid-Steer	1. Inspect for safety of operations. 2. test magnetometer equipment prior to use 3. Ensure all guards are present on power tools.	1. Tailgate safety briefing. 2. Site hazards per SSHP. 3. UXO trained personnel will be onsite.

ACTIVITY: DGM **ANALYZED BY/DATE:** JJK 8-6-10

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Use Digital Analog equipment to locate UXO 2. Set up IVS 3. Conduct equipment checkout	1. Physical exertion. 2. Heat/cold stress. 3. Slips/trips/falls 4. Snake bites 5. Eye hazards 6. Dehydration	1. Safe Work Practices. 2. Wear the correct PPE 3. Hydrate
EQUIPMENT TO BE USED	***INSPECTION REQUIREMENTS***	***TRAINING REQUIREMENTS***
1. EM61 Mk2 2. Analog magnetometers	1. Inspect for safety of operations. 2. Ensure all equipment is serviceable	1. Tailgate safety briefing. 2. Site hazards per SSHP.

ACTIVITY: Reacquisition **ANALYZED BY/DATE:** JJK 8-6-10

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Reacquire the anomaly	1. Physical exertion. 2. Heat/cold stress. 3. Slips/trips/falls 4. Snake bits 5. Eye hazard 6. Dehydration	1. Safe Work Practices. 2. Wear the correct PPE 3. Mark anomalies found 4. Hydrate
EQUIPMENT TO BE USED	***INSPECTION REQUIREMENTS***	***TRAINING REQUIREMENTS***
1. Trimble RTK 2. Pin Flags 3. Dig sheets	1. Inspect for safety of operations. 2. Ensure all equipment is serviceable	4. Tailgate safety briefing. 5. Site hazards per SSHP. 6. Only UXO trained personnel.

ACTIVITY: Intrusive Investigation **ANALYZED BY/DATE:** JJK 8-6-10

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Identify anomaly as MEC/MD Cultural debris 2. During excavation inspect all metal being uncovered 3. Hand excavate hand tools (preferred) 4. Identify type and condition of MEC 5. Mark/flag MEC for disposal 6. Mechanical excavation if anomaly is deeper than three feet	1. Physical exertion. 1. Heat/cold stress. 2. Unintentional detonation 3. MEC 4. Puncture/Laceration.	1. Safe Work Practices. 1. Wear the correct PPE 2. Set up site control zones if MEC is found 3. Visual clearance 4. Mark/flag MEC found
EQUIPMENT TO BE USED	***INSPECTION REQUIREMENTS***	***TRAINING REQUIREMENTS***
1 EM 61 Mk 2 2. Magnetometers 3. Hand tools. 4. Mechanical excavation	7. Inspect for safety of operations. 8. Ensure all equipment is serviceable 9. Ensure all guards are present on power tools. 10. Establish safety arc for backhoe	11. Tailgate safety briefing. 12. Site hazards per SSHP. 13. UXO trained personnel will be onsite.

ACTIVITY: UXO Disposal Operations **ANALYZED BY/DATE:** JJK 5-30-10

PRINCIPLE STEPS	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Identify explosive required 2. Deliver to site 3. Determine Fragmentation distance for intentional detonation 3. Review Demolition SOP 4. Inspect demo equipment for serviceability 5. Prepare UXO for demolition	1. Physical exertion. 2. Heat/cold stress. 3. Slip, trip, and fall. 4. Unintentional detonation 5. Puncture/Laceration. 10. Fire	1. Safe Work Practices. 2. Wear the correct PPE 3. Set up site to control access 4. Check for fires 5. Inspect site after disposal
EQUIPMENT TO BE USED	***INSPECTION REQUIREMENTS***	***TRAINING REQUIREMENTS***
1. Level D PPE. 2. Demolition equipment 3. Portable magazine 4. Cap container 5. Leather gloves. 6. Safety glasses required if an eye hazard exists. 7. Steel or composite-toed shoes are adequate unless a toe crush hazard exists. 8. Shovels 9. Fire extinguishers/ flappers	1. Inspect for safety of operations. 2. Ensure all equipment is serviceable 3. Ensure all explosives are accounted for. 4. Inspect site after detonation	1. Tailgate safety briefing. 2. Site hazards per SSHP. 3. UXO trained personnel will be onsite.

Enclosure

CHAS. LUNSFORD SONS & ASSOCIATES

Insurance Services Since 1870.

January 26, 2010

Cathy Etheredge
U X B International Inc.
2020 Kraft Drive, Ste. 2100
Blacksburg, VA 24060

RE: Workers Compensation Experience Modifications History

Dear Cathy:

Per your request here are the experience modifications for the last five years:

3/20/10	.89 *
3/20/09	.92 *
3/20/08	.83
3/20/07	1.00
3/20/06	.98

** Modified for the policy year 2009 and 2010 to reflect anticipated adjustments from NCCI for a subrogated claim currently reported on UXB's rating sheets.

If you have any questions or concerns please feel free to give me a call.

Sincerely,

Wally

Wallace J. Nelson, Jr.
Executive Vice President

907 South Main Street / P.O. Box 1005 / Blacksburg, VA 24063
540-552-0268 / 800 533-1008 / FAX 540 552-3948

OSHA's Form 300A (Rev. 01/2004)

Summary of Work-Related Injuries and Illnesses

Year 2009

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days away from work	Total number of days of job transfer or restriction
0	0
(K)	(L)

Injury and Illness Types

Total number of…
(M)

(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) Hearing Loss	0
(3) Respiratory Condition	0	(6) All Other Illnesses	0

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 58 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave, NW, Washington, DC 20210. Do not send the completed forms to this office.

Establishment information

Your establishment name UXB International, Inc. (Corporate)

Street 2020 Kraft Drive, Suite 2100

City Blacksburg State Virginia Zip 24060

Industry description (e.g., Manufacture of motor truck trailers)
Facilities Support Management Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
8 7 4 4

OR North American Industrial Classification (NAICS), if known (e.g., 336212)

Employment information

Annual average number of employees 85

Total hours worked by all employees last year 97150.04

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Company executive — Title: President

Phone: 540.443.3706 — Date: 2/1/2010

OSHA's Form 300A
Summary of Work-Related Injuries and Illnesses

Year 2008

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
0	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days of job transfer or restriction	Total number of days away from work
0	0
(K)	(L)

Injury and Illness Types

Total number of...
(M)

(1) Injury	0	(4) Poisoning	0
(2) Skin Disorder	0	(5) All other illnesses	0
(3) Respiratory Condition	0		

Establishment information

Your establishment name UXB International, Inc. - Corporate

Street 2020 Kraft Drive, Suite 2100

City Blacksburg State VA Zip 24060

Industry description (e.g., Manufacture of motor truck trailers)
Facilities Support Management Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
8 7 4 4

Employment information

Annual average number of employees 77

Total hours worked by all employees last year 96514

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Company executive — Title: Pres

Phone: 540-443-3700 — Date: 4/15/09

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

Public reporting burden for this collection of information is estimated to average 50 minutes per response, including time to review the instruction, search and gather the data needed, and complete and review the collection of information. Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number. If you have any comments about these estimates or any aspects of this data collection, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Ave. NW, Washington, DC 20210. Do not send the completed forms to this office.

OSHA's Form 300A
Summary of Work-Related Injuries and Illnesses

Year 2007

U.S. Department of Labor
Occupational Safety and Health Administration
Form approved OMB no. 1218-0176

All establishments covered by Part 1904 must complete this Summary page, even if no injuries or illnesses occurred during the year. Remember to review the Log to verify that the entries are complete

Using the Log, count the individual entries you made for each category. Then write the totals below, making sure you've added the entries from every page of the log. If you had no cases write "0."

Employees former employees, and their representatives have the right to review the OSHA Form 300 in its entirety. They also have limited access to the OSHA Form 301 or its equivalent. See 29 CFR 1904.35, in OSHA's Recordkeeping rule, for further details on the access provisions for these forms.

Number of Cases

Total number of deaths	Total number of cases with days away from work	Total number of cases with job transfer or restriction	Total number of other recordable cases
1	0	0	0
(G)	(H)	(I)	(J)

Number of Days

Total number of days of job transfer or restriction	Total number of days away from work
0	0
(K)	(L)

Injury and Illness Types

Total number of…

(M)			
(1) Injury	3	(4) Poisoning	0
(2) Skin Disorder	0	(5) All other illnesses	0
(3) Respiratory Condition	0		

Establishment information

Your establishment name UXB International, Inc.

Street 2020 Kraft Drive, Suite 2100

City Blacksburg State VA Zip 24060

Industry description (e.g., Manufacture of motor truck trailers)
Facilities Support Management Services

Standard Industrial Classification (SIC), if known (e.g., SIC 3715)
8 7 4 4

Employment information

Annual average number of employees 77

Total hours worked by all employees last year 104037

Sign here

Knowingly falsifying this document may result in a fine.

I certify that I have examined this document and that to the best of my knowledge the entries are true, accurate, and complete.

Company executive: [signature] Title: Sr. VP

Phone: 540-443-3700 Date: 2/12/2008

Post this Summary page from February 1 to April 30 of the year following the year covered by the form

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UXB Corporate Policy Statement

General

UXB International, Inc. (UXB) has developed this Corporate Safety and Health Plan (CHSP) to provide general guidance to:

- Qualified individuals performing Military Munitions Response Program (MMRP), Munitions and Explosive of Concern Operations (MEC) and Munitions and Constituents Operations (MCO)
- Qualified individuals performing Hazardous Toxic and Radiological Waste (HTRW) operations
- Approved visitors to a site potentially containing MEC, MCO, or HTRW. Elements within this program form the basis of compliance for all UXB personnel, subcontractors, and visitors desiring to observe or participate in a field activity on a site potentially contaminated with MEC, MCO, or HTRW.

Corporate Commitment

UXB has a total commitment to safety with a goal of having a workplace free of unsafe work conditions and unsafe acts. UXB is committed to complying with Federal, State, and local laws, regulations, statutes, directives, and ordinances, which relate to worker safety and health, and protection of the environment. UXB is dedicated to the health and safety of its employees and all persons accessing UXB work places. This CHSP is written to meet this commitment and comply with the requirement of 29 CFR 1910.120(b) and 29 CFR 1926.65 (b).

3 Corporate Policy

UXB shall have an established Safety and Health Program with accident prevention, notification, and investigation serving as a cornerstone of the program. The safety program shall focus on accident prevention on the anticipation and avoidance of accidents while promoting a safe working location for employees, public, and environment. The UXB Safety Program is designed to conform to federal regulations, and comply with Virginia state law. The safety program contains policy that establishes UXB's commitment to a safe work environment, communicating an organizational structure with roles and responsibilities for both management and employees.

The policy, purpose, and goal of UXB's Safety and Health Program are the elimination and or reduction of accidents that endanger worker, public, and environment thus, UXB ensures that all federal, state, local, and contract Safety and Health Program requirements flow down to all subcontractors. UXB policy requires the development and implementation of a written safety and health program for industrial, construction, hazardous, or hazardous waste operations. No job is so urgent or so important that we will knowingly risk injury or illness to accomplish the job. Every UXB employee shall adopt this philosophy.

CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Diving Operations **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
1. Select Site for Dive Station. 2. Select Location for Entering and Leaving Water 3. Ensure water is free of potential snags or obstructions 4. Ensure Standby Diver has free access to the water in the event he is deployed 5. Connect air supply	**Step 1:** 1. Danger to personnel and equipment due to other work being conducted in area **Steps 1 & 2:** 1. Restricted access for support personnel 2. Inability to recover diver 3. Slow standby diver deployment **Step 3:** 1. Diver impalement 2. Inability to communicate with diver 3. Damage to umbilical resulting in failure of air supply and/or communications **Step 4:** 1. Slow emergency response and rescue **Step 5:** 1. Insufficient life support air for diver and standby	**All steps:** 1. Ensure all personnel are trained and qualified IAW EM385-1-1 2. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan **Steps 1 & 2:** 1. Ensure that the Dive site is established in a location free from traffic or material handling equipment other than may be used as part of the diving operation 2. Place umbilicals in non-traffic areas and inspect laydown area to prevent umbilical damage **Step 3:** 1. Ensure diver slowly enters the water by (i.e. climbing down the ladder instead of jumping) and verifies the entry point is free of hazard **Step 4:** 1. If the diver entry point is distant from the divers control station, position the standby diver next to the water entry 2. Ensure the standby diver umbilical is staged for use **Step 5:** 1. Verify adequate primary and secondary air sources are connected and ready for use 2. Ensure air intake (if used) is free from contamination from outside sources
Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Control Box with Two Diver Radio Divers Helmet	Daily safety inspections. Divers Helmet	HAZCOM, 40Hr. HAZWOPER,

5 part Umbilicals	Divers Air control Box with Two Diver Radio	Site-specific Indoctrination Training Diver Training Dive Supervisor Training

Certification Of Activity Hazard Analysis			
The signature below certifies that the above mentioned persons have assessed and reviewed this task to ascertain the potential hazards associated with its conduct, and to determine the control techniques and PPE which will be required to safeguard site personnel from the identified hazards.			
Signature of Analyst:	Date:	Signature of Reviewer:	Date:

CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Diving Operations – Ordnance and Recovery **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
6. Observe weather conditions 7. Inspect dive station 8. Begin dive 9. Conduct instrument assisted Jackstay search to locate submerged ferrous metal objects 10. Report any item suspected to be ordnance related and identify with assistance from topside personnel 11. Investigate instrument responses indicating possible buried ordnance 12. Recover items located	**Step 1:** 2. Wind and Wave Action endangers all on-site personnel due to possible knock down, slips, trips and/or falls. 3. Diver injury due to unstable footing 4. Tender injury due to unstable footing 5. Diver injury due to loss of depth control 6. Ineffective bottom search due to loss of diver bottom position 7. Inability to adequately control the dive due to weather conditions interfering with the safe operation of equipment 8. Danger to personnel and equipment due to other work being conducted in area **Steps 1 & 2:** 1. Injury to personnel due to inadequate site control 2. Injury to personnel due to improper equipment operation. **Step 3:** 4. Diver injury due to inability to maintain depth control 5. Diver injury due to unstable footing 6. Tender injury due to unstable footing **Step 4:** 1. Diver injury due to inability to maintain depth control 2. Inadequate search due to diver deviation from Jackstay line. **Step 5:**	**All steps:** 3. Ensure all personnel are trained and qualified IAW EM385-1-1 4. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan 5. Ensure all divers are graduates of an approved Diving Curriculum and are fully qualified UXO Technicians **Steps 1 & 2:** 3. Dive supervisor carefully assess weather conditions to include wind speed, wave height, current, etc. **ABORT dive operations if weather conditions interfere with diving safely**. 4. Ensure that the dive station is established in a location free from traffic other than may be used as part of the diving operation 5. Ensure that the dive station is established in a location where no other operation will interfere with the safe conduct of dive station control or actions in the water. 6. Inspect umbilical lay down area for any items which may damage umbilicals (i.e. sharp rocks, debris, etc.) 7. Ensure visual barriers are in place to protect umbilicals and air whips. 8. Ensure standby diver is fully dressed, connected to his umbilical and prepared to respond at the direction of the diving supervisor. 9. Notify all on-site personnel dive operations are commencing.

	2. Diver injury due to inadvertent disturbance of an ordnance item not acceptable to move. 3. Diver injury due to improper identification of ordnance condition (Acceptable to move/not acceptable to move) **Step 6:** 1. Diver Injury due to improper air lift operation 2. Diver injury due to inadvertent disturbance of an ordnance item not acceptable to move. 3. Diver injury due to improper identification of ordnance condition (Acceptable to move/not acceptable to move) **Step7:** 1. Diver injury/Equipment damage due to collision with small boat or propeller strike 2. Umbilical failure due to propeller strike	**Step 3:** 2. **ABORT dive operations if weather conditions interfere with diving safely**. 3. Tender escort the diver into the water while keeping a firm grasp on his harness to prevent the diver from falling due to unstable footing or visibility limited by the dive helmet. 4. Ensure diver slowly enters the water being tightly tended in the event of falling. 5. Dive supervisor assess if the standby needs to be positioned closer to the waters edge in the event of an emergency. 6. If the diver entry point is distant from the divers control station, position the standby diver next to the water entry 7. Ensure the standby diver umbilical is staged for use **Step 4:** 1. **ABORT dive operations if weather conditions interfere with diving safely**. 2. Diver search visually and with magnetometer 5ft wide corridor centered on the Jackstay line. 3. Diver maintain contact either visually or physically to ensure 100% coverage of the search corridor. **Step 5:** 3. STOP search and request identification assistance from topside when an item suspected of being ordnance related is encountered. 4. DO NOT disturb any item until it has been positively identified. 5. Dive supervisor and at least one UXO Technician III and/or contractor and government OE Safety Specialist view video feed and direct diver to collect data needed for positive identification and status of condition (acceptable to move/not acceptable to move). 6. DO NOT move items unless all parties agree it is

		acceptable to move. 7. Mark item with float if not acceptable to move. 8. Recover item if acceptable to move. 9. Any item located which is not acceptable to move maybe removed at the discretion of the diver and/or diving supervisor. **Step 6:** 1.In the event of an instrument response with no visual indication of an item being present on the bottom and air lift will be used to remove the overburden and expose the item. 2.Use the air lift to partially expose the item and then secure the air lift and continue exposing the item by hand digging Remove the material adjacent to the item while not disturbing the item. 3.DO NOT disturb any item until it has been positively identified. 4.Dive supervisor and at least one UXO Technician III and/or contractor and government OE Safety Specialist view video feed (real time) and direct diver to collect data needed for positive identification and status of condition (acceptable to move/not acceptable to move). 5.DO NOT move items unless all parties agree it is acceptable to move. 6.Mark item with float if not acceptable to move. 7.Recover item if acceptable to move. 8.Any item located which is not acceptable to move maybe removed at the discretion of the diver and/or diving supervisor. **Step 7:** Notes: 1. Small items may be placed in the divers tool bag 2. Items to large for the tool bag will be recovered by topside support personnel 3. Diver may swim the item to the surface for recovery

		by boat or walk the item to shallow water and pass to support personnel. 4. The diver will attach a pull line for all items too large to be handled by the diver. Recommended Controls: 1. Wait until the diver is on the surface before approach 2. Do no operate outboard motor with 10 feet of the diver or umbilical 3. Approach the diver from down current and down wind 4. Stop engine when closer than 5 feet to diver 5. Diver pass item to personnel in small boat 6. Do not attempt to pull items until diver is clear. 7. Ensure umbilical is clear of pull line and direction of pull prior to pulling
Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Control Box with Two Diver Radio Divers Helmet 5 part Umbilicals	Daily safety inspections. Divers Helmet Divers Air control Box with Two Diver Radio Magnetometer Function test Video system function test	HAZCOM, 40Hr. HAZWOPER, Site-specific Indoctrination Training Diver Training Dive Supervisor Training Explosive Ordnance Disposal Air Lift Operations AHA

Certification Of Activity Hazard Analysis			
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Signature of Analyst:	Date: 04/01/10	Signature of Reviewer:	Date: 04/01/10

CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Diving Station Setup - Beach **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
13. Observe weather conditions 14. Select location for diver water entry/recovery 15. Select location for dive station 16. Deploy Diver's Support Equipment a. Compressor (if used) b. Umbilicals c. Generator (if used) d. Hot Water Heater (if used) e. High Pressure Air Source f. Diver's Air Control Box 17. Place Divers Air Control Box In Service	**Step 1:** 9. Wind and Wave Action endangers all on-site personnel due to possible knock down, slips, trips and/or falls. 10. Diver injury due to unstable footing 11. Tender injury due to unstable footing 12. Diver injury due to loss of depth control 13. Ineffective bottom search due to loss of diver bottom position 14. Inability to adequately control the dive due to weather conditions interfering with the safe operation of equipment. **Steps 2:** 1. Personnel injury due to slips, trips and/or falls. 2. Diver injury due to unstable footing 3. Tender injury due to unstable footing **Step 3:** 1. Personnel/Equipment damage due to excessive surf and/or tidal action. **Step 4:** 1. Personnel injury due to improper lifting technique. 2. Personnel Injury due to lifting heavy equipment with unstable footing (sand) 3. Personnel injury/equipment damage due to improperly secured equipment.	**All steps:** 6. Ensure all personnel are trained and qualified IAW EM385-1-1 7. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan **Step 1** 1. Dive supervisor carefully assess weather conditions to include wind speed, wave height, current, etc. **ABORT dive station setup if weather conditions will interfere with diving safely**. **Step 2:** 1. Do not test bottom if high surf is present. **ABORT dive station setup if weather conditions will interfere with diving safely or station setup**. 2. Ensure support personnel testing bottom are properly dressed for operations in the surf. (i.e. PFD, waders with safety belt or dry suit, walking stick to assist if footing proves to be unstable) 3. Do not allow personnel to test bottom conditions alone. A designated rescue person must be standing by at all times while the bottom is tested as an adequate walking surface. 4. Rescue person does not enter the surf with out being tended by another individual outside the surf danger area. **Step 3:** 1. Dive supervisor carefully assess weather conditions to include wind speed, wave height, current, etc. **ABORT dive station setup if weather conditions will interfere with diving safely**.

	4. Equipment damage due to vehicles **Step 5:** 1. Diver injury due to insufficient air supply 2. Loss of diver communications 3. Improper depth measurement	2. Ensure Dive Station is established in a location far enough inland so as not to be affected by rising tides and/or increasing surf. **Step 4:** 1. Ensure all personnel are using safe lifting techniques. 2. Use two or more personnel to lift any equipment >50lbs. 3. Utilize lifting equipment if necessary to move large pieces of dive support equipment (compressor, generator, air cylinders, etc.) 4. Place planking/sheeting on ground to stabilize walking surfaces if footing proves to be unmanageable. 5. Utilize planking/sheeting if necessary to move heavy support equipment with installed wheels. 6. Place visual barriers to protect umbilicals and hose whips from personnel and vehicle traffic 7. Mount compressor air intake mast upwind from any source of engine exhaust. 8. Ensure generator is grounded and GFCI is functioning **Step 5:** 10. Check all air fittings are tightened with an appropriately sized wrench. 11. Verify emergency air supply cylinders contain a minimum of 1500 psig. 12. Ensure air intake mast (if used) is free from contamination and mounted upwind from vehicle/compressor/generator exhaust. 13. Verify primary and secondary air sources are connected to the Diver's Air Control Box. 14. Connect Diver's Helmets to umbilicals 15. Charge umbilicals 16. Leak check all fittings 17. Function Test Diver's Helmets 18. Function Test Pneumofathometers 19. Shift to emergency air supply and repeat 8 & 9.

Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Control Box with Two Diver Radio Divers Helmet 5 part Umbilicals	Daily safety inspections. Compressor oil levels Generator GFCI Emergency air supply cylinder pressure Divers Helmet Divers Air control Box with Two Diver Radio Pneumofathometers	HAZCOM, 40Hr. HAZWOPER, Site-specific Indoctrination Training Safe lifting techniques Diver Training Dive Supervisor Training

Certification Of Activity Hazard Analysis

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CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Diving Station Setup - Boat **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
18. Observe weather conditions 19. Load Diver's Support Equipment a. Compressor (if used) b. Umbilicals c. Generator (if used) d. Hot Water Heater (if used) e. High Pressure Air Source f. Diver's Air Control Box 20. Transit to dive location 21. Mount diver water entry/ recovery ladder 22. Place Divers Air Control Box In Service	**Step 1:** 15. Wind and Wave Action endangers all on-site personnel due to possible knock down, slips, trips and/or falls. 16. Diver injury due to unstable footing 17. Tender injury due to unstable footing 18. Diver injury due to loss of depth control 19. Ineffective bottom search due to loss of diver bottom position 20. Inability to adequately control the dive due to weather conditions interfering with the safe operation of equipment. **Steps 2:** 4. Personnel injury due to improper lifting technique. 5. Personnel Injury due to lifting heavy equipment with unstable footing (wave action) 6. Personnel injury/equipment damage due to improperly secured equipment. **Step 3:** 1. Loss of personnel overboard 2. Drowning due to falling overboard **Step 4:** 1. Diver injury due to improperly mounted ladder 2. Difficulty in recovering diver in an emergency	**All steps:** 8. Ensure all personnel are trained and qualified IAW EM385-1-1 9. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan **Step 1** 2. Dive supervisor carefully assess weather conditions to include wind speed, wave height, current, etc. ABORT dive station setup if weather conditions will interfere with diving safely. **Step 2:** 1. All diving equipment will be loaded while pierside. 2. Ensure all personnel utilize safe lifting techniques. 3. Use two or more people when lifting weights>50lbs. 4. Use lifting equipment where possible. 5. Secure all equipment with ratcheting tie down straps or equivalent. 6. Mount compressor air intake mast (if diving compressor is used) above pilot house and upwind from compressor/generator or boat exhaust. 7. Ensure Divers air control box is securely mounted 8. Ensure emergency/primary air cylinders are secured **Step 3:** 1. Ensure all lifelines and rails which may have been removed during equipment load-out are replaced and secure. 2. Ensure all personnel are wearing USCG approved Personal Flotation Devices prior to departure and at all times while embarked. 3. All personnel maintain constant vigilance and be

	Step 5: 4. Diver injury due to insufficient air supply 5. Loss of diver communications 6. Improper depth measurement	aware of footing and handholds 4. Ensure an accurate personnel manifest is maintained. **Step 4:** 1. Secure ladder using braces/ratcheting tie downs (or equivalent) 2. Diver Test ladder security prior to first dive. 3. Ensure diver is fully dressed with all dive equipment in service. **Step 5:** 20. Check all air fittings are tightened with an appropriately sized wrench. 21. Verify emergency air supply cylinders contain a minimum of 1500 psig. 22. Ensure air intake mast (if used) is free from contamination and mounted upwind from vehicle/compressor/generator exhaust. 23. Verify primary and secondary air sources are connected to the Diver's Air Control Box. 24. Connect Diver's Helmets to umbilicals 25. Charge umbilicals 26. Leak check all fittings 27. Function Test Diver's Helmets 28. Function Test Pneumofathometers 29. Shift to emergency air supply and repeat 8 & 9.
Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Control Box with Two Diver Radio Divers Helmet 5 part Umbilicals	Daily safety inspections. Compressor oil levels Generator GFCI Emergency air supply cylinder pressure Divers Helmet Divers Air control Box with Two Diver Radio Pneumofathometers	HAZCOM, 40Hr. HAZWOPER, Site-specific Indoctrination Training Safe lifting techniques Diver Training Dive Supervisor Training
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Signature of Analyst:	Date: 4/01/10	Signature of Reviewer:	Date: 4/01/10

CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Air Lift Operations **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
23. Connect Air lift to tool air compressor 24. Deliver air lift to diver location 25. Turn on air at compressor 26. Use air lift to perform underwater excavations	**Step 1:** 21. Personnel injury due to hose rupture, coupling failure and/or improper connection **Step 2:** 7. Diver injury/Equipment damage due to collision with small boat or propeller strike 8. Umbilical failure due to propeller strike **Step 3:** 1. Loss of buoyancy control due to improper valve position on air lift 2. Loss of air lift control due to unexpected activation **Step 4:** 2. Diver loss of depth control due to clogging of air lift	**All steps:** 10. Ensure all personnel are trained and qualified IAW EM385-1-1 11. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan **Steps 1:** 10. Inspect all tool hoses for damage prior to use. 11. Tag all unsuitable hoses "Out of Service" and remove from the work area immediately 12. Ensure all hose connections are secured with cotter pins and whip-checks **Step 2:** 8. Wait until the diver is on the surface before approach 9. Do no operate outboard motor with 10 feet of the diver or umbilical 10. Approach the diver from down current and down wind 11. Stop engine when closer than 5 feet to diver 12. Diver swim to boat to retrieve air lift **Step 3:** 1. Do not attach the air lift to the diver 2. Diver return to bottom with air lift and positions himself for operation ensuring that all equipment is clear of the airlift suction and discharge 3. Diver verifies air lift air control valve is in the OFF position. 4. When the diver requests air for the air lift, start tool compressor and slowly open air valve. 5. Report to diver, air line is charged. 6. Diver test air lift and reports to topside positive

		function test. 7. Topside personnel remain prepared to secure air lift air at the compressor in the event of an emergency **Step 4:** 3. Diver keeps his hand on the air control valve at all times when in operation 4. Diver secure air supply valve if he notes excessive thrust from the air lift 5. Top side secure the air lift air supply at the compressor if the diver reports he has lost control 6. Report all ordnance finds while excavating with the air lift.
Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Control Box with Two Diver Radio Divers Helmet 5 part Umbilicals	Daily safety inspections. Divers Helmet Divers Air control Box with Two Diver Radio	HAZCOM, 40Hr. HAZWOPER, Site-specific Indoctrination Training Diver Training Dive Supervisor Training

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CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Breathing Air Compressor Operations **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
27. Check Engine Fuel Level 28. Check engine and compressor lubricating oil level 29. Connect Air Intake to Compressor 30. Connect Air Compressor to Air Receiver 31. Connect Air Receiver to Air Control Box 32. Connect Divers Umbilical to Air Control Box 33. Connect helmet to umbilical 34. Start compressor 35. Check operating pressures 36. Test diver air supply	**Step 1:** 22. Compressor stoppage due to low fuel 23. Diver injury due to insufficient air supply **Step 2:** 1. Engine and/or compressor damage 2. Compressor stoppage due to bearing failure 3. Diver injury due to insufficient air supply **Step 3:** 9. Diver Injury due to CO or other toxic fume poisoning **Step 4, 5, 6 & 7:** 1. Diver injury due to insufficient air supply as a result of improper valve alignment **Step 8:** 1. Personnel/Equipment damage due to malfunction of air system safeties **Step 9 & 10:** 1. Diver injury due to insufficient air supply as a result of improper valve alignment 10. Diver Injury due to CO or other toxic fume poisoning	**All steps:** 12. Ensure all personnel are trained and qualified IAW EM385-1-1 13. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan 14. Operate engine and compressor IAW manufacturers guidelines **Step 1:** 13. Fill engine fuel tank while stopped 14. Ensure engine fuel tank is filled at beginning of dive day and shift change **Step 2:** 13. Check engine and compressor oil at each refueling 14. Inspect dipstick for oil color change or excessive wear products (i.e. metal particles) 15. Add oil as necessary **Step 4,5 6, & 7:** 7. Do not utilize Breathing air compressor without volume tank 8. Tighten all air fittings with a wrench 9. Diving supervisor verify valve alignment **Step 8:** 1. Observe compressor for proper functioning 2. Function Test relief valves 3. Drain air receiver and filters **Step 9 & 10:** 1. Verify breathing system in divers hat is performing within manufacturers recommended limits 2. Breathe air on surface for a minimum of 5 minutes prior to commencing dive

		3. Diver report any unusual odor or feelings
Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Compressor Air Receiver Divers Air Control Box with Two Diver Radio Divers Helmet 5 part Umbilicals	Daily safety inspections. Divers Helmet Divers Air control Box with Two Diver Radio Air Filters Air System Drains Air System Relief Valves	HAZCOM, 40Hr. HAZWOPER, Site-specific Indoctrination Training Diver Training Dive Supervisor Training

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Signature of Analyst:	Date: 4/01/10	Signature of Reviewer:	Date: 4/01/10

CERTIFICATION OF ACTIVITY HAZARD ANALYSIS

Task: Diving Station Setup - Boat **Analyzed by: Elliott J. Adler** **Reviewed by: Tom Rancich**

Principle Steps	Potential Hazards	Recommended Controls
1. Observe weather conditions 2. Load Diver's Support Equipment a. Compressor (if used) b. Umbilicals c. Generator (if used) d. Hot Water Heater (if used) e. High Pressure Air Source f. Diver's Air Control Box 3. Transit to dive location 4. Mount diver water entry/ recovery ladder 5. Place Divers Air Control Box In Service 6. Remain safely onboard	**Step 1:** 1. Wind and Wave Action endangers all on-site personnel due to possible knock down, slips, trips and/or falls. 2. Diver injury due to unstable footing 3. Tender injury due to unstable footing 4. Diver injury due to loss of depth control 5. Ineffective bottom search due to loss of diver bottom position 6. Inability to adequately control the dive due to weather conditions interfering with the safe operation of equipment. **Steps 2:** 1. Personnel injury due to improper lifting technique. 2. Personnel Injury due to lifting heavy equipment with unstable footing (wave action) 3. Personnel injury/equipment damage due to improperly secured equipment. **Step 3:** 1. Loss of personnel overboard 2. Drowning due to falling overboard **Step 4:** 1. Diver injury due to improperly mounted ladder 2. Difficulty in recovering diver in an emergency **Step 5:** 1. Diver injury due to insufficient air supply 2. Loss of diver communications 3. Improper depth measurement **Step 6:** 1. Loss of personnel overboard	**All steps:** 1. Ensure all personnel are trained and qualified IAW EM385-1-1 2. Conduct all operations IAW VRH Safe Practices Manual and Emergency Management Plan **Step 1** 1. Dive supervisor carefully assess weather conditions to include wind speed, wave height, current, etc. ABORT dive station setup if weather conditions will interfere with diving safely. **Step 2:** 1. All diving equipment will be loaded while pierside. 2. Ensure all personnel utilize safe lifting techniques. 3. Use two or more people when lifting weights>50lbs. 4. Use lifting equipment where possible. 5. Secure all equipment with ratcheting tie down straps or equivalent. 6. Mount compressor air intake mast (if diving compressor is used) above pilot house and upwind from compressor/generator or boat exhaust. 7. Ensure Divers air control box is securely mounted 8. Ensure emergency/primary air cylinders are secured **Step 3:** 1. Ensure all lifelines and rails which may have been removed during equipment load-out are replaced and secure. 2. Ensure all personnel are wearing USCG approved Personal Flotation Devices prior to departure and at all times while embarked. 3. All personnel maintain constant vigilance and be aware of footing and handholds 4. Ensure an accurate personnel manifest is maintained. **Step 4:** 1. Secure ladder using braces/ratcheting tie downs (or equivalent) 2. Diver Test ladder security prior to first dive. 3. Ensure diver is fully dressed with all dive equipment in service.

		Step 5: 1. Check all air fittings are tightened with an appropriately sized wrench. 2. Verify emergency air supply cylinders contain a minimum of 1500 psig. 3. Ensure air intake mast (if used) is free from contamination and mounted upwind from vehicle/compressor/generator exhaust. 4. Verify primary and secondary air sources are connected to the Diver's Air Control Box. 5. Connect Diver's Helmets to umbilicals 6. Charge umbilicals 7. Leak check all fittings 8. Function Test Diver's Helmets 9. Function Test Pneumofathometers 10. Shift to emergency air supply and repeat 8 & 9. **Step 6:** 1. Two person rule one weather decks for all transits 2. Positive head count prior to getting underway, each time. 3. Immediately holler "Man overboard" and indicate location (port, starboard, stern bow). All personnel repeat "man overboard". 4. Everyone with eyes on the victim point and keep eyes on victim. 5. Captain bring boat to dead slow or stop as deemed safe. 6. If conscious, victim raises hand above head. 7. Captain assigns rescue swimmer and tossable life ring person as the boat maneuvers into recovery position. 8. If victim conscious through ring and bring victim to boat. 9. If victim is unconscious, deploy the rescue swimmer with back board. 10. Upon getting the victim aboard and assessing condition, determine if "may day" or "Pan, Pan" calls are required
Equipment To Be Used	**Inspections Required**	**Training Required**
Divers Air Control Box with Two Diver Radio Divers Helmet 5 part Umbilicals	Daily safety inspections. Compressor oil levels Generator GFCI	HAZCOM, 40Hr. HAZWOPER, Site-specific Indoctrination Training

	Emergency air supply cylinder pressure Divers Helmet Divers Air control Box with Two Diver Radio Pneumofathometers	Safe lifting techniques Diver Training Dive Supervisor Training

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Signature of Analyst:	Date:	Signature of Reviewer:	Date:

Dive Operations Plan

At-Sea and Shore

RIFS Cape Poge, South Beach and Long Point
Martha's Vineyard, Massachusetts

Dated _____

Submitted _____

Reviewed _____

Approved _____

USACE approved for contract number W912DY-04-D-0019

Name _____

Title _____

Signature _____

GLOSSARY OF ABBREVIATIONS

ACDE	Association of Commercial Diving Educators
ADCI	Association of Diving Contractors International
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
BC	Buoyancy Compensator
CFR	Code of Federal Regulations
CO2	Carbon Dioxide
CPR	Cardiopulmonary Resuscitation
DAN	Divers Alert Network
DDC	District Diving Coordinator
DMO	Diving Medical Officer
DOP	Dive Operations Plan
EAC	Emergency Assistance Checklist
EGS	Emergency Gas Supply
EMI	Emergency Management Institute
EMP	Emergency Management Plan
EMS	Emergency Medical Service
EMT	Emergency Medical Technician
EOD	Explosive Ordnance Disposal
FPM	Feet Per Minute
FSW	Feet of Sea Water
FUDS	Formerly Used Defense Sites
GPS	Global Positioning System
HP	High Pressure
IAW	In Accordance With
KMB	Kirby Morgan
KTS	Knots
LP	Low Pressure
MEC	Munitions and Explosives of Concern
OSHA	Occupational Safety & Health Administration
PMS	Planned Maintenance Systems
PSI	Pound Per Square Inch
PSIG	Pound Per Square Inch Gauge
RCC	Rescue Coordination Center
RIFS	Remedial Investigation / Feasibility Study
ROV	Remotely Operated Vehicle
SAE	Society Automotive Engineers
SCUBA	Self Contained Underwater Breathing Apparatus
SPM	Safe Practices Manual

SSA	Surface Supplied Air
SSDS	Surface Supplied Diving Systems
USACE	United States Army Corp of Engineers
USCG	United States Coast Guard
USNDM	United States Navy Dive Manual
UXO	Unexploded Ordnance
VRH	VRHabilis LLC

DIVE OPERATIONS PLAN

This Dive Operations Plan is a general overview of the underwater diving and search tasks to be performed while conducting searches along designated transects and in established grids to locate and investigate magnetic anomalies to determine the extent of MEC contamination at the three identified FUDS sites. Searches will be conducted using magnetometers and diver pushed EMI sleds. VRH will provide divers in support of towed array operations in the event of sled entanglement. This plan describes the dive modes, equipment and site access.

WARNING

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."

Date of dive plan submission:

14 April 2010

Name and contact information for diving supervisor preparing the dive plan:

Plan prepared by:

Scott Alogna
404 Cripple Creek Road
Cedar Park, TX 78613
Telephone: 512-573-1525

Plan reviewed by:

Kim Heckhausen
5 Brookhollow Road
Taunton, MA 02780
Telephone: 508-496-7749

Tom Rancich
30 Florence Street
Vineyard Haven, MA 02568
Telephone: 508-410-1306

Elliott Adler
11626 Loblolly Lane
Knoxville, TN 37934
Telephone: 865-806-6689

Names and duties of on-site dive team members, including diving supervisor*:

*Note: Dive stations will be manned by no less than a Diving Supervisor, Diver, Standby Diver and Tender. Scott Alogna is the primary diving supervisor for this operation however, three other qualified diving supervisors are listed below which may relieve Mr. Alogna during brief periods.

NAME	DUTIES
Tom Rancich	**Dive Supervisor**, Diver, Standby Diver, Tender, UXO Technician
Elliott Adler	**Dive Supervisor**, Diver, Standby Diver, Tender, UXO Technician
Scott Alogna	**Primary Diving** Supervisor Diving Program Manager
Kim Heckhausen	**Dive Supervisor**, Equipment Manager
Rob Rozzi	Diver, Standby Diver, Tender, UXO Technician
Erik Toews	Diver, Standby Diver, Tender, UXO Technician
Paul Baril	Diver, Standby Diver, Tender, UXO Technician
To be determined, as required	Diver, Standby Diver, Tender, UXO Technician
To be determined, as required (1st Alternate)*	Diver, Standby Diver, Tender, UXO Technician
To be deterrmined, as required	General Labor

*Note: At this point all contract divers have been identified. If for some reason one of the other divers are unable to complete the project (i.e., health, family problems, etc.) an alternate diver, yet to be determined, with equal qualifications will be brought in as the replacement diver.

List of diving equipment to be used:

Surface Supplied Diving Helmets	KMB 27 and/or 47
Primary Air Supply	Tested Grade D Breathing Air and/or LP Compressor (Quincy 325)
Emergency Air Supply	Tested Grade D Breathing Air
30 gal Air Receiver w/two stage filters (If diving LP Compressor Mode)	
Two Diver Air Control Box / Two Diver Radio	Divers Radio – Divers Supply Model TDR
Divers Bailout Bottle*	Minimum 30 cu ft
Hot Water Heater	Landa and/or Power America (back-up unit)
Wetsuit/Hot water Suit	Wetsuit modified with water distribution tubing. Use of an undergarment is mandatory when using hot water
Air Lift	
SCUBA**	All mandatory diver worn gear
Chase Boat	Four Man Emergency Fast Boat

*Divers Bailout Bottle - Surface Supplied diver "Emergency Air Supply (EGS)" is provided by the bailout bottle secured to the divers harness. The bailout bottle is equipped with a regulator to reduce the HP air to a safe working pressure. The bailout bottle whip is connected to the emergency air supply fitting on the helmet side-block assembly.

**SCUBA Diver – Each SCUBA diver shall be equipped with a Bailout Bottle with a minimum of 30 cuft of air and separate regulator.

Type of diving platform to be used:

Shore, and or 29' Phoenix Support Craft, or suitable vessel capable of supporting surface supplied diving operations.

Detailed description of the mission; Identify how/ if work will be divided into separate tasks or phases of work:

The overall object of this project is to locate, identify and remove remnants of military ordnance deposited in this area as a result of military training during WW II.

To accomplish this from shore, single divers will perform a 300 ft "Jackstay Search" of the bottom using a Schonstat ferrous metal locator to indicate possible ordnance items which may be located below the sea floor. Any items discovered by visual search will be positively identified prior to disturbance. Schonstat instrument responses indicating the presence of possible subsurface (below the sea floor) ordnance will be investigated by digging by hand, air lift, or jetting tool to remove the sand overburden.

When the diver encounters an item that he believes to be "ordnance like" in appearance, he will notify the diving supervisor. Qualified UXO technicians will view the video feed and assist the diver in confirming a positive identification of the item and its condition (i.e. fired/unfired, armed/unarmed, acceptable to move/unacceptable to move).

Upon a positive identification of ordnance, the diver will carabineer or tie a marker line into the jackstay line to provide a reference of the location the ordnance was found. The markers relative position within the search will be recorded. If the item was determined to be acceptable to move, the diver will bring the item to shore then continue the search. If the item is too large the diver will surface and be passed a pull line which he will then attach to the item. Topside support personnel will then recover the item once the diver is clear. If necessary the diver will retreat to ensure no entanglement hazard exists.

To accomplish this at-sea, single divers will perform either "Liveboating" or "Jack Stay/Circle Searches" of the bottom using a Schonstat ferrous metal locator or EMI towed sled to indicate possible ordnance items which may be located below the sea floor. Instrument responses indicating the presence of possible ordnance will be recorded by GPS position within the search area.

Liveboating;
When the diver encounters an item that he believes to be "ordnance like" in appearance, he will notify the diving supervisor who will have the boat hold position over the diver and obtain the relative position of the contact. Qualified UXO technicians will view the video feed and

assist the diver in confirming a positive identification of the item and its condition (i.e. fired/unfired, armed/unarmed, acceptable to move/unacceptable to move).

Upon a positive identification of ordnance, the GPS location will be recorded for future excavation if unable to be retrieved

Two Point Moor;
When the diver encounters an item that he believes to be "ordnance like" in appearance, he will notify the diving supervisor and will carabineer a marker line into the search line. The item's relative position within the search will be recorded. Qualified UXO technicians will view the video feed and assist the diver in confirming a positive identification of the item and its condition (i.e. fired/unfired, armed/unarmed, acceptable to move/unacceptable to move).

If the item was determined to be acceptable to move, the diver will bring item to shore and continue the search. If the item is too large* the diver will request a pull line which he will then attach to the item. Topside support personnel recover the item once the diver is clear. If necessary the diver will retreat to ensure no entanglement hazard exists.

***Note: The ordnance items expected to be found are 2.75" – 6" Rocket Motors which range in size from ~30" long and 5 lbs to ~48" long and 10lbs. No explosive loaded ordnance is expected to be encountered.**

There are NO separate tasks or phases.

<u>Date(s), time(s), duration, and location of operation:</u>

Production Diving Operations are anticipated to begin on or about 6 June 2010 and be complete on or about 31 May 2011.

Diving Operations may be conducted seven days per week to allow for work schedule adjustments as may be required due to inclement weather. In general, it is anticipated that operations will be conducted Mon – Fri, approximately 10hrs per day during daylight hours. Night diving is allowed.

Location of the diving operations will be Cape Poge, South Beach and Long Point, Martha's Vineyard, Massachusetts

Diving mode used including a description of the backup air supply, as required:

Surface Supplied Air and SCUBA

Surface Supplied Divers backup air supply is Tested Grade D Breathing Air supplied by a local vendor. The Divers Air Console is capable of receiving either high pressure air directly from the bottle or LP air from a breathing air regulator placed on the bottle.

SCUBA Divers' EGS is supplied by separate EGS bottle with a 30 cuft of air minimum with separate regulator.

Nature of work to be performed by the divers, including tools used and materials to be handled or installed:

Scuba diving in support of towed array survey and or underwater searches.

Surface Supplied Liveboating search using fluxgate magnetometer (Schonstat), or EMI Towed Sled.

Surface Supplied Jackstay or Circle search using fluxgate magnetometer (Schonstat).

Shallow excavation by hand, airlift or jetting tool.

Anticipated surface and underwater conditions, to include visibility, temperature, currents, etc. Thermal protection will be considered as appropriate:

Variable dependent on season and weather conditions.

At-Sea;
Surface conditions - Typically Sea-states 2-3 will have minor effect on diving operations. Greater sea states will be evaluated as they arise and no diving will be performed if the conditions do not permit the diver or topside personnel to safely conduct operations. Additionally If the surf zone is too energetic to transport an injured diver across it in a boat then dive operations will be suspended.

Underwater conditions – These will be varying in depth but less than 100 fsw dives and as such the underwater conditions should not be heavily influenced by the surface conditions. *Dives conducted from sea at or near the surf zone will be evaluated for wave induced currents also.

Currents – Offshore currents will have to be observed and gauged for intensity. Currents greater than 1.5 Knots require additional weights. Currents are zero during slack tide and increase to a maximum of <0.5kts during tidal shifts.
*Wave induced currents are typically larger than tidal currents along the beach. It is incumbent on the diver to report to the diving supervisor if he is having difficulty in maintaining position or depth control. Should either of these circumstances exist the dive will be aborted and not resumed until the conditions subside.
Visibility – From 1-2ft to 10-15ft

Temperature – Water temperatures now are 52-55 degrees F and will warm slightly over the life of the project. Thermal protection for the divers will be provided by hot water.

From Shore;
Surface conditions - No diving will be performed if the surface conditions do not permit the diver to maintain depth control. If the surf zone is too energetic to transport an injured diver across it in a boat then dive operations will be suspended.

Underwater conditions – These will be very shallow dives and as such the underwater conditions will be heavily influenced by the surface conditions. As stated above, no dives will be performed if conditions do not permit the diver to maintain depth control.

Visibility – From 1-2ft to 10-15ft

Temperature – Water temperatures now are 52-55 degrees F and will warm slightly over the life of the project. Thermal protection for the divers will be provided by hot water.

Currents* – Observed currents are zero during slack tide and increase to a maximum of <0.5kts during tidal shifts.

*Wave induced currents are typically larger than tidal currents along the beach. It is incumbent on the diver to report to the diving supervisor if he is having difficulty in maintaining position or depth control. Should either of these circumstances exist the dive will be aborted and not resumed until the conditions subside.

<u>Maximum single dive bottom time for the planned depth of dive for each diver. Altitude adjustments to dive tables will be calculated for dives made at altitudes of 1000 ft (304.8 m) or more above sea level:</u>

Maximum Depth At-SEA: <100FSW

No Decompression Limit for <100FSW :25 minutes

Maximum single dive bottom times will be depth dependent but no greater than 300 min. and will be shorter dependent on depth and diver fatigue.
Maximum Depth From Shore: <20FSW

No Decompression Limit for <20FSW – *Unlimited*

Maximum single dive bottom times will be no greater than 300 min but may be shorter dependent on diver fatigue.

Identification of topside assistance/support to the dive team (i.e., crane operator, lock operator, etc.):

One to two additional personnel will be assigned to the dive site to support small boat operations, should the need arise. The chase boat will be on-site to support diving operations and transport an injured diver to shore. Chase boat will be manned in emergency by a coxswain and tender at a minimum.

Means of direct communication between the dive site and the project office, the lockmaster/USACE project manager, and the contracting officer (if applicable):

Direct Communications between the dive site, project office, USACE project manager, DDC and other involved personnel will be by cell phone at the numbers listed above.

Plans submitted for Contractor operations shall also include the name of Contractor (and diving subcontractor if applicable), Contract number, and names and contact information for key personnel:

Diving Subcontractor: **VRHabilis, LLC**
RR Box 401
5 Brook Hollow Road
Vineyard Haven, MA 02568

Key Personnel:

President and CEO
Tom Rancich
5 Brook Hollow Road
Vineyard Haven, MA 02568
508.410.1306

Chief Operations Officer
Elliott Adler
11626 Loblolly Lane
Knoxville, TN 37934
865.806.6689

Primary Diving Supervisor
Scott Alogna
404 Cripple Creek Road
Cedar Park, TX 78613
512.573.1525

Equipment Technician, Diving Supervisor
Kim Heckhausen
30 Florence Street
Taunton, MA 02780
508.496.7749

Enclosure 3c

Emergency Management Plan

RIFS Cape Poge, South Beach and Long Point
Martha's Vineyard, Massachusetts

Dated _____

Submitted _____

Reviewed _____

Approved _____

USACE approved for contract number W912DY-04-D-0019

Name _____

Title _____

Signature _____

Emergency Management Plan for the Remedial Investigation/Feasibility Study at

- The Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts FUDS D01MA0595,
- Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts FUDS D01MA0486
- Tisbury Great Pond, West Tisbury, Martha's Vineyard, Dukes County, Massachusetts FUDS D01MA0453

This EMP is to be utilized in all diving operations (At-Sea and Shore). Recovery sites will be determined by diving locations.

Nearest operational recompression chamber:

Norman Knight Hyperbaric Medicine Center
243 Charles Street
Boston
Massachusetts
02114
617 573-4411 (phone)
24 Hr Phone: 617 523-7900 (pager)

Divers Alert Network (DAN) -919-684-8111

Emergency Transportation to recompression chamber:

Boston Med Flight- 800 233 8998

Nearest hospital:

Martha's Vineyard Hospital
One Hospital Road
P.O. Box 1477
Oak Bluffs, MA 02557
508 693-0410

Martha's Vineyard Hospital does not have hyperbaric treatment facilities. However, the hospital will still be the best location to treat and sustain a stricken diver while waiting for air transportation to Norman Knight Hyperbaric Medicine Center. Martha's Vineyard Hospital has enormous experience in handling life flight patients and coordinating responses with Boston Med Flight

Rescue Coordination Center:

USCG RCC Boston
(617)223-8555

EMERGENCY TRANSPORTATION PLAN WHEN WORKING AT SOUTH BEACH

Emergency Victim Transportation Plan Edgartown

Edgartown Emergency Medical Services is manned at all times and is located close to our eastern (South Beach/Cape Pogue) dive sites. Edgartown EMS will be the fastest means for getting a stricken diver into professional medical care.

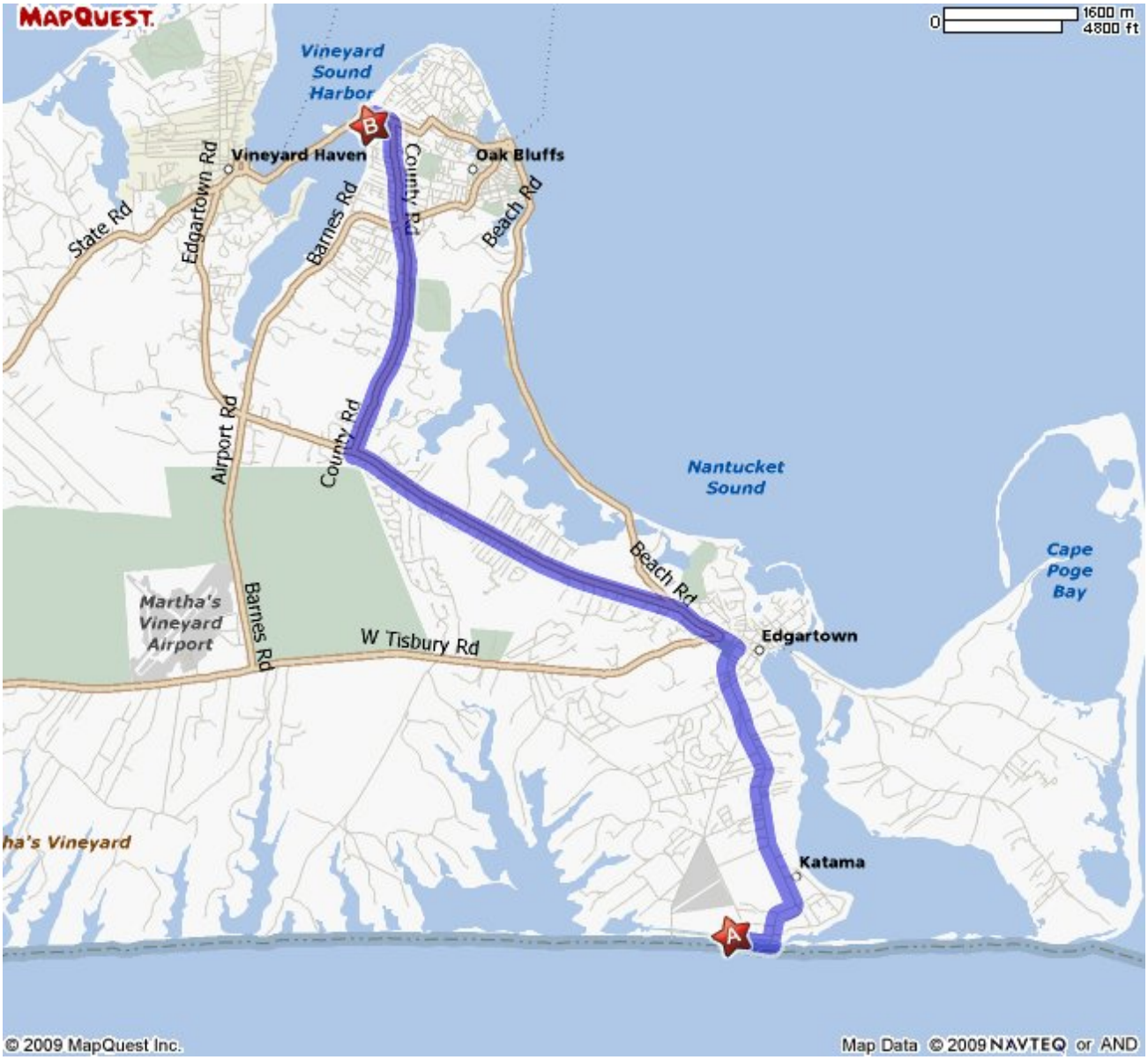
- If at-sea diver will be transported via chase boat on oxygen to beach, then vehicle at Atlantic Drive/Herring Creek Road/Katama Road (dive site dependant)
- On-shore diver will be placed on oxygen and transported via truck or utility vehicle to Atlantic Drive/Herring Creek Road/Katama Road (dive site dependant)
- Diver will be transferred to the Edgartown Ambulance for transport to the hospital
- The Emergency Room will care for the diver until Boston Med Flight Arrives Boston Med Flight will transport the diver to Norman Knight Hyperbaric Medicine Center via low level flight

Contingency

In the event that Edgartown EMS is unable to respond or there is a communication failure, the diver will be transported by truck from South Beach to Martha's Vineyard Hospital.

1:	Start out going EAST on ATLANTIC DR toward HERRING RUN.	0.4 mi
2:	Turn LEFT onto KATAMA RD.	2.6 mi
3:	KATAMA RD becomes PEASES POINT WAY S.	0.4 mi
4:	Turn LEFT onto COOKE ST.	0.3 mi
5:	Turn SLIGHT LEFT onto UPPER MAIN ST.	0.4 mi
6:	Turn SLIGHT RIGHT onto VINEYARD HAVEN RD.	2.9 mi
7:	VINEYARD HAVEN RD becomes EDGARTOWN VINEYARD HAVEN RD.	0.3 mi
8:	Turn RIGHT onto COUNTY RD.	3.2 mi
9:	Turn SLIGHT LEFT onto EASTVILLE AVE.	0.2 mi
10:	Turn LEFT onto HOSPITAL WAY.	0.1 mi
11:	End at 1 Hospital Rd Vineyard Haven, MA 02568	

MAP FROM SOUTH BEACH TO THE MARTHA'S VINEYARD HOSPITAL



EMERGENCY TRANSPORTATION PLAN WHEN WORKING AT LONG POINT/TISBURY GREAT POND

Emergency Victim Transportation Plan West Tisbury

Tri-Town Emergency Medical Services is manned at all times and is located within 5 miles of all of our Long Point diving sites. Tri-Town EMS will be the fastest means for getting a stricken diver into professional medical care.

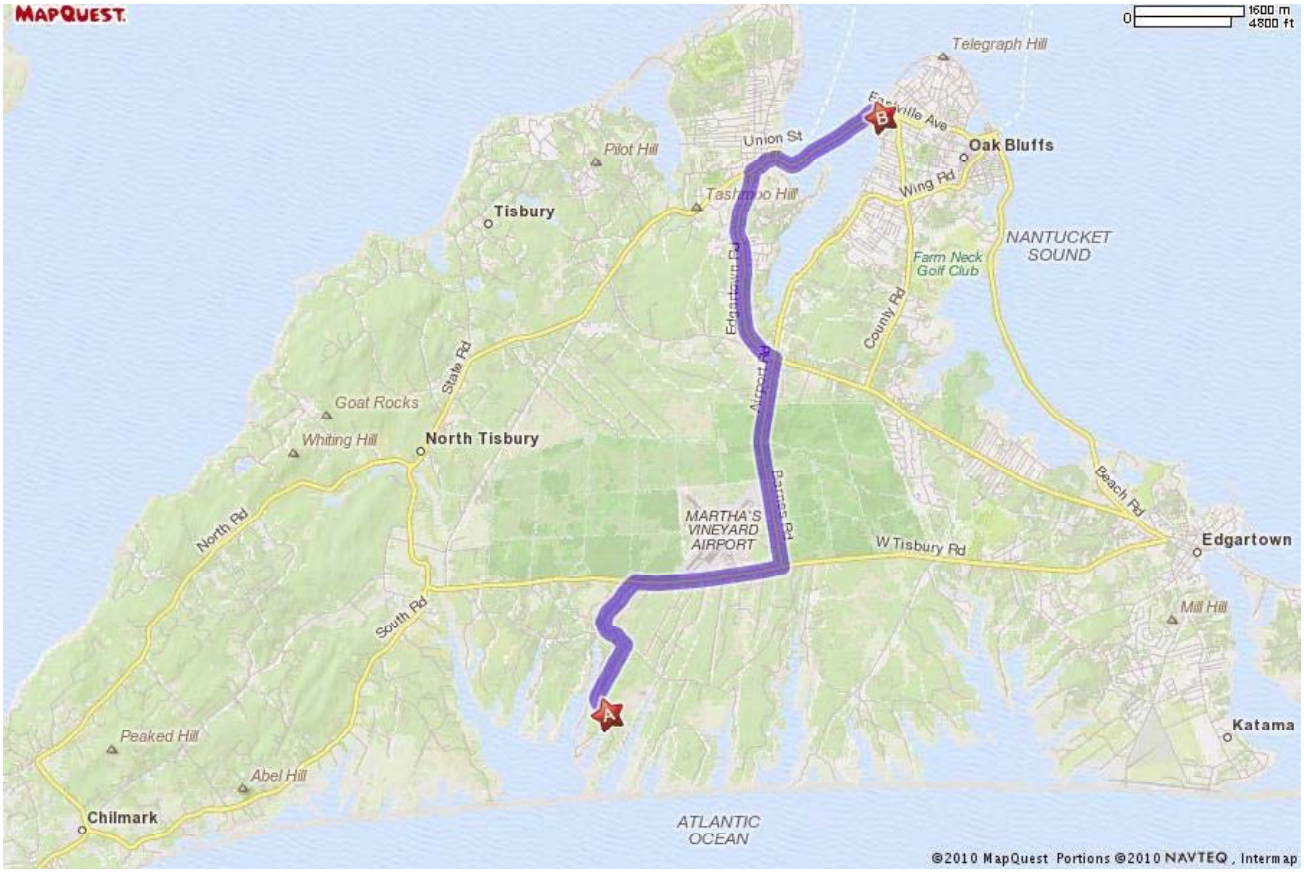
- If at-sea diver will be place on oxygen and transported to shore via boat then to Long Point Road via truck or utility vehicle
- On-shore diver will be placed on oxygen and transported via truck or utility vehicle to Long Point Road
- Diver will be transferred to the Tri-Town Ambulance for transport to the hospital
- The Emergency Room will care for the diver until Boston Med Flight Arrives Boston Med Flight will transport the diver to Norman Knight Hyperbaric Medicine Center via low level flight

Contingency

In the event that Tri-Town EMS is unable to respond or there is a communication failure, the diver will be transported by truck FROM Long Point/Tisbury Great Pond to Martha's Vineyard Hospital.

1. Start out going NORTH on LONG POINT RD towards MIDDLE POINT RD 0.0 mi
2. Turn SLIGHT RIGHT onto MIDDLE POINT RD (portions unpaved)
   0.2 mi
3. MIDDLE POINT RD becomes THUMB POINT RD (portions unpaved)
   0.7 mi
4. Turn LEFT onto SCRUBBY NECK RD (portions unpaved) 0.4 mi
5. Turn RIGHT onto DEEP BOTTOM RD (portions unpaved) 0.6 mi
6. Turn RIGHT onto EDGARTOWN W. TISBURY RD 1.1 mi
7. EDGARTOWN W. TISBURY RD becomes W TISBURY RD 0.5 mi
8. Turn LEFT onto BARNES RD 1.9 mi
9. BARNES RD becomes AIR RD 0.0 mi
10. AIR RD becomes AIRPORT RD 0.5 mi
11. Turn LEFT onto EDGARTOWN VINEYARD HAVEN RD 0.9 mi
12. EDGARTOWN VINEYARD HAVEN RD becomes EDGARTOWN RD 1.4 mi
13. Turn RIGHT onto S MAIN ST/STATE RD 0.2 mi
14. Turn SLIGHT RIGHT onto BEACH ST 0.1 mi
15. Turn RIGHT onto BEACH RD 1.2 mi
16. Turn RIGHT onto HOSPITAL RD/LINTON LN. Continue to follow HOSPITAL RD 0.1 mi
17. HOSPITAL is on the LEFT

MAP FROM LONG POINT/TISBURY GREAT POND TO MARTHA'S VINEYARD HOSPITAL



EMERGENCY TRANSPORTATION PLAN WHEN WORKING AT CAPE POGE

Emergency Victim Transportation Plan

Edgartown Emergency Medical Services is manned at all times and is located within 5 miles of all of our diving sites. Edgartown EMS will be the fastest means for getting a stricken diver into professional medical care.

- If at-sea diver will be place on oxygen and transported toward Edgartown via boat
    - For diving related injury, Life Flight will be called immediately and a dust off location established (this has been pre-coordinated and agreed upon with Life Flight.
    - For mechanical injury, diver will be delivered to Edgartown Marine

- On-shore diver will be placed on oxygen and transported via truck or utility vehicle to Chappaquidick Ferry

- Diver will be transferred to the Edgartown Ambulance for transport to the hospital

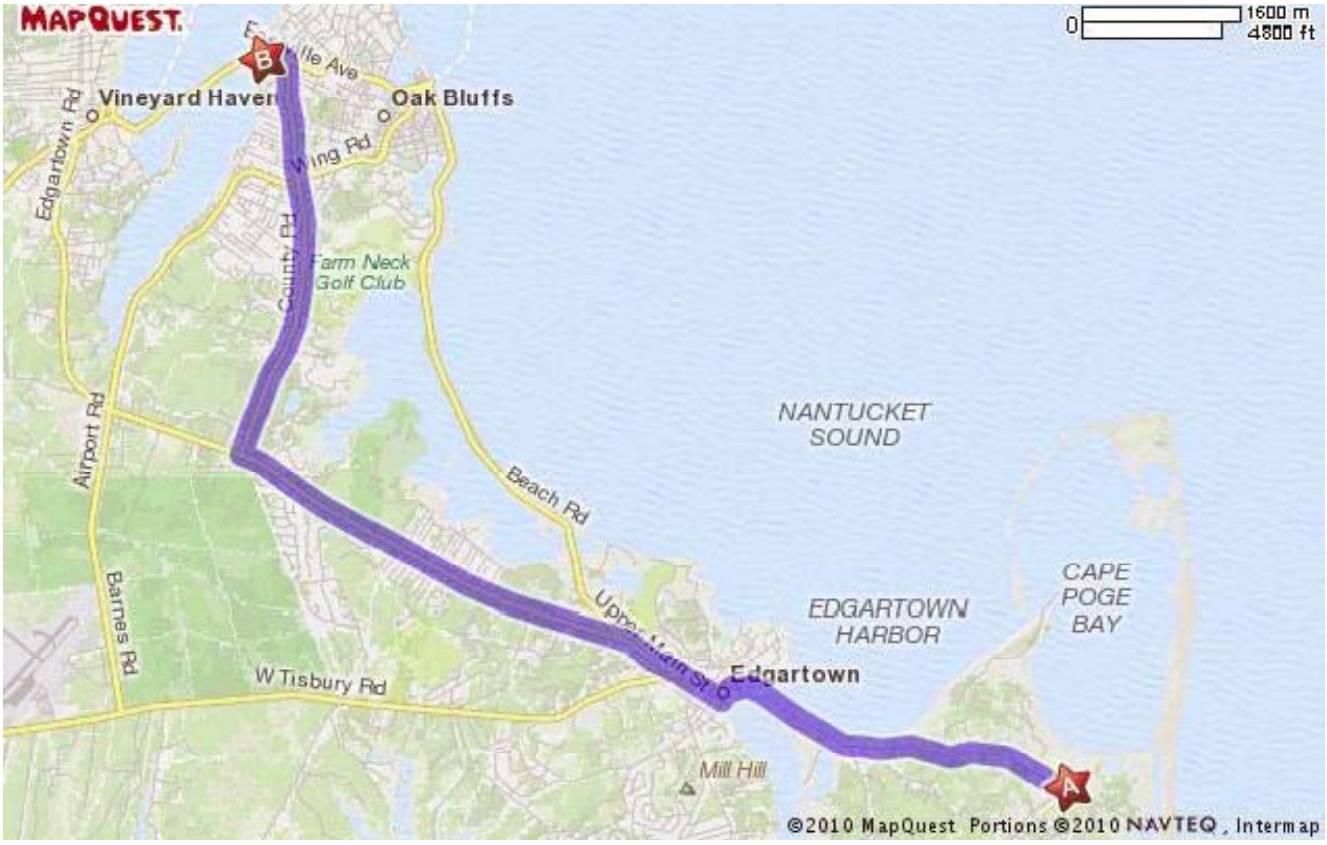
- The Emergency Room will care for the diver until Boston Med Flight Arrives Boston Med Flight will transport the diver to Norman Knight Hyperbaric Medicine Center via low level flight

Contingency

In the event that Edgartown EMS is unable to respond or there is a communication failure, the diver will be transported by truck from Cape Poge to Martha's Vineyard Hospital.

1.	Start out going **WEST** on **CHAPPAQUIDDICK RD** toward **JEFFERS LN**.	2.4 mi
2.	Take the **EDGARTOWN-CHAPPAQUIDDICK** FERRY(Check schedule / fares)	0.1 mi
3.	Go **NORTHWEST** on **DAGGET ST**	0.0 mi
4.	Turn **LEFT** onto **DOCK ST**	0.1 mi
5.	**DOCK ST** becomes **MAIN ST**	0.0 mi
6.	Turn **LEFT** onto **S WATER ST**	0.1 mi
7.	Turn **RIGHT** onto **COOKE ST**	0.5 mi
8.	Turn **SLIGHT LEFT** onto **UPPER MAIN ST**	0.4 mi
9.	Turn **SLIGHT RIGHT** onto **VINEYARD HAVEN RD**	2.9 mi
10.	**VINEYARD HAVEN RD** becomes **EDGARTOWN**	0.0 mi
11.	**VINEYARD HAVEN RD**	0.3 mi
12.	Turn **RIGHT** onto **COUNTY RD**	3.2 mi
13.	Turn **SLIGHT LEFT** onto **EASTVILLE AVE**	0.2 mi
14.	Turn **LEFT** onto **HOSPITAL WAY**	0.0 mi
15.	Turn **RIGHT** onto **HOSPITAL RD**	0.0 mi
16.	**1 HOSPITAL RD** is on the **RIGHT**	0.0 mi
17.	**1 Hospital Rd, Vineyard Haven, MA 02568-2604**	

MAP FROM CAPE POGE TO MARTHA'S VINEYARD HOSPITAL



COMMUNICATIONS PLAN TO ACTIVATE EMERGENCY SERVICES

The diving supervisor will assign a person to initiate emergency calls. Two fully charged cell phones will be on site anytime dive operations are underway. Site has been tested and verified for reliable cell phone continuity.

- 911 will be called first
- If directed by the diving supervisor, Boston Med Flight will be called (800 233 8998)
- If directed by the diving supervisor, Martha's Vineyard Hospital will be called 508 693-0410

Diver rescue procedures
Generic emergency/rescue procedures for multiple scenarios are found in the Safe Practices Manual.

At-Sea
Upon the diver exiting/removal from the water the dive supervisor will assess the diver. If he determines that an emergency or problem exists, he will immediately call a halt to all work on the site and commence an appropriate response.

The Dive Supervisor is overall responsible for the emergency/casualty response. The dive supervisor will:

- Determine the level of the urgency - critical, serious or mild.
- Assign a team member to call 911
- Assign a team member to call Boston Med flight if required
- Assign a team member to call Martha's Vineyard Hospital if required
- Assign a team member to apply first aid, including the immediate application of oxygen* (* Mr. Rossi is a qualified EMT and will take medical control of any casualty until the arrival of Edgartown EMS UNLESS he is not able to do so, i.e. he is the victim).
- Coxswain, tender and diver will board the chase boat, ensure diver is on oxygen and transport to prearranged recovery site.

South Beach/Cape Pogue/Long Point
Upon the diver exiting/removal from the water the dive supervisor will assess the diver. If he determines that an emergency or problem exists he will immediately call a halt to all work on the site and commence an appropriate response.

Upon a work halt being called all personnel will muster at the dive station.

The Dive Supervisor is overall responsible for the emergency/casualty response. The dive supervisor will:

- Determine the level of the urgency: critical, serious or mild.
- Assign a team member to call 911
- Assign a team member to call Boston Med flight if required
- Assign a team member to call Martha's Vineyard Hospital if required
- Assign a team member to apply first aid, including the immediate application of oxygen*

  (* Mr. Rossi is a qualified EMT and will take medical control of any casualty until the arrival of Edgartown EMS UNLESS he is not able to do so, i.e. he is the victim).

- If the standby diver was used, the dive supervisor will assess his fitness for duty following the ten minutes observation period (conducted by tender) and assign tasks accordingly

Standby Diver

If the standby diver was used in the recovery of the diver, the Standby Diver will:

- Un-hat and de-rig with the assistance of the Tender
- Move out of the way of rescue operations
- Remain uninvolved until clear of the 10 minute observation period
- Report to the Dive Supervisor upon completion of the observation period
- Complete tasks as assigned

If the standby diver was not used in the recovery of the diver, the standby diver will:

- Un-hat and de-rig with the assistance of the Tender
- Report to the Dive Supervisor
- Complete tasks as assigned

Tender

If the standby diver was used in the recovery of the diver, the tender will:

- Un-hat and de-rig the standby diver
- Move the standby diver out of the way of rescue operations
- Observe the Standby Diver for ten minutes, watching for any signs of dive illness
- Report to the Dive Supervisor upon completion of the observation period
- Complete tasks as assigned

If the standby diver was not used in the recovery of the diver, the tenderr will:

- Un-hat and de-rig the standby diver
- Report to the Dive Supervisor
- Complete tasks as assigned

UXO workers

UXO workers will:

- Report to the dive supervisor upon being informed of an incident.
- Complete tasks as assigned

Laborer

If on site, the laborer will:

- Report to the dive supervisor upon being informed of an incident.
- Complete tasks as assigned

Safe Practices Manual
Diving Operations

RIFS Cape Poge, South Beach and Long Point
Martha's Vineyard, MA

Dated: _____

Submitted: _____

Reviewed: _____

Approved: _____

USACE approved for Contract Number: W912DY-04-D-0019

Name: _____

Title: _____

Signature: _____

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C. VRH Equipment Inspection Checklist – SCUBA
D. VRH SCUBA Pre-dive checklist
E. VRH Pre-mission Equipment Inspection Checklist – Surface Supplied
F. VRH Surface Supplied Pre-dive checklist
G. Dive Log Sheet & Repetitive Dive Worksheet
H. USN No-Decompression Limits & Repetitive Group Designation Table for No-decompression Air Dives
I. USN Residual Nitrogen timetables for Repetitive Air dives
J. USN Standard Air Decompression Tables
K. VRH Policy Statement
L. Designated Diving Supervisor Certification Letter(s)
M. OSHA 29 CFR 1910, Subpart T
N. USACE Publication 385-1-1
O. Ice and Cold water Diving Operations
P. Liveboating

REFERENCES

A. Occupational Safety and Health Administration (OSHA) Instruction # 29 CFR 1910 Sub Part T
B. Army Corps of Engineers (USACE) Publication # 385-1-1
C. USACE Publication # 385-1-86
D. United States Navy Dive Manual (USNDM) (Rev. 6)
E. Association of Diving Contractors International (ADCI) Consensus Standards
F. ANSI/ACDE -01
G. USCG 46 CFR Chapter I Part 197 Subpart B. Commercial Diving Operations

GLOSSARY OF ABBREVIATIONS

ACDE	Association of Commercial Diving Educators
ADCI	Association of Diving Contractors International
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
BC	Buoyancy Compensator
CFR	Code of Federal Regulations
CO2	Carbon Dioxide
CPR	Cardiopulmonary Resuscitation
DAN	Divers Alert Network
DDC	District Diving Coordinator
DMO	Diving Medical Officer
DOP	Dive Operations Plan
EAC	Emergency Assistance Checklist
EGS	Emergency Gas Supply
EMI	Emergency Management Institute
EMP	Emergency Management Plan
EMS	Emergency Medical Service
EMT	Emergency Medical Technician
EOD	Explosive Ordnance Disposal
FPM	Feet Per Minute
FSW	Feet of Sea Water
FUDS	Formerly Used Defense Sites
GPS	Global Positioning System
HP	High Pressure
IAW	In Accordance With
KMB	Kirby Morgan
KTS	Knots
LP	Low Pressure
MEC	Munitions and Explosives of Concern
OSHA	Occupational Safety & Health Administration
PMS	Planned Maintenance Systems
PSI	Pound Per Square Inch
PSIG	Pound Per Square Inch Gauge
RCC	Rescue Coordination Center
RIFS	Remedial Investigation / Feasibility Study
ROV	Remotely Operated Vehicle

SAE	Society Automotive Engineers
SCUBA	Self Contained Underwater Breathing Apparatus
SPM	Safe Practices Manual
SSA	Surface Supplied Air
SSDS	Surface Supplied Diving Systems
USACE	United States Army Corp of Engineers
USCG	United States Coast Guard
USNDM	United States Navy Dive Manual
UXO	Unexploded Ordnance
VRH	VRHabilis LLC

1. PERSONNEL REQUIREMENTS

A. VRHabilis is a Veteran Run company and as such only employs USN trained EOD, SCUBA and Surface-Supplied Deep-Sea Divers who have completed one or more of the approved diver curriculums.

B. All divers are required to have a complete Hazmat/Diving physical examination every year certified by a license physician and cleared for diving operations.

C. All divers will meet the Medical /Physical Requirements contained within Ref. E.

D. All divers will be fully trained and qualified for the position they are assigned. Divers shall be fully knowledgeable of prescribed safety procedures including the use of all equipment and tools necessary for the safe completion of assigned tasks.

E. All divers will maintain a level of physical conditioning required to safely complete the assigned tasks.

F. All divers will have at least 4 working dives with particular equipment, techniques and similar decompression as prescribed by the scope of work.

G. Requalification Dives consist of:
   2 working/training dives per year in SCUBA
   2 working/training dives per year in Surface Supplied Apparatus
   Note: One dive will have been within the last 6 months of contract award.

H. All divers will maintain a current certification in First Aid, CPR and be certified in the use of Emergency Oxygen on the surface and in transport..

I. After any serious diving injury or illness, divers shall be re-examined by a physician and approved for diving.

J. Any dive resulting in injury or illness of any type (regardless how minor) to any dive team member will be reported immediately to the Diving Supervisor. Diving Supervisor and Project Manager will investigate and document the incident IAW Ref. A.

K. All divers shall maintain a Personal Log Book to detail hyperbaric exposures. (IAW Ref E).

L. The Diving Supervisor(s) for every diving evolution shall be designed in writing and a copy contained within this document for presentation to competent authority as necessary. This document is contained in Appendix J.

VRHabilis LLC

DRUG-FREE WORKPLACE POLICY

VRHabilis is committed to providing a safe work environment and to fostering the well-being and health of its employees. That commitment is jeopardized when any VRHabilis employee illegally uses drugs or alcohol on the job, comes to work with these substances present in his/her body, or possesses, distributes, or sells drugs in the workplace. Therefore, VRHabilis has established the following policy:

1. It is a violation of company policy for any employee to possess, sell, trade, or offer for sale illegal drugs or otherwise engage in the illegal use of drugs or alcohol on the job.

2. It is a violation of company policy for anyone to report to work under the influence of illegal drugs or alcohol – that is with illegal drugs or alcohol in his or her body.

3. It is a violation of the company policy for anyone to use prescription drugs illegally.

4. Violations of this policy are subject to disciplinary action up to and including termination.

It is the responsibility of the company's supervisors to counsel employees whenever they see changes in performance or behavior that suggests an employee is under the influence of alcohol or other drugs. Although it is not the supervisor's job to diagnose personal problems, the supervisor should encourage such employees to seek help and advise them about available resources for getting help.

The goal of this policy is to balance our respect for individuals with the need to maintain a safe, productive, and drug-free environment. The intent of this policy is to offer a helping hand to those who need it, while sending a clear message that illegal drug use and alcohol abuse are incompatible with employment at VRHabilis .

2. OPERATING PROCEDURES - GENERAL

VRHabilis will conduct all diving operations in accordance with OSHA, 29 CFR 1910, Subpart T – Commercial Diving Operations, USACE EM385-1-1 Safety and Health Requirements Manual, the U.S. Navy Dive Manual SS521-AG-PRO-010 Rev. 6 and the Association of Diving Contractors International Consensus Standards for Commercial Diving and Underwater Operations, Fifth Edition.

- Every dive station will have on-hand and available for each member of the dive team the following items - Safe Practices Manual, Job Safety Analysis/AHA, Emergency Assistance Checklist, USN Diving Manual, ADCI Consensus Standards and at least one cell phone.

- All diving operations will be conducted in accordance with Figure 6-16 (Ref. D) Minimum Manning Levels for Air Diving and Ref. B App. O.

- All diving operations will be conducted utilizing the air supply requirements contained in Table 4-2 and 4-3 (Ref D).

- All dive stations will maintain a portable oxygen breathing supply for use as Emergency Surface Oxygen capable of delivering 30 minutes minimum or until emergency medical assistance can be administered.

- All divers will have a diver carried reserve breathing gas supply of sufficient duration to terminate the dive and recover the diver.

- At least one member of every dive team shall be designated the Standby Diver and should be suitably prepared to enter the water when directed by the Diving Supervisor. Prior to commencement of the operation, the Standby Diver's equipment shall be fully verified as functioning correctly and thereafter maintained in that condition until completion of the dive. Should the Standby Diver be required to enter the water, a surface check shall be completed to ensure proper breathing gas supply, bailout function, and effective communications before the diver leaves the surface.

- All dive stations will maintain a complete First Aid Kit, American Red Cross Standard First Aid Handbook (or equivalent), bag type Resuscitator, and a Stokes litter or backboard, with flotation capability.

- Code Alpha and Civilian Dive Flag signaling diving operations underway, constructed of rigid material one meter in height, visible from all directions and illuminated at night, will be displayed throughout every diving evolution.

- All efforts to dive during non-sonar windows shall be taken. When necessary safe distances from sonar will be maintained IAW Ref D. APP. 1A

- All personnel employed by VRH or engaged in diving activities will wear appropriate personal protective equipment as required by REF. A and F.

- When diving operations at altitudes of 1000 ft (304.8 m) or more of elevation above Sea-level, Dive Supervisors shall use appropriate high altitude decompression tables that compensate for the increased elevation.

- Divers will wait at least 12 hours before flying after any dive. This interval will be extended to 24 hours following multiple days of repetitive dives.

VRHabilis Project Managers and Diving Supervisors will use the following Safety Procedures and Equipment Procedures Checklists as minimum guidelines for every diving evolution as appropriate. (Appendix A).

SAFETY PROCEDURES CHECKLIST

✓ **Safe Practices/Operations Manual**
- Operating procedures
- Team member assignments and responsibilities
- Equipment procedures and checklist
- Emergency procedures.
- Specific individual procedures for tools, equipment, and associated systems
- Available at the dive site to all team members
- Copy to the Person in Charge of the vessel or facility

✓ **Emergency Aid**
- Decompression chamber (off-site)
- Nearest hospital/medical treatment facility
- Air or ground emergency transportation
- On call physician
- U.S. Coast Guard, other National Rescue Coordination Centers, or other responding authority
- Emergency rescue source other than U.S. Coast Guard
- Two-way communication on site and where practical, tested to emergency response link

✓ **First Aid**
- First aid kit
- First aid manual
- Bag-type manual resuscitator
- Emergency Surface Oxygen Supply
- Floatable Backboard/Stretcher

✓ **Planning and Assessment**

- Activity Hazard Analysis
- Site Assessment
- Evaluate environmental pollution containment and response readiness where applicable
- Diving model/equipment system(s)
- Means of water entry and exit
- Breathing gas supplies including reserves (set up and tested)
- Thermal protection (all dive team members)
- Dive team assignments/briefing and fitness to dive
- ROV team assignments/briefing and readiness to conduct operations
- Inert gas status of dive team members (repet dive designations)
- Decompression and/or treatment procedures (including altitude)
- Communications procedures and methods for all personnel involved in the operation
- Emergency procedures
- Dive station setup
- Any necessary modifications to the Safe Practices/Operations Manual
- Written designation by Diving/ ROV Supervisor given to the Person in Charge of vessel or facility
- Report on the nature and planned times of the intended operation, and the involvement of the vessel or facility's equipment and personnel to the Person in Charge

✓ **Hazards to Diving Operations**

- Surface vessel, vehicular traffic, or aircraft operations
- Overhead crane/gantry operations
- Pedestrian traffic
- Displayed diver signals
- Vessel and dive equipment weather limitations

✓ **Underwater Hazardous Conditions**

- Umbilical fouling and/or entrapment
- Differential pressures
- Lockout/Tagout
- Contaminated or toxic liquid
- Limited access/confined space/penetration
- Use of explosives or seismic activities
- Underwater sonar
- Cathodic protection
- Marine life
- High currents/severe tidal conditions
- Foreign waterborne materials, such as logs, ice floe, etc.

✓ **Record Keeping**

- Project description/accomplishment records completion
- Diving and treatment records, accident reports
- Individual dive and ROV logbook entries appropriate to the intended operation

3. OPERATING PROCEDURES & CHECKLISTS – SCUBA

Prior to the commencement of any diving operation, an Activity Hazard Analysis and EAC shall be completed and all members of the dive team together with other involved personnel shall be present at the pre-dive briefing. All diving and support personnel shall adhere to the Minimum Rest policy contained in Ref. E. as directed by the Diving Supervisor.

The following are minimum requirements for SCUBA diving operations.

- The planned time of the diving operation shall not exceed either the No-Decompression limits or the air supply duration of the cylinders excluding the reserve supply. Cylinder pressures shall be determined immediately prior to each dive and recorded by the Diving Supervisor.

- Audio communications are not required for a diver who is accompanied by another diver or who is tended on the surface with a safety line using line pull signals.

- SCUBA divers will be line-tended from the surface unless accompanied by another diver in the water in continuous visual contact during the dive. Loss of visual contact is cause for termination of the dive.

- Dive depths shall not exceed 100 FSW

- SCUBA dives are not permitted in enclosed or physically confining spaces.

- SCUBA dives will not be conducted in currents exceeding one (1) knot or conducted in visibility less than 3 ft (0.9 m) unless line is tended with diver/surface two-way voice communications.

- Every diver shall have a diver carried reserve breathing gas supply. This bailout bottle will have a minimum of 30 cuft (0.85 m^3) of air and a separate regulator. An octopus is not considered to be an alternate air source.

- During all SCUBA dives a Standby diver will be available while the diver is in the water.

- Each tethered SCUBA diver shall wear a safety harness with a positive buckling device, attachment point for the safety line, and a lifting point to distribute the pull force of the line over the diver's body while maintaining the body in a heads-up vertical position when unconscious or inert.

- SCUBA diving cylinders shall be visually inspected internally and externally for corrosion and pitting annually and hydrostatically tested ever 5 years.

Diving ladders and stages shall:

- Be capable of supporting the weight of two divers plus their gear.
- Be made of corrosion-resistant material or be maintained free of corrosion.
- Be suitable for the purpose intended.
- Extend a minimum of three feet below surface where installed.
- Be provided with a safety chain and internal hand holds for dive safety during launch and recovery (Stages)
- Make provisions for mounting of breathing gas cylinder and regulator for emergency breathing at all depths of intended operation. (Stages)

PRE-DIVE PROCEDURES

Prior to any dive, all divers must carefully inspect their own equipment for signs of deterioration, damage, or corrosion. The equipment must be tested for proper operation. Each diver will inspect his own mandatory equipment, for every dive.

Air Cylinders

- Inspect air cylinder exterior and valves for rust, cracks, dents, and any evidence of weakness.
- Inspect the O-ring.
- Verify reserve mechanism is closed (lever in up position) signifying a filled cylinder ready for use.
- Gauge the cylinders according to the following procedure:
  1. Attach pressure gauge to O-ring seal face of the on/off valve.
  2. Close gauge bleed valve and open air reserve mechanism (lever in down position). Slowly open the cylinder on/off valve, keeping a cloth over the face of the gauge.
  3. Read pressure gauge. The cylinder must not be used if the pressure is not sufficient to complete the planned dive.
  4. Close the cylinder on/off valve and open the gauge bleed valve.
  5. When the gauge reads zero, remove the gauge from the cylinder.
  6. Close the air reserve mechanism (lever in up position).
  7. If the pressure in cylinders is 50 psi or greater over rating, open the cylinder on/off valve to bleed off excess and regauge the cylinder.

Harness Straps and Backpack

- Check for signs of rot and excessive wear.
- Adjust straps for individual use and test quick-release mechanisms
- Check backpack for cracks and other unsafe conditions

Breathing Hoses

- Check the hoses for cracks and punctures.
- Test the connections of each hose at the regulator and mouthpiece assembly by tugging on the hose. Check the clamps for corrosion and damage; replace as necessary and in accordance with PMS procedures.

Regulator & Pressure Gauge

- Ensure over-bottom pressure of first stage regulator has been set to a minimum of 135 psig or in accordance with manufacturer's recommendations within the past year.
- Attach regulator to the cylinder manifold, ensuring that the O-ring is properly seated.
- Crack the cylinder valve open and wait until the hoses and gauges have equalized.
- Next open the cylinder valve completely and then close (back off) one-quarter turn.
- Check for any leaks in the regulator by listening for the sound of escaping air. If a leak is suspected, determine the exact location by submerging the valve assembly and the regulator in a tank of water and watch for escaping bubbles. Frequently the problem can be traced to an improperly seated regulator and is corrected by closing the valve, bleeding the regulator, detaching and reseating. If the leak is at the O-ring and reseating does not solve the problem, replace the O-ring and check again for leaks.

Life Preserver/Buoyancy Compensator (BC)

- Orally inflate preserver to check for leaks and then squeeze out all air. The remaining gas should be removed after entry into the water by rolling onto the back and depressing the oral inflation tube just above the surface. Never suck the air out, as it may contain excessive carbon dioxide.
- Inspect the carbon dioxide cartridges to ensure they have not been used (seals intact) and are the proper size for the vest being used and for the depth of dive.
- The cartridges shall be weighed in accordance with the manufacturer's recommendations.
- The firing pin should not show wear and should move freely.
- The firing lanyards and life preserver straps must be free of any signs of deterioration.
- When the life preserver inspection is completed, place it where it will not be damaged. Life preservers should never be used as a buffer, cradle, or cushion for other gear.

Face Mask

- Check the seal of the mask and the condition of the head strap.
- Check for cracks in the skirt and faceplate.

Swim Fins

- Check straps for signs of cracking.
- Inspect blades for signs of cracking.

Dive Knife

- Test the edge of the knife for sharpness.
- Ensure the knife is fastened securely in the scabbard.
- Verify that the knife can be removed from the scabbard without difficulty, but will not fall out.

Snorkel

- Inspect the snorkel for obstructions.
- Check the condition of the mouthpiece.

Weight Belt

- Check the condition of the weight belt.
- Make sure that the proper number of weights are secure and in place.
- Verify that the quick-release buckle is functioning properly.

Submersible Wrist Watch

- Ensure wrist watch is wound and set to the correct time.
- Inspect the pins and strap of the watch for wear.

Depth Gauge and Compass

- Inspect pins and straps.
- If possible, check compass with another compass.
- Make comparative checks on depth gauges to ensure depth gauges read zero fsw on the surface.

Miscellaneous Equipment

- Inspect any other equipment that will be used on the dive as well as any spare equipment that may be needed during the dive including spare regulators, cylinders, and gauges.
- Check all protective clothing, lines, tools, flares, and other optional gear.

Diver Preparation and Brief

When the divers have completed inspecting and testing their equipment, they shall report to the Diving Supervisor. The divers shall be given a pre-dive briefing of the dive plan. This briefing is critical to the success and safety of any diving operation and shall be concerned with only the dive about to begin. All personnel directly involved in the dive should be included in the briefing. Minimum items to be covered are:

- Clear, brief statement of the mission/dive objectives.
- Time and depth limits for the dive
- Dive station assignments and responsibilities.
- Review of all tasks required to complete the mission.
- Review of diving phases from water entry to post dive.
- Anticipated conditions expected throughout the dive both underwater and topside.
- Review of Job Safety Analysis/AHA .
- Any changes to operating procedures due to specific underwater operations.
- Specific signals to be used
- Question the health of each diver instruct them to report any physical conditions, problems or adverse physiological effects that may render the diver unfit to dive.
- Review conditions that will cause the termination of the dive
- Review the Emergency Assistance Checklist.
- Review all Emergency Procedures

When the Diving Supervisor determines all requirements for the dive have been met, the divers may dress for the dive.

Donning Gear

Although SCUBA divers should be able to put on all gear themselves, the assistance of a tender is encouraged. Dressing sequence is important as the weight belt must be outside of all backpack harness straps and other equipment in order to facilitate its quick release in the event of an emergency. The following is the recommended dressing sequence to be observed:

1. Protective clothing. Ensure adequate protection is provided with a wet suit.
2. Booties and hood.
3. Dive knife.
4. Life preserver, with inflation tubes in front and the actuating lanyards exposed and accessible.
5. SCUBA - most easily donned with the tender holding the cylinders in position while the diver fastens and adjusts the harness. The SCUBA should be worn centered on the

diver's back as high up as possible but not high enough to interfere with head movement. All quick-release buckles must be positioned so that they can be reached by either hand.. At this time, the cylinder on/off valve should be opened fully and then backed off one-quarter turn. Ensure buoyancy compensator whip is connected to the buoyancy compensator.

6. Accessory equipment (diving wrist watch, depth gauge, snorkel).
7. Weight belt.
8. Gloves.
9. Swim fins.
10. Face mask or full face mask.

VRH SCUBA Pre-dive Checklist (see App. D)

The divers must report to the Diving Supervisor for a final inspection. During this final pre-dive inspection the Diving Supervisor must:

- Ensure that the divers are physically and mentally ready to enter the water.
- Verify that all divers have all minimum required equipment (SCUBA, face mask, life preserver or buoyancy compensator, safety harness, weight belt, dive knife, scabbard, swim fins, watch and depth gauge). When diving SCUBA and a buddy line is used, only one depth gauge and one watch per dive team is required.
- Verify that the cylinders have been gauged and that the available volume of air is sufficient for the planned duration of the dive.
- Test communications to diver (s) when required.
- Ensure that all quick-release buckles and fastenings can be reached by either hand and are properly rigged for quick release.
- Verify that the weight belt is outside of all other belts, straps, and equipment and will not become pinched under the bottom edge of the cylinders.
- Verify that the life preserver or buoyancy compensator is not constrained and is free to expand, and that all air has been evacuated.
- Check position of the knife to ensure that it will remain with the diver no matter what equipment is left behind.
- Ensure that the cylinder valve is open fully and backed off one-quarter to one-half turn.
- Ensure that the hose supplying air passes over the diver's right shoulder and the exhaust hose on the double-hose unit passes over the left shoulder. Double-hose regulators are attached so that the exhaust ports face up when the tank is standing upright.
- With mouthpiece or full face mask in place, breathe in and out for several breaths, ensuring that the demand regulator and check valves are working correctly.
- With a single-hose regulator, depress and release the purge button at the mouthpiece and listen for any sound of leaking air. Breathe in and out several times ensuring valves are working correctly.

- Give the breathing hoses and mouthpiece a final check; ensure that none of the connections have been pulled open during the process of dressing.
- Check that the air reserve mechanism lever is up (closed position).
- Conduct a brief final review of the dive plan.
- Verify that dive signals are displayed and personnel and equipment are ready to signal other vessels in the event of an emergency.

Water Entry and Descent

Divers enter the water via the safest method determined previously. Once divers are in the water they will perform pre-descent surface checks on each other, themselves or with the tender if only single diver. These checks include the following:

- Make a breathing check of the SCUBA. Breathing should be easy with no resistance and no evidence of water leaks.
- Visually check dive partner's equipment for leaks, especially at all connection points. Ensure manifold is underwater.
- Check partner for loose or entangled straps; ensure quick releases are properly rigged.
- Check dive mask face seal; ensure the mask can be cleared through normal methods.
- Check buoyancy. Neutral to slightly negative is preferred. Excessively heavy should be investigated and corrected.
- If wearing a dry suit, check for leaks. Adjust buoyancy as needed.
- Orient the diver(s) with descent line, compass or other fixed point as necessary

When satisfied that all equipment checks out properly, the divers report they are ready to the Diving Supervisor. The Diving Supervisor directs the divers to zero their watches and gives a signal to leave the surface.

Divers may swim down or they may use a descending line to pull themselves down. The rate of descent will be governed by the ease with which the diver(s) are able to equalize their ears and sinuses but should never exceed 75 feet per minute (fpm).

If either diver experiences difficulty in clearing, both divers must stop and ascend until the situation is resolved. If after several attempts the problem persists the dive shall be aborted and both divers will return to the surface.

Upon reaching the bottom or operating depth, the divers must orient themselves to their surroundings, verify the site and check underwater conditions. If conditions appear to be radically different from those anticipated and seem to pose a hazard, the dive should be aborted and the conditions reported to the Diving Supervisor.

The dive will be aborted if the observed conditions call for any major change in the dive plan. Divers will surface and discuss the situation with the Diving Supervisor.

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.

Underwater Procedures

In SCUBA, diving bottom time is at even more of a premium than surface supplied diving because of the limited supply of air.

Divers must maintain situational awareness. Keep constant visual check of the condition of the diving partner, their bottom time and maximum depth, air pressure and conditions on the bottom.

Divers need to maintain a controlled pace of work and breathing rate. The rate of work should be paced to maintain a slow rhythm of steady breathing.

Skip-breathing leads to hypercapnia and is prohibited.

Common methods of diver communications are: through-water communication systems, hand signals, slate boards, and line-pull signals.

Termination of Dive

The working interval of a dive shall be terminated when:

- directed by the Diving Supervisor or Project Manager
- diver requests termination
- diver fails to respond correctly to communications or signals from a dive team member.
- Communication is lost and cannot be quickly reestablished between the divers, the tender/diver, and the Diving Supervisor.
- diver goes on reserve air supply.

Ascent

When it is time to return to the surface, either diver may signal the end of the dive. When the signal has been acknowledged, the divers shall ascend to the surface together at a rate not to exceed 30 feet per minute.

For a normal ascent, the divers will breathe steadily and naturally. Divers must never hold their breath during ascent, because of the danger of an air embolism.

While ascending, divers must keep an arm extended overhead to watch for obstructions and should spiral slowly while rising to obtain a full 360 degree scan of the water column.

POST DIVE PROCEDURES

Surfacing and Leaving the Water

When approaching the surface, divers must not come up under the support craft or any other obstruction. They should listen for the sound of propellers and delay surfacing until satisfied that there is no obstruction. On the surface, the diver should scan immediately in all directions and check the location of the support craft, other divers, and any approaching surface traffic. If they are not seen by the support personnel they should attempt to signal with hand signals, whistle, or flare.

As the divers break the surface, the tender and other personnel must keep them in sight constantly and be alert for any signs of trouble. While one diver is being recovered attention must not be diverted from the diver remaining in the water. The dive is completed when all divers are safely aboard.

Getting into a boat will be easier if the divers remove the weight belts and SCUBA and then hand them to the tenders. If the boat has a ladder, swim fins should also be removed. Without a ladder, the swim fins will help to give the diver an extra push to get aboard. A small boat may be boarded over the side or over the stern depending on the type of craft and the surface conditions.

Divers will be assisted in undressing and monitored closely for the 10 minute clean time. During this time the Diving Supervisor will question the divers to ascertain their condition, maximum depth and bottom time, and any problems during the dive.

The Diving Supervisor will ensure all the required information is recorded in the diving log.

The Diving Supervisor should debrief each returning diver while the experience of the dive is still fresh. The Diving Supervisor should determine if the assigned tasks were completed, if any problems were encountered, if any changes to the overall dive plan are indicated and if the divers have any suggestions for the next team.

When satisfied with their physical condition, the divers' first responsibility after the dive is to check their equipment for damage and get it properly cleaned and stowed. Each diver is responsible for the immediate post-dive maintenance and proper disposition of the equipment used during the dive.

3.A. ASSIGNMENTS & RESPONSIBILITIES OF DIVE TEAM MEMBERS - SCUBA

All diving operations will be manned in accordance with Figure 6-16 (Ref. D) Minimum Manning Levels for Air Diving.

Project Manager;

The Project Manager will ensure the required documents are on hand and up to date, and where required have been approved.

The Project Manager will be available to the Diving Supervisor to answer questions and liaison with and communicate progress to competent authorities. The Project Manager will conduct random visual inspections of the dive side and proceedings.

Diving Program Manager

The Diving Program Manager will maintain all required publications for diving and ensure their accuracy. He shall be responsible to the Project Manager for updates, or changes to the diving program.

The Diving Program Manager will be responsible for the training and qualifications of each dive team member and the certification of Diving Supervisors.

The Diving Program Manager will be responsible for conducting refresher training courses and diver requalification/training dives.

The Diving Program Manager shall conduct complete inspections of all equipment, personnel and documentation prior to commencement of diving operations.

The Diving Program Manager will conduct a detailed investigation and document his findings for presentation to the Project Manager for any mishap, near mishap or diving injury that occurs during the course of a dive.

Diving Supervisor.

The Diving Supervisor will be designated in writing and in charge of the actual diving operation for a particular dive or series of dives. Diving operations shall not be conducted without the presence of the Diving Supervisor. The Diving Supervisor has the authority and responsibility to discontinue diving operations in the event of unsafe diving conditions.
The Diving Supervisor shall be included in preparing the operational plans. The Diving Supervisor shall consider contingencies, determine equipment requirements, recommend

diving assignments, and establish back-up requirements for the operation. The Diving Supervisor shall be familiar with all divers on the team and shall evaluate the qualifications and physical fitness of the divers selected for each particular job. The Diving Supervisor will inspect all equipment and conduct pre-dive briefings of personnel prior to every dive.

While the operation is underway, the Diving Supervisor monitors progress; debriefs divers; updates instructions to subsequent divers; and other personnel as necessary are advised of progress and of any changes to the original plan.

The Diving Supervisor will terminate the dive and report any unsafe conditions, actions or events that may occur to the VRH Project Manager and Diving Program Manager as soon as possible for resolution and documentation..

When the mission has been completed, the Diving Supervisor gathers appropriate data, analyzes the results of the mission, prepares reports to be submitted to higher authority, and ensures that required records are completed. These records may range from equipment logs to individual diving records.

Diver(s)

While working, the diver shall keep topside personnel informed of conditions on the bottom, progress of the task, and of any developing problems that may indicate the need for changes to the plan or a call for assistance from other divers. To ensure safe conduct of the dive, the diver shall always obey a signal from the surface and repeat all commands when using vice communications.

The diver is responsible for the diving gear worn and shall ensure that it is complete and in good repair.

When using externally powered tools with SCUBA, the diver must have voice communications with the Diving Supervisor.

Buddy Diver

A buddy diver is the diver's partner for a SCUBA operation. The buddy divers are jointly responsible for the assigned mission. Each diver keeps track of depth and time during the dive. Each diver shall watch out for the safety and well-being of his buddy and shall be alert for symptoms of nitrogen narcosis, decompression sickness, and carbon dioxide build-up. A diver shall keep his buddy in sight in case of an emergency. If SCUBA divers get separated and cannot locate each other, both divers shall surface immediately. If visibility is less than 3 ft divers will be Line tended with voice communication.

Dive partners operating in pairs are responsible for both the assigned task and each other's safety. The basic rules for buddy diving are:

- Always maintain contact with the dive partner. In good visibility, keep the partner in sight. In poor visibility, use a buddy line.
- Know the meaning of all hand and line-pull signals.
- If a signal is given, it must be acknowledged immediately. Failure of a dive partner to respond to a signal must be considered an emergency.
- Monitor the actions and apparent condition of the dive partner. Know the symptoms of diving ailments. If at any time the dive partner appears to be in distress or is acting in an abnormal manner, determine the cause immediately and take appropriate action.
- Never leave a partner unless the partner has become trapped or entangled and cannot be freed without additional assistance. If surface assistance must be sought, mark the location of the distressed diver with a line and float or other locating device. Do not leave a partner if voice communications or line-pull signals are being used; contact the surface and await assistance or instructions.
- Establish a lost-diver plan for any dive. If partner contact is broken, follow the plan.
- If one member of a dive team aborts a dive, for whatever reason, the other member also aborts and both must surface.
- Know the proper method of buddy breathing.

Standby Diver

The standby diver with a tender is required for all diving operations. The standby diver is a fully qualified diver, assigned to provide emergency assistance, and is ready to enter the water immediately.

The standby SCUBA diver shall don all equipment and be checked by the Diving Supervisor.

The standby diver may then remove the mask and fins and have them ready to don immediately for quick deployment. For safety reasons, at the discretion of the Diving Supervisor, the standby diver may remove the tank.

The standby diver receives the same briefings and instructions as the working diver, monitors the progress of the dive, and is fully prepared to respond if called upon for assistance. The SCUBA standby diver shall be equipped with an octopus rig.

Diver Tender.

The tender works closely with the diver on the bottom. At the start of a dive, the tender checks the diver's equipment and topside air supply for proper operation and dresses the diver. Once the diver is in the water the tender constantly tends the lines to eliminate excess slack or tension. The tender exchanges line-pull signals with the diver, keeps the Diving Supervisor informed of the line-pull signals and amount of diving hose/tending line over the side, and remains alert for the any signs of an emergency.

Tending with a Surface or Buddy Line.

When a diver is being tended by a line from the surface or a buddy line, several basic considerations apply.

- Lines should be kept free of slack.
- Line signals must be given in accordance with the procedures given in Table 8-3.
- Any signals via the line must be acknowledged immediately by returning the same signal.
- The tender should signal the diver with a single pull every 2 or 3 minutes to determine that the diver is all right. A return signal of one pull indicates that the diver is all right.
- If the diver fails to respond to line-pull signals after several attempts, the standby diver must investigate immediately.
- The diver must be particularly aware of the possibilities for the line becoming snagged or entangled.
- If a surface line is not being used, the tender must keep track of the general location of the divers by observing the bubble tracks or the float or locating device (such as a pinger or strobe light). When tending a single diver, the tender shall continually monitor the diver float for diver location and line pull signals.

Support personnel

Other support personnel may include almost any member of the company and when assigned to duties that support diving operations will be properly indoctrinated and trained for the position assigned.

Small-Boat operators shall understand general diving procedures, know the meanings of signals, and be aware of the mission objectives.

Other personnel, such as winch operators or deck crew, might interact with the operation directly, but only when under the control of the Diving Supervisor.

3.B. EMERGENCY PROCEDURES – SCUBA

Equipment Failure

With well-maintained SCUBA equipment that is thoroughly inspected and tested before each dive, operational failure is rarely a problem. When a failure does occur, the correct procedures will depend upon the type of failure. As with most emergencies, the training and experience of the diver, and buddy diver will be the most important factor in resolving the situation safely.

Loss of Gas Supply.

Usually, when a SCUBA diver loses breathing gas it should be increasingly obvious.

- Divers noticing resistance to breathing will check their pressure gauge and go on reserve as necessary.
- Notify their buddy and terminate the dive.
- Upon arrival on the surface divers will notify the Diving Supervisor immediately of having gone on reserve air, their maximum depth and bottom time.

Surfacing divers may be suffering from hypoxia, hypercapnia, missed decompression, or a combination of the three, and should be diagnosed and treated accordingly.

Emergency Free-Ascent Procedures.

If a diver is suddenly without air or if the SCUBA is entangled and the dive partner cannot be reached quickly, a free ascent must be made. Guidelines for a free ascent are:

- Drop any tools or objects being carried by hand.
- Abandon the weight belt.
- If the SCUBA has become entangled and must be abandoned, actuate the quick-release buckles on the waist, chest, shoulder, and crotch straps. Slip an arm out of one shoulder strap and roll the SCUBA off the other arm.
- If the reason for the emergency ascent is a loss of air, drop all tools and the weight belt and actuate the life preserver to surface immediately. Do not drop the SCUBA unless it is absolutely necessary.
- If a diver is incapacitated or unconscious and the dive partner anticipates difficulty in trying to swim the injured diver to the surface, the partner should activate the life preserver or inflate the buoyancy compensator. The weight belt may have to be released also. However, the partner should not lose direct contact with the diver.
- Exhale continuously during ascent to let the expanding air in the lungs escape freely.

Fouling and Entrapment.

- Upon receiving information of a trapped diver alert dive team and standby diver.
- Determine divers' remaining air supply. Provide a new apparatus or air source if required.
- Determine what tools, equipment and personnel are required.
- Deploy Standby diver if required
- If the situation cannot be readily resolved call for assistance.
- Alert medical authorities and recompression chamber.

Once the diver has been freed and returns to the surface, the diver shall be examined and treated, bearing in mind the following considerations:

- The diver will probably be overly tired and emotionally exhausted.
- The diver may be suffering from or approaching hypothermia.
- The diver may have a physical injury.
- The SCUBA diver may be suffering from asphyxia. If a free ascent has been made, gas embolism may have developed.
- Significant decompression time may have been missed.

Loss of communication

If audio communications are lost with SCUBA the system may have failed or the diver could be in trouble. If communications are lost:

- Use line-pull signals at once. Depth, current, bottom or work site conditions may interfere.
- Check the rising bubbles of air. A cessation or marked decrease of bubbles could be a sign of trouble.
- Listen for sounds from the diving helmet. If no sound is heard, the circuit is probably out of order. If the flow of bubbles seems normal, the diver may be all right.
- If sounds are heard and the diver does not respond to signals, assume the diver is in trouble.
- Have divers already on the bottom investigate, or send down the standby diver to do so.

Lost Diver

In planning for an operation using SCUBA, lost diver procedures shall be included in the dive plan and dive brief. Losing contact with a SCUBA diver can be the first sign of a serious problem.

If contact between divers is lost, each diver shall surface. If the diver is not located quickly, or not found at the surface, the Diving Supervisor shall initiate search procedures immediately.

When notified of a lost diver, a search shall be conducted by a tended diver in the area where the lost diver was last seen.

At the same time, medical personnel should be notified and the recompression chamber team alerted.

A lost diver is often disoriented and confused and may have left the operating area. Nitrogen narcosis or other complications involving the breathing mixture, which can result in confusion, dizziness, anxiety, or panic, are common in recovered lost divers. The diver may harm the rescuers unknowingly. When the diver is located, the rescuer should approach with caution to prevent being harmed and briefly analyze the stricken diver's condition.

If the diver is found unconscious, attempts should be made to resupply breathing gas and restore consciousness. If this cannot be accomplished, the diver shall be brought to the surface immediately. Gas Embolism may occur during ascent, significant decompression may be missed and immediate recompression may be required. If it is possible to provide the diver with an air supply such as a single-hose demand SCUBA, the rescuer should do so during the ascent.

Injured diver

- A diver surfacing with an injury shall be recovered as rapidly as possible and assessed for treatment.
- Administer First Aid/CPR as required and ascertain depth and bottom time profile, to determine if decompression was missed.
- Recover any other divers and terminate the dive.
- Once all divers have been recovered, conduct neurological exam if warranted.

Diver blow up/exceeded ascent rate to surface

The following rules apply for correcting variations in rate of ascent. The normal rate of ascent is 30 fsw/min. Minor variations in the rate of travel between 20 and 40 fsw/min are acceptable and do not require correction.

If a diver makes an uncontrolled ascent to the surface at a rate greater than 30 fsw/min, but the dive itself is within no-decompression limits, the diver should be observed on the surface for one hour to ensure that symptoms of decompression sickness or arterial gas embolism do not develop. Recompression is not necessary unless symptoms develop.

If a diver appears on the surface unexpectedly, quickly determine if the diver is okay, depth and bottom time and the cause for surfacing. Terminate the dive and recover all divers. Monitor all divers through clean time and one hour.

If the diver surfaces with an over inflation syndrome

- Recover the diver as soon as possible and place on emergency oxygen.
- Activate the Emergency Assistance checklist. Notify and transport to the nearest recompression facility

Diver loss of consciousness

As a basic rule, any diver who has obtained a breath of compressed gas from any source at depth, whether from diving apparatus or from a diving bell, and who surfaces unconscious, loses consciousness, or has any obvious neurological symptoms within 10 minutes of reaching the surface, must be assumed to be suffering from arterial gas embolism.

1. Alert dive team and deploy standby diver if necessary.
2. Recover diver to dive station and check for vital signs, administer CPR if required.
3. Notify emergency services and transport to recompression chamber.
4. Recompression treatment shall be started immediately. A diver who surfaces unconscious and recovers when exposed to fresh air shall receive a neurological evaluation to rule out arterial gas embolism.

Victims of near-drowning who have no neurological symptoms should be carefully evaluated by a DMO for pulmonary aspiration.

Injury/illness of topside personnel with diver in water
1. Evaluate effect on diver.
2. Inform diver of problem and action planned if possible.
3. Alert Standby Diver.
4. Alert deck crew.
5. The Diving Supervisor will direct first Aid/CPR as necessary, determine the course of action, utilize the EAC, and terminate the dive if required.

Adverse weather conditions
1. Evaluate effect on diver.
2. Inform diver of problem and action planned.
3. Alert Standby Diver.
4. Alert deck crew.
5. Terminate dive.

Conditions for topside personnel shall be considered as well as divers. Lightning is cause for termination of the dive and will not be resumed for 30 minutes post last sighting.

Fire
1. Extinguish fire; secure equipment.
2. Determine damage and effect on diver.
3. If required, terminate dive; commence decompression.

3.C. EQUIPMENT CERTIFICATIONS & INSPECTION CHECKLISTS - SCUBA

VRH equipment modifications, repairs, tests, calibrations, and/or maintenance shall be recorded by means of a tagging and logging system, and include the date and nature of work performed and the signed and printed name of the individual performing the work.

All equipment will be maintained in accordance with manufacturer's recommendations.

All equipment will be inspected in accordance with Appendix C, contained herein.

Air Compressor(s) - VRH or leased air compressors will have air sampling certification documents meeting the requirements contained within Ref. D.

Air storage flasks - Leased air storage flasks will have air sampling certification documents meeting the requirements contained within Ref. D.

Oxygen storage flasks - Leased oxygen storage flasks will have oxygen sampling certification documents meeting the requirements contained within Ref. D.

SCUBA Bottles shall be hydrostatically tested every 5 years and visually inspected every year.

SCUBA charging lines shall be fabricated using SAE 100R7 hose for 3,000 psi service and SAE 100R8 hose for 5,000 psi service.

The use of strain reliefs made from cable, chain, 21-thread, or 3/8-inch nylon, married at a minimum of every 18 inches and at the end of the hose, is a required safety procedure to prevent whipping in the event of hose failure under pressure. Marrying cord shall be 1/8-inch nylon or material of equivalent strength. Tie wraps, tape, and marlin are not authorized for this purpose.

Regulators shall be maintained, tested and inspected in accordance with the manufactures recommendations and prior to every diving mission commencement.

Buoyancy Compensators shall be inspected in accordance with the manufacturers recommendations. Co2 Cartridges shall be weighed prior to every mission and inspected daily prior to diving.

4. OPERATING PROCEDURES & CHECKLISTS - SURFACE SUPPLIED AIR

Prior to the commencement of any diving operation, a Activity Hazard Analysis and EAC shall be completed and all members of the dive team together with other involved personnel shall be present at the pre-dive briefing.

All diving and support personnel shall adhere to the Minimum Rest policy contained in Ref. E. as directed by the Diving Supervisor.

The following are minimum requirements for Surface Supplied Air diving operations.

- Surface Supplied Air (SSA) operations will not be conducted at depths greater than 190 ft. Dives with bottom times of 30 minutes or less may be conducted to 220 ft.

- Exceptional Exposure dives will not be conducted except in emergency lifesaving situations.

- Recompression chambers shall be available and ready for use at the dive location for any dive outside the no-decompression limits or deeper than 100 ft.

- Each diver will be continuously tended while in the water with one diver per tender, regardless of depth.

- A Standby diver who meets all the requirements of the primary diver is required for all surface supplied dives and will be dressed and ready to deploy

- An underwater diver/tender shall be stationed at the point of entry when any penetration diving is conducted, or diving in enclosed/physically confining spaces.

- Each diving operation shall have an identified **Primary air** supply sufficient to support divers for the duration of the planned dive, including decompression.

- Each dive operation shall have an identified **Secondary air** supply integral or in-line with the primary air source sufficient to safely terminate the dive and recover the diver(s) in the event of loss of the primary air supply;

- Each diver must have an **Emergency gas supply** (EGS) available that can be turned on immediately by the diver in the event of loss of air. The reserve breathing air supply shall be of sufficient capacity to recover the diver and

complete emergency decompression (if required) in the event of loss of primary air but no less than 30 Cu.ft.

- An EGS is required on all dives, regardless of depth.

- Each diver must have a reserve breathing supply available that can be turned on immediately by the diver in the event of loss of air. The reserve breathing air supply shall be of sufficient capacity to recover the diver and complete emergency recompression (if required) in the event of loss of primary air but no less than 30 cuft.

- For enclosed space diving an extended EGS whip 50 to 150 feet in length may be used. If the diving scenario requires the EGS topside, adjust the first stage regulator to 150 psi over bottom pressure.

- Electronic communication systems with an external speaker shall be incorporated in all SSA diving operations so the entire dive team can monitor communications. Communications devices shall be tested prior to each dive, maintained in an operable condition, and protected from damage during use and storage.

- All dive operations will be terminated in a safe, orderly fashion using line-pull signals if voice communications are lost. Defective electronic communication equipment shall not prevent a standby diver from deploying in an emergency if the dive supervisor determines it is safe for the diver to deploy and line-pull signals are used.

- All valves and electrical switches that directly influence the air supply shall be labeled:

"DIVER'S AIR SUPPLY- DO NOT TOUCH"

PRE-DIVE PROCEDURES

The **Diving Safety and Planning checklist** should be referenced and incorporated into the pre-dive setup. (See Appendix A).

The **Surface Supplied Equipment Inspection Checklist** should then be utilized. (See Appendix E)

The diving station is neatly organized with all diving and support equipment placed in an assigned location. Deck space must not be cluttered with gear; items that could be damaged are placed out of the way (preferably off the deck). A standard layout pattern should be established and followed.

The primary and secondary air supply systems are checked to ensure that adequate air is available. Air compressors of the divers' air system are started and checked for proper operation. The pressure in the accumulator tanks is checked. If HP air cylinders are being used, the manifold pressure is checked. If a compressor is being used as a secondary air supply, it is started and kept running throughout the dive.

Depth soundings are taken and descent line, stage, stage lines, and connections are checked.

When the Diving Supervisor is satisfied that all equipment is on station and in good operating condition, the next step is to dress the divers.

Dressing the divers

Dressing the divers is the responsibility of the tender

1. Don diving dress (such as a wet suit, dry suit, hot-water suit, or chaffing garment).
2. Don diver's harness, secure, and adjust.
3. If weighted diving shoes or ankle weights are used, they are placed on the diver by the tender and secured.
4. Don neck ring for helmet to be used.
5. Don and adjust weight belt.
6. Secure knife to belt, leg, or arm per diver's preference.
7. With the diver or a second dive-team member holding the mask or helmet, open the emergency gas cylinder (when used).
8. Don mask or helmet and secure mask harness or helmet clamp.
9. Secure the umbilical assembly to harness.
10. After properly dressing the diver, ensure that all equipment is functioning properly, and inform the Diving Supervisor that the diver is ready

Pre-dive Checklist
The Diving Supervisor must always perform pre-dive checks on all divers prior to water entry, using the **Surface Supplied Pre-dive Checklist.** (see Appendix F).

Water Entry and Descent

Divers will enter the water utilizing the safest method determined by the JSA/AHA.

Diving ladders and stages shall:

- Be capable of supporting the weight of two divers plus their gear.
- Ladders must extend a minimum of three feet below surface where installed.
- Be provided with a safety chain and internal hand holds for dive safety during launch and recovery. (Stages)

- Make provisions for mounting of breathing gas cylinder and regulator for emergency breathing at all depths of intended operation. (Stages)

Pre-descent Surface Check.

In the water, prior to descending to operating depth, the diver will make a final equipment check. The diver immediately checks for leaks in the air connections and suit.

If two divers are being employed, both divers perform as many checks as possible on their own rigs and then check their dive partner's rig. The tender or another diver can be of assistance by looking for any telltale bubbles.

A communications check is made and malfunctions or deficiencies not previously noted are reported at this time.

When satisfied that the divers are ready in all respects to begin the dive, they notify the Diving Supervisor and the tenders move the divers to the descent line. When in position for descent, the diver adjusts for negative buoyancy and signals readiness to the Diving Supervisor.

Descent.

Descent may be accomplished with the aid of a descent line or stage. While descending, the diver adjusts the air supply so that breathing is easy and comfortable.

Some specific guidelines for descent are as follows:

- With a descent line, the diver locks the legs around the line and holds on to the line with one hand.

- In a current or tideway, the diver descends with back to the flow in order to be held against the line and not be pulled away. If the current measures more than 1.5 knots, the diver wears additional weights or descends on a weighted stage, so that descent is as nearly vertical as possible.

- When the stage is used for descent, it is lowered with the aid of a winch and guided to the site by a shackle around the descent line. Upon reaching the bottom, the diver exits the stage as directed by the Diving Supervisor.

- The maximum allowable rate of descent, by any method, normally **should not exceed 75 feet per minute (fpm).**

Underwater Procedures

The diver(s) will employ the following techniques to adapt to underwater conditions:

- Upon reaching the bottom and before leaving the area of the stage or descent line, the diver checks equipment and makes certain that the air supply is adequate, and report conditions on the bottom.
- The diver is now ready to move to the work site and begin the assignment.

Divers should follow these guidelines for movement on the bottom areas:

- Before leaving the descent line or stage, ensure that the umbilical is not fouled.
- Loop one turn of the lifeline and air hose over an arm; this acts as a buffer against a sudden surge or pull on the lines.
- Proceed slowly and cautiously to increase safety and to conserve energy.
- If obstructions are encountered, pass over the obstruction, not under or around.
- If the current is strong, stoop or crawl to reduce body area exposed to the current.

Deploying the Standby Diver as a Worker Diver

The standby diver may be deployed as a working diver provided all of the following conditions are met:

- Surface-supplied no-decompression dive of 60 fsw or less.
- Same job/location, e.g., working on port and starboard propellers on the vessel
- Prior to deploying the standby diver, the work area shall be determined to be free hazards (i.e., suctions, discharges) by the first diver on the job site.
- When working in ballast tanks or confined spaces, the standby diver may deploy as a working diver, but both divers shall be tended by a third diver who is outside the confined space.

Ascent & Decompression Procedures

Follow these ascent procedures when it is time for the divers to return to the surface:

1. To prepare for a normal ascent, the diver clears the job site of tools and equipment.

2. Readings from the pneumofathometer are taken as the primary depth measurements.

3. Communicate to the diver **"**Prepare to leave bottom". When all tools and extra lines have been cleared away. and the diver is ready he reports "Ready to leave bottom".

4. The Diving Supervisor informs divers leaving bottom and divers report actually leaving bottom.

5. If, during the ascent, while using a descent line, the diver becomes too buoyant and rises too quickly, the diver checks the ascent by clamping his legs on the descent line.

6. The rate of ascent is a critical factor in decompressing the diver. Ascent must be carefully controlled and directed at 30 feet per minute by the Diving Supervisor. The ascent is monitored with the pneumofathometer. As the diver reaches the stage and climbs aboard, topside is notified of arrival.

7. While ascending and during the decompression stops, the diver must be satisfied that no symptoms of physical problems have developed. If the diver feels any pain, dizziness, or numbness, the diver immediately notifies topside. During this often lengthy period of ascent, the diver also checks to ensure that his umbilical is not fouled.

8. Upon arrival at the surface, topside personnel, timing the movement as dictated by any surface wave action, coordinate bringing the diver and or stage and umbilical up and over the side.

9. If the diver exits the water via the ladder, the tenders provide assistance. The diver will be tired, and a fall back into the water could result in serious injury. Under no conditions is any of the diver's gear to be removed before the diver is firmly on deck.

POST DIVE PROCEDURES

- Divers clean-time begins upon arrival on the surface. Divers will be continuously monitored during this time by an assigned individual.
- During this time the Diving Supervisor will check the condition of all divers.
- Question regarding any physical problems or adverse physiological effects and instruct the diver to report any and all problems.
- Advise the diver of the VRH policy of flying after diving.
- Instruct the diver to remain awake and in the vicinity of the recompression chamber for one hour after any dive deeper than 100 ft. or outside the no-decompression limits.

4.A. ASSIGNMENTS AND RESPONSIBILITIES OF DIVE TEAM MEMBERS - SURFACE SUPPLIED AIR

All diving operations will be manned in accordance with Figure 6-16 (Ref. D) Minimum Manning Levels for Air Diving.

Project Manager;

The Project Manager will ensure the required documents are on hand and up to date, and where required have been approved.

The Project Manager will be available to the Diving Supervisor to answer questions and liaison with and communicate progress to competent authorities.

The Project Manager will conduct random visual inspections of the dive side and proceedings.

Diving Program Manager

The Diving Program Manager will maintain all required publications for diving and ensure their accuracy. He shall be responsible to the Project Manager for updates, or changes to the diving program.

The Diving Program Manager will be responsible for the training and qualifications of each dive team member and the certification of Diving Supervisors.

The Diving Program Manager will be responsible for conducting refresher training courses and diver requalification/training dives.

The Diving Program Manager shall conduct complete inspections of all equipment, personnel and documentation prior to commencement of diving operations.

The Diving Program Manager will conduct a detailed investigation and document his findings for presentation to the Project Manager for any mishap, near mishap or diving injury that occurs during the course of a dive.

Diving Supervisor.

The Diving Supervisor will be designated in writing and in charge of the actual diving operation for a particular dive or series of dives. Diving operations shall not be conducted without the presence of the Diving Supervisor. The Diving Supervisor has the authority and responsibility to discontinue diving operations in the event of unsafe diving conditions.

The Diving Supervisor shall be included in preparing the operational plans. The Diving Supervisor shall consider contingencies, determine equipment requirements, recommend diving assignments, and establish back-up requirements for the operation. The Diving Supervisor shall be familiar with all divers on the team and shall evaluate the qualifications and physical fitness of the divers selected for each particular job. The Diving Supervisor will inspect all equipment and conduct pre-dive briefings of personnel prior to every dive.

While the operation is underway, the Diving Supervisor monitors progress; debriefs divers; updates instructions to subsequent divers; and other personnel as necessary are advised of progress and of any changes to the original plan.

The Diving Supervisor will terminate the dive and report any unsafe conditions, actions or events that may occur to the VRH Project Manager and Diving Program Manager as soon as possible for resolution and documentation..

When the mission has been completed, the Diving Supervisor gathers appropriate data, analyzes the results of the mission, prepares reports to be submitted to higher authority, and ensures that required records are completed. These records may range from equipment logs to individual diving records.

Diver(s)

The diver is responsible for the diving gear worn and shall ensure that it is complete, in good repair and tested.

To ensure safe conduct of the dive, the diver shall always obey a signal from the surface and repeat all commands when using vice communications.

Accomplish all tasks assigned by the Diving Supervisor. In the event the diver is assigned a task for which he does not consider himself competent either by training and/or experience, the diver shall immediately inform the Diving Supervisor.

Read, understand, and comply with all employer's policies and with applicable governmental regulations as they relate to their qualifications or performance while engaging in diving operations.

While working, the diver shall keep topside personnel informed of conditions on the bottom, progress of the task, and of any developing problems that may indicate the need for changes to the plan or a call for assistance from other divers.

Ensure that the deepest depth attained during their dive has been established before their ascent.

Maintain a diver's logbook which details all dives, medical examinations, courses taken, certification level achieved, and personal equipment maintenance.

Ensure that medical certificates are up-to-date and recorded in their diver's logbook. Present their logbook to the Diving Supervisor on every job for his signature.

Maintain certification in First Aid, CPR, and Oxygen use.

Standby Diver

The Standby Diver in the carrying out of his duties and responsibilities shall:

- Be capable and qualified to carry out all of the duties and responsibilities of the diver as set forth above.
- Have fitted his diving helmet or mask to the Standby Diver's umbilical in a wrench-tight status and then shall check for proper flow of breathing medium and for adequate communications.

The diving helmet or mask shall be ready to be donned by the Standby Diver when directed by the Diving Supervisor.

He shall remain in the immediate vicinity of the diver water entry location, and be ready to enter the water when directed by the Diving Supervisor.

Diver Tenders

The duties of a tender are to: assist the diver with donning and checking equipment; continuously tend the diver's umbilical during water entry/exit; continuously tend the diver's umbilical and be aware of the diver's depth and location, at all times while the diver is in the water; assist the diver in undressing; and continually monitor the diver after completion of the dive as directed by the Diving Supervisor.

Specifically the Tender;

- Assists the diver in donning diver-worn equipment.
- After properly dressing the diver, ensure that all equipment is functioning properly, and inform the Diving Supervisor that the diver is ready.

- When the diver is ready to dive, the tender directs and assists the diver from the dressing area to the water-entry point. The tender always keeps one hand on the umbilical close to the diver, and the other hand on the diver's helmet or body harness, while assisting the diver during water entry.
- As the diver enters the water, the tender handles the umbilical. The tender must be careful to keep the diver's umbilical away from sharp edges, rotating machinery, and other hazards that could result in damage to or fouling of the umbilical.
- When a descending line is used by the diver, the tender should handle the umbilical from a point at least ten feet from the descending line.
- During the dive, the tender must be alert for, and immediately report to the Diving Supervisor, conditions or situations that may be hazardous or unsafe to the diving operations.
- The tender also must assist the diver in controlling his rate of descent by keeping excess slack out of the umbilical, and track the diver's relative position by continuously monitoring the tautness and location of the umbilical, direction and movement of surface bubbles
- Throughout the dive, the tender must keep slack out of the umbilical while at the same time holding it taut therefore, the tender must always hold the diver's umbilical firmly with at least one hand to receive the line-pull signals.
- When the dive is complete and the diver is ready to leave the water, the tender assists the diver to the water-exit point and keeps a taut-tension on the umbilical while the diver climbs the ladder; and provides assistance as directed when the diver exits by other means.
- When the diver returns to the bench or staging area the tender always keeps his/her hands on the umbilical close to the diver and on the diver's helmet or body harness maintaining positive control of the diver while assisting the diver to the derigging/undressing area.

Support personnel

Other support personnel may include almost any member of the company and when assigned to duties that support diving operations will be properly indoctrinated and trained for the position assigned.

Small-Boat operators shall understand general diving procedures, know the meanings of signals, and be aware of the mission objectives.

Other personnel, such as winch operators or deck crew, might interact with the operation directly, but only when under the control of the Diving Supervisor.

4.B. EMERGENCY PROCEDURES - SURFACE SUPPLIED AIR

Fire

1. Extinguish fire; secure equipment.
2. Determine damage and effect on diver.
3. If required, terminate dive; commence decompression.

Equipment failure

1. Evaluate effect on diver.
2. Inform diver of problem and action planned.
3. Alert Standby Diver.
4. Alert deck crew.
5. Diver informs topside of his readiness.
6. Terminate dive.

Adverse weather conditions

The Diving Supervisor shall evaluate changing weather conditions and determined if termination is necessary. Conditions for topside personnel shall be considered as well as divers. Lightning is cause for termination of the dive.

1. Evaluate effect on diver and dive team
2. Inform diver of problem and action planned.
3. Alert Standby Diver.
4. Alert deck crew.
5. Diver informs topside of his readiness.
6. Terminate dive.

Trapped or fouled diver/umbilical

1. Avoid panic and ensure diver does not ditch equipment.
2. Diver informs topside.
3. Alert Standby Diver.
4. Diver determines extent of entrapment.
5. Diver attempts to free himself.
6. If required, send Standby Diver to diver's assistance.
7. When diver is free, if unable or unwilling to continue the dive, or if Standby Diver was required to go to his assistance, terminate dive.

Loss of vital support equipment

1. Evaluate effect on diver.
2. Inform diver of problem and action planned.
3. Alert Standby Diver.
4. Alert deck crew.
5. Diver informs topside of his readiness.
6. Terminate dive.

Loss of gas supply

1. Re-establish breathing media supply by:
    - Activating topside Secondary air supply, or
    - Diver goes on bailout bottle, or
    - Put constant purge on diver's pneumo hose then have diver insert the hose into helmet/mask.
2. Alert standby diver.
3. Diver goes to descent line or stage.
4. If required, deploy Standby Diver for assistance.
5. Terminate dive.

Loss of communication

1. Attempt to establish line-pull signals.
2. Put air to diver's pneumo.
3. Alert Standby Diver.
4. Diver proceeds to descent line or stage .
5. Bring diver to first stop or surface once line-pull signals are established.
6. If required (unable to establish any form of communications with diver), send Standby Diver to diver's assistance prior to bringing diver to his first stop.
7. Terminate dive.

Injured diver

1. Diver informs topside and dive is aborted.
2. Alert Standby Diver.
3. Diver determines nature and extent of injury.
4. If required, send Standby Diver down to assist diver, administer first aid, and evaluate injury. Standby Diver should remain with diver.
5. Standby Diver assists injured diver to surface, following proper decompression procedures, except when severity of injury indicates a greater risk than omitting decompression.
6. Request required medical assistance and emergency evacuation (if required).
7. Monitor breathing. If breathing stops, overpressure diver's regulator, if possible.
8. A diver surfacing with an injury shall be recovered as rapidly as possible and assessed for treatment.

9. Administer First Aid/CPR as required and ascertain depth and bottom time profile, to determine if decompression was missed. Once all divers have been recovered, conduct neurological exam if warranted.

Diver blow up/exceeded ascent rate to surface

If a diver blows up and makes an uncontrolled ascent to the surface, but the dive itself is within no-decompression limits, the diver should be observed on the surface for one hour to ensure that symptoms of decompression sickness or arterial gas embolism do not develop. Recompression is not necessary unless symptoms develop.

1. If a diver appears on the surface unexpectedly, quickly determine if the diver is okay.
2. Recover the diver, deploy standby diver if required.
3. Determine amount of decompression missed and treat accordingly.
4. Terminate the dive and recover all divers. Monitor all divers thorough clean time and one hour.

Diver loss of consciousness (on surface)

As a basic rule, any diver who has obtained a breath of compressed gas from any source at depth, whether from diving apparatus or from a diving bell, and who surfaces unconscious, loses consciousness, or has any obvious neurological symptoms within 10 minutes of reaching the surface, must be assumed to be suffering from arterial gas embolism.

1. Alert dive team and deploy standby diver if necessary.
2. Recover diver to dive station and check for vital signs, administer CPR if required.
3. Notify emergency services and transport to recompression chamber.
4. Recompression treatment shall be started immediately. A diver who surfaces unconscious and recovers when exposed to fresh air shall receive a neurological evaluation to rule out arterial gas embolism.

Victims of near-drowning who have no neurological symptoms should be carefully evaluated by a DMO for pulmonary aspiration.

Injury/illness of topside personnel with diver in water

1. Administer first aid as required, notify medical assistance as necessary. Evaluate effect on diver.
2. Inform diver of problem and action planned.
3. Alert deck crew.
4. Terminate dive if required.

4.C. EQUIPMENT CERTIFICATIONS & INSPECTION CHECKLISTS - SURFACE SUPPLIED AIR

All equipment will be maintained in accordance with manufacturer's recommendations.

All equipment will be inspected in accordance with Appendix E, contained herein.

Equipment modifications, repairs, tests, calibrations, or maintenance shall be recorded by means of a tagging or logging system, and include the date and nature of work performed and the name of the individual performing the work.

Air Compressor(s) - VRH or leased air compressors will have air sampling certification documents meeting the requirements contained within Ref. D.

Air Storage Flasks - Leased air storage flasks will have air sampling certification documents meeting the requirements contained within Ref. D.

Oxygen Storage Flasks - Leased oxygen storage flasks will have oxygen sampling certification documents meeting the requirements contained within Ref. D.

Umbilical's - Umbilical's shall be marked, beginning at the divers end, in 10 ft increments to 100 ft and in 50 ft increments thereafter.

Umbilical Markings

Distance (from diver's end)	Marking
10 ft [3 m]	one white band
20 ft [6.1 m]	two white bands
30 ft [9.2 m]	three white bands
40 ft [12.2 m]	four white bands
50 ft [15.2 m]	one yellow band
60 ft [18.3 m]	1 yellow/1 white
70 ft [21.3 m]	1 yellow/2 white
80 ft [24.4 m]	1 yellow/3 white
90 ft [27.4 m]	1 yellow/4 white
100 ft [30.5 m]	1 red band
150 ft [45.7 m]	1 red/1 yellow
200 ft [61 m]	2 red bands
250 ft [76.2 m]	2 red/1 yellow
300 ft [91.5 m]	3 red bands

For each 50 ft thereafter the sequence continues by increasing the number of red bands at each even increment of 100 ft (30.5 m). In cases where the umbilical color matches an above band color, a reasonable substitute may be used (contrasting outline on same-color tape, contrasting diagonal pattern, replacement with color not used above). Umbilical's shall have a nominal breaking strength of 1000 lb and shall be made of kink resistant materials.

Hoses shall have a maximum allowable working pressure equal to or greater than the maximum depth of dive relative to supply source plus 150 psi, and have a rated bursting pressure at least four times the working pressure.

Hoses must be tested prior to being placed into initial service and after any repair, modification, or alteration and at least every 12 months to 1.5 times the working pressure. Umbilical assemblies shall be tensile tested at the same time intervals by subjecting each hose-to-fitting connection to a 200 pound axial load.

When hoses are not in use, their open ends must be closed by taping or other means.

Diving helmets and harnesses will be certified by the manufacturer upon purchasing and maintained by the diver IAW Ref. E.

5. SAFETY INSPECTION CHECKLIST (INTERNAL)

VRHabilis shall conduct Safety Inspections in accordance with the following schedule & checklist.

Daily

Dive Program Manager or Project Manager will conduct periodic spot checks and ensure as a minimum the following has been completed.

- Verify Equipment Checklist has been completed.
- Visually inspect Dive site and water entry/egress location.
- Determine diver's physical/mental condition and fit to dive status.
- Ensure Code Alpha/Civilian dive flags displayed and illuminated if at night.
- Test communications with all support agencies and notify diving operations are commencing.
- Ensure dive briefing is conducted to include days dive plan, EAC, AHA
- Ensure First Aid Kits available and ensure Emergency Oxygen breathing supply is adequate..
- Verify dive systems have been secured after last dive.
- Verify Code Alpha/Civilian dive flags removed after last dive.
- Notify all support agencies and inform when diving operations are complete.
- Complete daily project description/progress report, maintain with daily dive log.
- Inspect all equipment/vehicles used in emergency injury transport

Weekly

- Inventory First Aid Kits and inspect Emergency Oxygen breathing supply.
- Perform Pre-mission non-return valve check when helmet has been in storage, and weekly when diving .

Monthly

- Inspect Fire Extinguishers
- Test/operate diving compressors.
- Review Daily dive log and progress reports

Quarterly

- Review Divers Personal Dive Log books. Pre-mission when diving.

Semi Annually

- Inspect Air compressor and obtain air sampling analysis
- Calibrate all gauges used in diving.

Annually

- Visually inspect Volume tank internally and externally for damage or corrosion.
- Visually inspect air storage tanks internally and externally for damage or corrosion.
- Visually inspect all divers umbilical's and pressure test.
- Conduct Hydrostatic tests on all air/oxygen cylinder/storage tanks every 5th year.

6. DIVER FITNESS FOR DUTY REQUIREMENTS

For persons engaged as divers, or otherwise subjected to hyperbaric conditions, the requirements contained in Ref. E. will be adhered to.

The following recommendations are to be used with the **Medical History/Physical Examination Forms**. These forms will be maintained by VRH as required in Ref A.

These standards are the minimum requirements. The use of these standards is intended to be tempered with the good judgment of the examining physician. Where there is doubt about the medical fitness of the subject, the examining physician should seek the further opinion and recommendations of an appropriate specialist in that field.

Particular attention must be paid to past medical and diving history. In general, a high standard of physical and mental health is required for diving.

Consequently, in addition to excluding major disqualifying medical conditions, examining physicians should identify and **give careful consideration** to minor, chronic, recurring or temporary mental or physical illnesses which may distract the diver and cause him to ignore factors concerned with his own or others safety.

These standards, in general, apply to all divers. Some consideration must be given to the subject's medical history, work history, age, etc.

There is no minimum or maximum age limit providing all the medical standards can be met. Ref E. does, however, restrict issue of Commercial Diver Certification Cards to persons 18 years of age or older.

Serious consideration must be given to the need for all divers to have adequate reserves of pulmonary and cardiovascular fitness for use in an emergency. The lack of these reserves may possibly lead to the termination of a professional diving career.

The examining physician should exercise the appropriate professional judgment to determine whether, in particular circumstances, additional testing may be warranted. Disqualification for an inability to meet any of these standards must be determined on a case-by-case basis related only to the specific job functions of the position being applied for, and assuming reasonable accommodations cannot be made.

Examinations will be conducted annually, in conjunction with Hazmat examinations. A re-examination after a diving-related injury or illness will be conducted as needed to determine fitness to return to diving duty

Physical Examination

For persons engaged as divers or otherwise subjected to hyperbaric conditions, the initial exam and periodic medical re-examination include the following:

- Work history
- The tests required in **Table 1** as appropriate
- Any tests deemed necessary to establish the presence of any of the disqualifying conditions.
- Any additional tests the physician deems necessary to prepare the written report.

Re-examination after Injury or Illness

Any person engaged as a diver, or otherwise exposed to hyperbaric conditions, will have a medical examination following a known diving-related injury or illness which requires hospitalization of 72 hours or more (unless national or local laws dictate otherwise),

Physician's Written Report

A written report outlining a person's medical condition and fitness to engage in commercial diving or other hyperbaric activities should be provided by the examining physician at any time a physical examination is required herein. The written **Physical Examination Form** should be accompanied with a completed copy of the standard **Medical History Form** or its equivalent.

The examining physician should be qualified by experience or training for the conduct of commercial diver physical examinations and if not, should consult with another medical practitioner so qualified.

Disqualifying Conditions

A person having any of the following conditions, as determined by a physician's examination shall be disqualified from engaging in diving or other hyperbaric activities.

- History of seizure disorder other than early childhood febrile conditions
- Cystic or cavitary disease of the lungs, significant obstructive or restrictive lung disease, or recurrent pneumothorax
- Chronic inability to equalize sinus and middle ear pressure
- Significant central or peripheral nervous system disease or impairment
- Chronic alcoholism, drug abuse, or history of psychosis
- Significant hemoglobinpathies
- Significant malignancies

- Grossly impaired hearing
- Significant osteonecrosis
- Chronic conditions requiring continuous control by medication
- Pregnancy

Withdrawal from Hyperbaric Conditions

It shall be determined on the basis of the physician's examination, whether a person's health will be materially impaired by continued exposure to hyperbaric conditions. The physician should indicate any limitations or restrictions which would apply to the person's work activities in his written report.

Medical Record Keeping

An accurate medical record for each person subject to the medical specifications of this section should be established and maintained. The record should include those physical examinations specified herein including the **Medical History/Physical Examination Forms** and the physician's written report.

The medical record shall be maintained for a minimum of five years from the date of the last hyperbaric exposure unless otherwise prescribed by law.

7. ADMINISTRATIVE AND RECORDKEEPING PROCEDURES

All administrative and recordkeeping procedures will be maintained IAW Ref.A.

The **record maintained for each diving operation must include**: the full names of the dive-team members, including the designated person-in-charge; the date, time, and location of the dive; the diving mode(s) used; a general description of the work performed; the approximate underwater and surface conditions; and the maximum depth and bottom time for each diver, surface intervals with group designators, breathing medium, depth and duration of decompression stops an date and time of last dive if within 48 hours. This information will be recorded on the **VRH Daily Dive Log and maintained in the VRH Smooth Log .**

The following additional information is required for dives outside the no-decompression limits, deeper than 100 fsw, or using mixed-gas: depth-time and breathing-gas profiles; decompression tables (including any modifications); and, for repetitive diving, the elapsed time since the last pressure exposure (if less than 24 hours) or the repetitive dive designation for each diver.

When two or more divers are working simultaneously, the information required may be kept for the divers on one record. However, if the divers have different dive exposures or use different decompression tables, then separate entries must be made for each diver.

Accident reporting will be conducted in accordance with references A, E and G, (OSHA, ADCI and USCG).

For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information must be recorded and maintained: a description of decompression sickness symptoms (including depth and time of onset); and a description of treatment results. The information required also shall be recorded on the OSHA 300 Log ("Log of Work-Related Injuries and Illnesses").

VRH shall maintain a log of recordable work-related injuries and illnesses. The purpose of this requirement is to document recordable illnesses, including incidents of decompression sickness, even when the initial symptoms include such manifestations as skin itch, slight joint cramps, and slight numbness of the extremities. Although seemingly innocuous, these symptoms are recognized and suspected as mild forms of decompression sickness. Symptoms and treatments must be recorded similarly to any other injury or illness.

VRH will maintain a current physical examination for every diver every year as well as the initial exam as a baseline reference.

Diver's Personal Log Books

All divers shall maintain a personal dive log book (ADCI Commercial Diver Log Book) or equivalent to detail hyperbaric exposures. The Log Book must be identified to the diver using it by photograph, signature, and home address. As a minimum, the following information shall be entered in the Log Book:

- Diving contractor's name and address
- Date of the dive
- The name or other designation and location of the diving site or vessel from which the diving operation was carried out
- Maximum depth reached on the dive
- The time left surface, bottom time, and the time reached surface for each hyperbaric exposure
- Surface interval, if dive includes time for decompression
- Type of breathing apparatus and breathing mixture used
- Task performed
- Type of designation of the decompression table and schedule used

Maintenance Records

- Suitable equipment logs shall be established and maintained in a correct and current condition.
- All equipment shall have a unique identity traceable to the equipment log.
- Entries made in the equipment log shall describe the nature of the work performed, including the dates of modification, repair or test, the name of the individual performing the work or test, and the particular piece of equipment involved.
- Individual persons performing maintenance, repair, calibration, test, or modification of any diving equipment shall both print and sign their name in the equipment log.
- Each diving helmet or mask used in the conduct of commercial diving operations shall be inspected and maintained in accordance with the manufacturer's suggested procedure. Required inspections and/or tests shall be logged and verified in the logbook of the owner of the device.

APPENDIX A
DIVING SAFETY AND PLANNING CHECKLIST

(Sheet 1 of 4)

STEPS IN PLANNING OF DIVING OPERATIONS - Detailed, advanced planning is the foundation of diving safety.

A. ANALYZE THE MISSION FOR SAFETY.

__ Ensure mission objective is defined.
__ Determine that non-diving means of mission accomplishment have been considered and eliminated as inappropriate.
__ Coordinate emergency assistance.
__ Review relevant Naval Warfare Publications (NWP) and OPNAV instructions.

B. IDENTIFYAND ANALYZE POTENTIAL HAZARDS.

__ **Natural Hazards:**

1.Atmospheric:
__ Exposure of personnel to extreme conditions
__ Adverse exposure of equipment and supplies to elements
__ Delays or disruption caused by weather

2.Surface:
__ Sea sickness
__ Water entry and exit
__ Handling of heavy equipment in rough seas
__ Maintaining location in tides and currents
__ Ice, flotsam, kelp, and petroleum in the water
__ Delays or disruption caused by sea state

3.Underwater and Bottom:
__ Depth which exceeds diving limits or limits of available equipment
__ Exposure to cold temperatures
__ Dangerous marine life
__ Tides and currents
__ Limited visibility
__ Bottom obstructions
__ Ice (underwater pressure ridges, loss of entry hole, loss of orientation, etc.)
__ Dangerous bottom conditions (mud, drop-offs, etc.)

__ **On-Site Hazards:**
__ Local marine traffic or other conflicting naval operations
__ Other conflicting commercial operations
__ High-powered, active sonar
__ Radiation contamination and other pollution (chemical, sewer outfalls, etc.)

__ **Mission Hazards:**
__ Decompression sickness
__ Communications problems
__ Drowning
__ Other trauma (injuries)
__ Hostile action

__ **Object Hazards:**
__ Entrapment and entanglement
__ Shifting or working of object
__ Explosives or other ordnance

DIVING SAFETY AND PLANNING CHECKLIST
(Sheet 2 of 4)

C. SELECT EQUIPMENT, PERSONNEL and EMERGENCYPROCEDURES.

__ **Diving Personnel:**
- __ 1. Assign a complete and properly qualified Diving Team.
- __ 2.Assign the right man to the right task.
- __ 3. Verify each member of the Diving Team is properly trained, qualified for the equipment and depths involved.
- __ 4. Determine that each man is physically fit to dive, paying attention to:
  - __ general condition and any evidence of fatigue
  - __ record of last medical exam
  - __ ears and sinuses
  - __ severe cold or flu
  - __ use of stimulants or intoxicants
- __ 5.Observe divers for emotional readiness to dive:
  - __ motivation and professional attitude
  - __ stability (no noticeably unusual or erratic behavior)

__ **Diving Equipment:**
- __ 1.Verify that diving gear chosen and diving techniques are adequate and authorized for mission and particular task.
- __ 2.Verify that equipment and diving technique are proper for depth involved.
- __ 3.Verify that life support equipment has been tested & approved for U.S. Navy use.
- __ 4.Determine that all necessary support equipment and tools are readily available and are best for accomplishing job efficiently and safely.
- __ 5. Determine that all related support equipment i.e. winches, boats, cranes, floats, etc. are operable, safe and under control of trained personnel.
- __ 6.Check that all diving equipment has been properly maintained (with appropriate records) and is in full operating condition.

__ **Provide for Emergency Equipment:**
- __ 1. Obtain suitable communications equipment with sufficient capability to reach outside help; check all communicationss for proper operation.
- __ 2.Verify that a recompression chamber is ready for use,or notify the nearest command with one that its use may be required within a given timeframe.
- __ 3. Verify that a completely stocked first aid kit is at hand.
- __ 4. If oxygen will be used as standby first aid, verify that the tank is full and properly pressurized, and that masks, valves, and other accessories are fully operable.
- __ 5.If a resuscitator will be used, check apparatus for function.
- __ 6. Check that fire-fighting equipment is readily available and in full operating condition.
- __ 7.Verify that emergency transportation is either standing by or on immediate call.

__ **Establish Emergency Procedures:**
- __ 1.Know how to obtain medical assistance immediately.
- __ 2. For each potential emergency situation, assign specific tasks to the diving team and support personnel.
- __ 3.Complete and post Emergency Assistance Checklist; ensure that all personnel are familiar with it.
- __ 4.Verify that an up-to-date copy of U.S. Navy Decompression Tables is available.
- __ 5.Ensure that all divers, boat crews and other support personnel understand all diver hand signals.
- __ 6.Predetermine distress signals and call-signs
- __ 7.Ensure that all divers have removed anything from their mouths on which they might choke during a dive (gum, dentures, tobacco).
- __ 8.Thoroughly drill all personnel in Emergency Procedures, with particular attention to cross-training; drills should include:
  Emergency recompression Rapid undressing Fire First aid Rapid dressing Embolism Restoration of breathing Near-drowning Electric shock Blowup Entrapment Lost diver

DIVING SAFETY AND PLANNING CHECKLIST

(Sheet 3 of 4)

D. ESTABLISH SAFE DIVING OPERATIONAL PROCEDURES

__ Complete Planning, Organization, and Coordination Activities:

__ 1.Ensure that other means of accomplishing mission have been considered before deciding to use divers.
__ 2.Ensure that contingency planning has been conducted.
__ 3. Carefully state goals and tasks of each mission and develop a flexible plan of operations (Dive Plan).
__ 4.Completely brief the diving team and support personnel (paragraph 6-7).
__ 5. Designate a Master Diver or properly qualified Diving Supervisor to be in charge of the mission.
__ 6.Designate a recorder/timekeeper and verify that he understands his duties and responsibilities.
__ 7.Determine the exact depth at the job-site through the use of a lead line, pneumofathometer, or commercial depth sounder.
__ 8.Verify existence of an adequate supply of compressed air available for all planned diving operations **plus an adequate reserve for emergencies.**
__ 9.Ensure that no operations or actions on part of diving team, support personnel, technicians, boat crew, winch operators, etc., take place without the knowledge of and by the direct command of the Diving Supervisor.
__ 10. All efforts must be made through planning, briefing, training, organization, and other preparations to minimize bottom time. Water depth and the condition of the diver (especially fatigue), rather than the amount of work to be done, shall govern diver's bottom time.
__ 11.Current decompression tables shall be on hand and shall be used in all planning and scheduling of diving operations.
__ 12.Instruct all divers and support personnel not to cut any lines until approved by the Diving Supervisor.
__ 13.Ensure that ship, boat, or diving craft is securely moored and in position to permit safest and most efficient operations (exceptions are emergency and critical ship repairs).
__ 14.Verify that, when using surface-supplied techniques, the ship, boat, or diving craft has at least a two-point moor.
__ 15.Ensure that, when conducting SCUBA operations in hazardous conditions, a boat can be quickly cast off and moved to a diver in distress.

__ Perform Diving Safety Procedures, Establish Safety Measures:

__ 1.Ensure that each diver checks his own equipment in addition to checks made by tenders, technicians or other support personnel.
__ 2.Designate a standby diver for all diving operations; standby diver shall be dressed to the necessary level and ready to enter the water if needed.
__ 3.Assign buddy divers, when required, for all SCUBA operations.
__ 4.Take precautions to prevent divers from being fouled on bottom. If work is conducted inside a wreck or other structure, assign a team of divers to accomplish task. One diver enters wreck, the other tends his lines from point of entry.
__ 5. When using explosives, take measures to ensure that no charge shall be fired while divers are in water.
__ 6.Use safety procedures as outlined in relevant Naval publications for all U/W cutting and welding operations.
__ 7.Brief all divers and deck personnel on the planned decompression schedules for each particular dive. Check provisions for decompressing the diver.
__ 8. Verify that ship, boat, or diving craft is displaying proper signals, flags, day shapes, or lights to indicate diving operations are in progress. (Consult publications governing International or Inland Rules, International/Inland local signals, and Navy communications instructions.)
__ 9.Ensure that protection against harmful marine life has been provided. (See Appendix 5C.)
__ 10.Check that the quality of diver's air supply is periodically and thoroughly tested to ensure purity.
__ 11.Thoroughly brief boat crew.
__ 12.Verify that proper safety and operational equipment is aboard small diving boats or craft.

DIVING SAFETY AND PLANNING CHECKLIST

(Sheet 4 of 4)

__ **Notify Proper Parties that Dive Operations Are Ready to Commence:**

__ 1. Diving Officer
__ 2. Commanding Officer
__ 3.Area Commander
__ 4. Officer of the Deck/Day
__ 5. Command Duty Officer or Commanding Officer of ships alongside
__ 6.Bridge, to ensure that ship's personnel shall not:
    __ turn the propeller or thrusters
    __ get underway
    __ activate active sonar or other electronics
    __ drop heavy items overboard
    __ shift the moor
__ 7. Ship Duty Officer, to ensure that ship's personnel shall not:
    __ activate sea discharges or suctions
    __ operate bow or stern-planes or rudder
    __ operate vents or torpedo shutters
    __ turn propellers
__ 8.Other Interested Parties and Commands:
    __ Harbor Master/Port Services Officer
    __ Command Duty Officers
    __ Officers in tactical command
    __ Cognizant Navy organizations
    __ U.S. Coast Guard (if broadcast warning to civilians is required)
__ 9.Notify facilities having recompression chambers and sources of emergency transportation that diving operations are underway and their assistance may be needed

APPENDIX B
EMERGENCY ASSISTANCE CHECKLIST

EMERGENCY MEDICAL SERVICE (EMS) Location: Phone Number: Remarks:	RECOMPRESSION CHAMBER Location: Phone Number: Remarks:
DIVING MEDICAL OFFICER Location: Name: Phone Number: Response Time:	LAW ENFORCEMENT: Location: Phone Number: Remarks:
FIRE DEPARTMENT Location: Phone Number: Remarks:	EMERGENCY CONSULTATION Navy Experimental Dive Unit (NEDU) Phone Numbers 24 Hours a Day (850) 234-4351 (850) 230-3100
DIVERS ALERT NETWORK (DAN) Location: Phone Number: (919) 684-8111 Collect Remarks: USCG Rescue Coordination Center Location: Phone Number Remarks	TRANSPORTATION Location: Phone Number: Remarks:

IN THE EVENT OF AN ACCIDENT AFTER TAKING APPROPRIATE EMERGENCY ACTION CONTACT VR HABILIS LLC PROJECT MANAGER (865) 806-6689 OFFICE (508) 410-1306

APPENDIX C

VRHABILIS LLC - SCUBA EQUIPMENT INSPECTION CHECKLIST

Project _____Inspection Done By_____Date_____

SCUBA PRE-DIVE PROCEDURES - Pre-dive procedures for SCUBA operations include equipment prep, diver prep, and conducting a pre-dive inspection before the divers enter the water.

A. Equipment Preparation. Prior to any dive, all divers must carefully inspect their own equipment for signs of deterioration, damage, or corrosion. The equipment must be tested for proper operation. Pre-dive preparation procedures must be standardized, not altered for convenience, and must be the personal concern of each diver.

Air Cylinders.

__ 1. Inspect air cylinder exteriors and valves for rust, cracks, dents and any evidence of weakness.

__ 2. Inspect O-ring.

__ 3. As required verify that the reserve mechanism is closed (lever in up position) signifying a filled cylinder ready for use or that each diver is equipped with a minimum of 30 ft3 of air (bailout) and separate regulator. An octopus is not considered to be an alternate air source.

__ 4. Gauge the cylinders. Record the pressure.

Harness Straps , Backpack and Safety Harness.

__ 1. Check the hoses for cracks and punctures.

__ 2. Adjust straps for individual use and test quick-release mechanisms.

__ 3. Check backpack for cracks and other unsafe conditions.

__4. Check all straps, webbing positive buckling device, attachment point for the safety line, and a lifting point to distribute the pull force of the line over the diver's body while maintaining the body in a heads-up vertical position when unconscious or inert.

Breathing Hoses.

__ 1. Attach regulator**(s)** to the cylinder manifold, ensuring that the O-ring is properly seated.

__ 2. Test the connections of each hose at the regulator and mouthpiece assembly by tugging on the hose.

__ 3. Check the clamps for corrosion and damage; replace as necessary.

Regulator.

__ 1. Attach regulator**(s)** to the cylinder manifold, ensuring that the O-ring is properly seated.

__ 2. Crack the cylinder valve open and wait until the hoses and gauges have equalized.

__ 3. Next open the cylinder valve completely and then close (back off) one-quarter turn.

__ 4. Check for any leaks in the regulator by listening for the sound of escaping air. If a leak is suspected, determine the exact location by submerging the valve assembly and the regulator in a tank of water and watch for escaping bubbles. Frequently the problem can be traced to an improperly seated regulator and is corrected by closing the valve, bleeding the regulator, detaching and reseating. If the leak is at the O-ring and reseating does not solve the problem, replace the O-ring and check again for leaks.

Life Preserver/Buoyancy Compensator (BC)

__ 1. Orally inflate preserver to check for leaks and then squeeze out all air. The remaining gas should be removed after entry into the water by rolling onto the back and depressing the oral inflation tube just above the surface. Never suck the air out, as it may contain excessive carbon dioxide.
__ 2. Inspect the carbon dioxide cartridges to ensure they have not been used (seals intact) and are the proper size for the vest being used and for the depth of dive.
__ 3. The firing pin should not show wear and should move freely.
__ 4. The firing lanyards and life preserve straps must be free of any signs of deterioration.
__ 5. When the life preserver inspection is completed, place it where it will not be damaged. Life preservers should never be used as a buffer, cradle, or cushion for other gear.

Face Mask.

__ 1. Check the seal of the mask and the condition of the head strap.
__ 2. Check for crack in the skirt and faceplate.

Swim Fins.

__ 1. Check straps for signs of cracking.
__ 2. Inspect blades for signs of cracking.

Dive Knife.

__ 1. Test the edge of the knife for sharpness.
__ 2. Ensure the knife is fastened securely in the scabbard.
__ 3. Verify that knife can be removed from the scabbard without difficulty, but will not fall out.

Snorkel.

__ 1. Inspect the snorkel for obstructions.
__ 2. Check the condition of the mouthpiece.

Weight Belt.

__ 1. Check the condition of the weight belt.
__ 2. Make sure that the proper number of weights are secure and in place.
__ 3. Verify that the quick-release buckle is functioning properly.

Submersible Wrist Watch.

__ 1. Ensure wrist watch is wound and set to the correct time.
__ 2. Inspect the pins and strap of the watch for wear.

Depth Gauge and Compass.

__ 1. Inspect pins and straps.
__ 2. If possible, check compass with another compass.
__ 3. Make comparative checks on depth gauges to ensure depth gauges read zero fsw on the surface.

Miscellaneous Equipment.

__ 1. Inspect any other equipment that will be used on the dive as well as any spare equipment that may be needed during the dive including spare regulators, cylinders, and gauges.
__ 2. Check all protective clothing, lines, tools, flares, and other optional gear.

B. Diver Preparation and Brief. When the divers have completed inspecting and testing their equipment, they shall report to the Diving Supervisor. The divers shall be given a Pre-dive briefing of the dive plan. This briefing is critical to the success and safety of any diving operation and shall be concerned with only the dive about to begin. All personnel directly involved in the dive should be included in the briefing. Minimum items to be covered are:

__ 1. Dive objectives
__ 2. Time and depth limits for the dive
__ 3. Task assignments
__ 4. Buddy assignments
__ 5. Work techniques and tools
__ 6. Phases of the dive
__ 7. Route to the work site
__ 8. Special signals
__ 9. Anticipated conditions
__10. Anticipated hazards
__11. Emergency procedures (e.g., unconscious diver, trapped diver, loss of air, aborted dive, injured diver, lost diver, etc.)

APPENDIX D

VRHABILIS LLC - SCUBA PRE-DIVE CHECKLIST

Project _____Inspection Done By_____Date_____

The divers must report to the Diving Supervisor for a final inspection. During this final pre-dive inspection the Diving Supervisor must:

- ☐ Ensure that the divers are physically and mentally ready to enter the water.
- ☐ Verify that all divers have all minimum required equipment (SCUBA, face mask, life preserver or buoyancy compensator, **safety harness**, weight belt, dive knife, scabbard, swim fins, watch and depth gauge). When diving SCUBA and a buddy line is used, only one depth gauge and one watch per dive team is required.
- ☐ Verify that the cylinders have been gauged and that the available volume of air is sufficient for the planned duration of the dive.
- ☐ Ensure that all quick-release buckles and fastenings can be reached by either hand and are properly rigged for quick release.
- ☐ Verify that the weight belt is outside of all other belts, straps, and equipment and will not become pinched under the bottom edge of the cylinders.
- ☐ Verify that the life preserver or buoyancy compensator is not constrained and is free to expand, and that all air has been evacuated.
- ☐ Check position of the knife to ensure that it will remain with the diver no matter what equipment is left behind.
- ☐ Ensure that the cylinder valve is open fully and backed off one-quarter to one-half turn.
- ☐ Ensure that the hose supplying air passes over the diver's right shoulder and the exhaust hose on the double-hose unit passes over the left shoulder. Double-hose regulators are attached so that the exhaust ports face up when the tank is standing upright.
- ☐ With mouthpiece or full face mask in place, breathe in and out for several breaths, ensuring that the demand regulator and check valves are working correctly.
- ☐ Depress and release the purge button at the mouthpiece and listen for any sound of leaking air. Breathe in and out several times ensuring valves are working correctly.
- ☐ Give the breathing hose and mouthpiece a final check; ensure that none of the connections have pulled open during the dressing process.
- ☐ Check that the air reserve mechanism lever is up (closed position).
- ☐ Conduct a brief final review of the dive plan.
- ☐ Verify that the dive signals are displayed and personnel and equipment are ready to signal other vessels in the event of an emergency.

APPENDIX E

VRHABILIS LLC - PRE-MISSION SURFACE-SUPPLIED EQUIPMENT CHECKLIST

Project _____Inspection Done By_____Date_____

CAUTION - This checklist is an overview intended for use with the appropriate equipment O&M technical manual.

A. Basic Preparation:

__1. Verify that a recompression chamber is on the diving station for dives of more than 100 fsw or outside the No-Decompression limits.

__2. Ensure that all personnel concerned, or in the vicinity, are informed of diving operations.

__3. Determine that all valves, switches, controls, and equipment components affecting diving operation are tagged-out to prevent accidental shut-down or activation.

B. General Equipment:

__4. Verify that all diving system components have been properly assembled on station and arranged to facilitate smooth operations.

__5. Verify that proper signals indicating underwater operations being conducted are displayed correctly.

__6. Compressors:

- __a. Ensure that compressor is secure in diving craft and shall not be subject to operating angles, caused by roll or pitch that will exceed 15 degrees from the horizontal.
- __b. Check that the divers air compressor oil supply is adequate and does not overflow the fill mark; contamination of air supply could result from fumes or oil mist.
- __c. Check the fuel and oil level in the divers air compressor engine for proper level.
- __d. Check the compressor exhaust is vented away from work areas and, specifically, does not foul the compressor intake.
- __e. Check that compressor intake is obtaining a free and pure suction without contamination. Use pipe to lead intake to a clear suction if necessary.
- __f. Check all filters, cleaners and oil separators for cleanliness.
- __g. Bleed off all condensed moisture from filters and from the bottom of volume tanks. Check all manifold drain plugs, and that all petcocks are closed.
- __h. Check that all belt-guards are properly in place on drive units.
- __i. Check the fuel and oil in the electric generator.
- __j. Check the fuel and oil in all support equipment.
- __k. Verify that all supply hoses running to and from the compressor have proper leads, do not pass near high-heat areas, are free of kinks and bends, and are not exposed on deck in such a way that they could be rolled over, damaged, or severed by machinery or other means.

__l. Verify that all pressure supply hoses have safety lines and strain relief's properly attached.
__m. Make connections between primary and secondary air supply and diver's volume tank and console.

C. Activate the Air Supply:

__7. Compressors:
__a. Ensure that all warm-up procedures are completely followed.
__b. Check all petcocks, filler caps, overflow points, bleed valves, and drain plugs for leakage or malfunction of any kind.
__c. Verify that there is a properly functioning pressure gauge on the volume tank and that the compressor is meeting its delivery requirements.
__8. Cylinders:
__a. Gauge all H/P cylinders for adequate pressure.
__b. Gauge all EGS cylinders.
__c. Check all manifolds and divers console valves for operation.
__d. Activate and check delivery.
__9. For all supply systems, double check "Do Not Touch" tags.

D. Equipment Protection:

__10. Assemble and lay out all dive equipment, both primary equipment and standby spares for diver (or standby diver), including all accessory equipment and tools.
__11. Check all equipment for superficial wear, tears, dents, distortion, or other discrepancies.
__12. Check all masks, helmets, neckdamns, faceplates, seals, and visors for damage.
__13. Check all exhaust and non-return valves.
__14. Check all harnesses, laces, strain reliefs, and lanyards for wear; renew as needed.
__15. Check all masks, helmets for communications, cameras and lights.

E Diving Hoses:

__15. Ensure all diver's umbilical are laid out and have a clear fairlead.
__16. Bleed air through diver's umbilical to check that hoses are free of moisture.

F. Test Equipment with Activated Air Supply.

__17. Hook up all air hoses to helmets, masks
__18. Verify flow to helmets and masks.
__19. Hook up and test all communications, cameras and lights as required.

G. Recompression Chamber Checkout (If required):

__1. Check that chamber is completely free and clear of all combustible materials.

__2. Hook up all air and oxygen hoses to chamber.
__3. Check primary and back-up air supply to chamber and all pressure gauges.
__4. Check that chamber is free of all odors or other "contaminants."
__5. Hook up and test all communications.
__6. Check air flow from both primary and back-up supplies to chamber.

H. Final Preparations:

__1. Verify that all necessary records, logs, and timesheets are on the diving station.
__2. Check that appropriate decompression tables are readily at hand.
__3. Place the dressing bench in position, reasonably close to the diving ladder or stage, to minimize diver travel.

APPENDIX F

VRHABILIS LLC - SURFACE SUPPLIED PRE-DIVE CHECKLIST

Project_____Inspection Done By_____Date_____

When the divers have completed inspecting and testing their equipment, they shall report to the Diving Supervisor. The divers shall be given a pre-dive briefing of the dive plan. This briefing is critical to the success and safety of any diving operation and shall be concerned with only the dive about to begin. All personnel directly involved in the dive should be included in the briefing. Minimum items to be covered are:

- ☐ Clear, brief statement of the mission/dive objectives.
- ☐ Time and depth limits for the dive
- ☐ Dive station assignments and responsibilities.
- ☐ Review of all tasks required to complete the mission.
- ☐ Review of diving phases from water entry to post dive.
- ☐ Anticipated conditions expected throughout the dive both underwater and topside.
- ☐ Review of Job Safety Analysis/AHA .
- ☐ Any changes to operating procedures due to specific underwater operations.
- ☐ Specific signals to be used
- ☐ Question the health of each diver instruct them to report any physical conditions, problems or adverse physiological effects that may render the diver unfit to dive.
- ☐ Conditions that will cause the termination of the dive
- ☐ Review the Emergency Assistance Checklist and all Emergency Procedures

The tenders report to the Diving Supervisor for a final inspection. During this final Pre-dive inspection the Diving Supervisor must:

- ☐ Ensure that the divers are physically and mentally ready to enter the water.
- ☐ Verify that all divers have all required equipment and tools.
- ☐ Verify that the diver's minimum manifold pressure is sufficient for the depth of the dive.
- ☐ Verify the EGS pressure, ensure the cylinder valve is shut, helmet supply valve is open, inform the diver.
- ☐ Verify the weights are sufficient for the diving apparatus in use.
- ☐ Check the position of the knife to ensure it will not be lost.
- ☐ Ensure the diver's umbilical is properly rigged to the harness and will not come undone.
- ☐ Verify air flow to helmets and don helmets.
- ☐ Witness divers perform surface checks and ensure proper operation.
- ☐ Perform communications checks between topside and all divers.
- ☐ Deploy divers and conduct in-water checks and check for leaks.
- ☐ When satisfied and diver reports ready to leave surface, start time keeping and recording devices as required.

APPENDIX G
VRHabilis Daily Dive Log & Repetitive Dive Worksheet

VRH DAILY DIVE LOG & REPETITIVE DIVE WORKSHEET

Job Name _____ Location _____

Job No. _____ Date _____ Start Time _____ Secure Time _____

Diving task & job description: Breathing medium and apparatus used

Date & Time of last previous Dive

CREW AND POSITION

DIVING CONDITIONS

Weather _____ Air Temp _____ Water Temp _____

Current _____ Visibility _____ Tide Schedule: MWH _____ MLW _____

Primary Air Pressure _____

Emergency Air Pressure _____ Initials _____

		1	2	3	4	5
Diver #1	Leave Surface					
	Leave Bottom					
	Reach Surface					
Bail-Out PSI	Bottom Time					
	Depth/Penetration					
	Schedule					
	Repet Group					
	Surface Interval					
	NewGroup/RNT					

		1	2	3	4	5
Diver #2	Leave Surface					
	Leave Bottom					
	Reach Surface					
Bail-Out PSI	Bottom Time					
	Depth/Penetration					
	Schedule					
	Repet Group					
	Surface Interval					
	New Group/RNT					

Table & Schedule used _____ Depth and Duration of any stops _____. RNT Rule Y/N

Signature _____ Date _____

APPENDIX H

USN No-Decompresson Limits & Repetitive Group Designation Table for No-Decompression Air Dives.

USNDM Page 9-62

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APPENDIX I

USN Residual Nitrogen Time Table for Repetitive Air Dives

USNDM Page 9-63

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APPENDIX J

USN Standard Air Decompression Tables

USNDM Pages 9-64 thru 9-82

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APPENDIX K

VRHabilis LLC
Policy Statement of Compliance

VRHabilis LLC will administer and conduct all diving operations in accordance with OSHA 29 CFR 1910 Subpart T and USACE Publication 385-1-1.

All Standard and Emergency Operating Procedures will be conducted in accordance with the USNDM current revision.

All personnel engaged in Diving Operations acknowledge these requirements and submit by their signature below that they have read, understand and will comply with these standards

Dated_____

Signed _____Printed _____

VRH Project Manager_____Printed_____

APPENDIX L.

VRHabilis LLC
Designated Diving Supervisor Certification Letter

_____is hearby designated VRH Diving Supervisor.

VRH having reviewed your qualification and training authorize you to supervise all diving operations on Air.

You are directed to conduct all diving operations in accordance with OSHA 29 CFR 1910 Subpart T, and US Army Corps of Engineers Publication 385-1-1, current revisions.

You are directed to maintain your knowledge of all diving, standard and emergency operating procedures as well as recompression procedures.

The VRH Safe Practices Manual will be on site for every diving evolution.

VRH Diving Program Manager_____ Date_____

VRH Project Manager _____Date_____

APPENDIX M

OSHA 29 CFR 1910 SUBPART T

Pages 1-62

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APPENDIX N

USACE Publication 385-1-1, SECTION 30

DIVING OPERATIONS

30.A GENERAL

30.A.01 All USACE diving operations, both government and contractor shall be performed in accordance with this manual. Failure to meet these requirements will be cause for rejection or cessation of operations. Unless otherwise delegated in this section, requests for waivers or variance to the requirements of this section must be made in accordance with Appendix N of this manual through the local Designated Dive Coordinator (DDC) or the Alternate Dive Coordinator (ADC) acting on their behalf.

30.A.02 The USACE Command, at their discretion, may elect to implement and enforce more conservative diving requirements than stated herein, but under no circumstances will the operational requirements be less than specified in this Section.

30.A.03 Diving shall not be used as a work method if the work objective can be more safely and efficiently accomplished by another means (e.g., using remote controlled television systems in lieu of divers).

30.A.04 Surface-Supplied Air (SSA) shall be used whenever possible in accordance with the practical constraints of diving operations.

30.A.05 Live boating will not be used without prior specific acceptance by the DDC.

30.A.06 Training documentation shall be in compliance with the OSHA Diving Standards 29 CFR 1910.410 and shall show that the dive team members have successfully completed training to the appropriate level (e.g., SSA diver's certificate, surface supplied mixed-gas diver certificate). Such training shall be provided by:

a) A commercial diving school, military school, Federal school (e.g., USACE), or an Association of Commercial Diving Educators (ACDE) accredited school;
b) An in-house training program that meets the requirements contained in ANSI/ACDE-01, or in the Association of Diving Contractors International (ADCI) Consensus Standards;
c) Training for Scientific Divers using compressed air (SCUBA or SSA), shall be in compliance with 29 CFR 1910.410 and shall meet the above requirements or the training guidelines in the Standards for Scientific Diving published by the American Academy of Underwater Scientists (AAUS).

30.A.07 In substitution for a training certificate, an ADCI member company may show proof of a dive team member's qualification or experience by submitting a valid "ADCI Card" for the appropriate training level issued by the current employer.

30.A.08 Contractors shall provide evidence that each dive team member has training and experience consistent with the performance requirements of the scope of work. As a minimum, each team member shall have at least 1 year of commercial experience in the applicable position; divers shall have completed at least four (4) working dives with similar decompression techniques as in the contract, using the particular diving techniques and equipment to be used under the contract. Divers shall demonstrate that at least one (1) of the four (4) qualification dives was performed in the last 6 months prior to the contract award date. The DDC will ensure USACE divers meet the training and qualification requirements of ER 385-1-86.

30.A.09 Each dive team member shall have current certification in CPR, first aid, the use of emergency oxygen systems, and, if provided on the dive site, the use of Automated External Defibrillators (AEDs). Evidence of this will be a photocopy of the certificates.

30.A.10 Divers will receive an annual diving physical. A statement that each diver has been medically examined within the previous 12 months and has been determined fit and approved to dive shall be signed by a licensed physician. The DDC will maintain a file of physician clearance certifications for all USACE divers. Contractors shall submit physician's certification to the DDC in accordance with 30.A.14. After any serious diving injury or illness, divers shall be re-examined by a physician and approved for diving.

30.A.11 Divers will wait at least 12 hours before flying after any dive: this interval should be extended to 24 hours following multiple days of repetitive dives.

30.A.12 When diving at altitudes of 1000 ft (304.8 m) or more of elevation above sea level, Dive Supervisors shall use appropriate high altitude decompression tables that compensate for the increased elevation.

30.A.13 Contract diving operations will be monitored and/or inspected by personnel qualified as USACE Dive Inspectors. Individual USACE Dive teams shall be inspected during operations at least once annually by the DDC, ADC and/ or Dive Safety Representative (DSR)
a. Qualified Dive Inspectors shall hold current USACE training certification as Dive Inspector, Diver/ Dive Supervisor, Dive Safety Administrator, or Dive Coordinator; however, use of trained monitors/inspectors with other credentials will be considered on a case-by-case basis and may be approved in writing by the DDC. All USACE personnel used as dive inspectors must be approved by the DDC prior to performing inspector duties.
b. Inspectors shall conduct on-site monitoring/ inspections of contractor dive sites during pre-dive conference, equipment inspection, and initial dives. Monitoring may be continuous for the

duration of the contract dive activity or intermittent, as determined by the DDC based on an evaluation of the job complexity and degree of hazards.

30.A.14 The following documents are required for all USACE and Contractor diving operations. All documents will be reviewed and found acceptable by two of the following: DDC/ ADC/ DSR, prior to start of diving operations. Contractors shall submit the documents through the Contracting Officer. Additional documentation may be required depending on the scope of the diving operation:

a. Safe Practices Manual. ***> See 30.A.16.***
b. Dive Operations Plan(s). ***> See 30.A.17.***
c. AHA to cover all aspects of the job. ***> See 30.A.18.***
d. Emergency Management Plan. ***> See 30.A.19.***
e. Dive Personnel Qualifications. ***> See 30.A.06 – 10.***

> Note: The above review requirement is that two qualified USACE personnel independently evaluate the documents prior to acceptance. The ADC may substitute for either the DDC or DSR in the review and/or acceptance process if these personnel are not available at the time of review.

30.A.15 A Dive Operations Plan, AHA, emergency management plan, and personnel list with qualifications will be developed for each separate diving operation. These documents will be submitted to the DDC for review and found acceptable prior to commencement of diving operations and will be at the diving location at all times. Each of these documents will become a part of the project file. Potential high-hazard conditions, such as penetration diving, contaminated environment diving, dives outside the no decompression limits, and in areas where differential pressure entrapment hazards exist, will be specifically addressed in each document when they are anticipated as part of the diving operation.

30.A.16 Safe Practices Manual. Contractors and USACE Districts/ Labs with in-house dive teams shall develop and maintain a safe practices manual that encompasses their entire diving program. The safe practices manual shall be available at all times to the Government representative and all dive team members at each diving location. The safe practices manual shall include, as a minimum, the following:

a) Dive safety procedures and checklists;
b) Assignments and responsibilities of dive team members;
c) Equipment certifications, procedures, and inspection checklists;
d) Emergency procedures for fire, equipment failure, adverse weather conditions, and medical illness or injury and specific procedures for:
    1) Entrapped or fouled diver including fouled umbilical (suction and entanglement / debris);
    2) Actions upon loss of vital support equipment;
    3) Actions upon loss of gas supply;

4) Action upon loss of communication;
5) Lost diver plan;
6) Injured diver plan;
7) Actions upon discovery of fire;
8) Diver blow up/over rapid ascent to surface;
9) Diver loss of consciousness; and
10) Injury/illness of member of surface crew with diver in the water.

e) Procedures for internal safety inspections (frequency, checklists, etc.);
f) A complete copy of OSHA, 29 CFR 1910, Subpart T, and a statement of the employer's policy for ensuring compliance with the standard;
g) The appropriate U.S. Navy Table(s), including as a minimum;
   1) U.S. Navy Table of No-Decompression Limits and Repetitive Group Designation for No-Decompression Air Dives;
   2) (2) U.S. Navy Residual Nitrogen Timetables for Repetitive Air Dives;
   3) U.S. Navy Standard Air Decompression Table.
h) A sample of the diving log sheets to be used;
i) A sample of the repetitive dive worksheets or equivalent (dive profile method) to be used;
j) An outline of the fitness for duty (including medical) requirements for dive team members, and
k) An outline of administrative and recordkeeping procedures.

30.A.17 Dive Operations Plan. This plan is a general overview of all tasks to be performed, dive modes and equipment, site access, etc. Complex projects involving more than one work task, location, and/or dive team require task-specific dive plans as part of the overall Dive Operations Plan. As a minimum the Dive Operations Plan will contain the following:

a) Date of dive plan submission;
b) Name and contact information for Diving Supervisor preparing the dive plan;
c) Names and duties of on-site dive team members, including Diving Supervisor;
d) List of diving equipment to be used;
e) Type of diving platform to be used;
f) Detailed description of the mission; Identify how/ if work will be divided into separate tasks or phases of work;
g) Date(s), time(s), duration, and location of operation;
h) Diving mode used (SCUBA, SSA, and snorkeling) including a description of the backup air supply, as required;
i) Nature of work to be performed by the divers, including tools used and materials to be handled or installed;
j) Anticipated surface and underwater conditions, to include visibility, temperature, currents, etc. Thermal protection will be considered as appropriate;

k) Maximum single dive bottom time for the planned depth of dive for each diver. Altitude adjustments to dive tables will be calculated for dives made at altitudes of 1000 ft (304.8 m) or more above sea level;
l) Identification of topside assistance/support to the dive team (i.e., crane operator, lock operator, etc.);
m) Means of direct communication between the dive site and the project office, the lockmaster/USACE Project Manager, and the contracting officer (if applicable);
n) Plans submitted for Contractor operations shall also include the name of Contractor (and diving subcontractor if applicable), Contract number, and names and contact information for key personnel.

< NOTE: The dive plan will include the following statement: "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."

30.A.18 Activity Hazard Analysis. An AHA represents the dive team's best effort to anticipate and mitigate or prevent the adverse effects of equipment failure, extreme weather/environmental conditions, or other hazardous/unexpected situations.

a) AHA's shall address risk to personnel, property and to impacts to the overall USACE mission. When required, a new AHA shall be conducted to reflect changes in site conditions, operational changes, etc.
b) Each AHA will be job specific and address each phase of work, to include the hazards associated with flying after diving.
c) For USACE dive teams, a Risk Assessment Code should be applied to high hazard jobs, with residual risk being approved by the appropriate level of command.
d) Control of Hazardous Energy (Lockout/ Tagout) procedures in accordance with Section 12 of this manual and procedures for dealing with differential pressures will be included if appropriate. If Hazardous Energy Control procedures are required for the diving operation, the Diving Supervisor will visually check all lockout/tagout and other control procedures/devices to assure they are in place and redundant where possible prior to the commencement of the diving operation. A copy of any clearances/permits to be issued to deal with identified hazards will be attached to the AHA.
e) Some dives may be sufficiently complex to warrant several separate analyses.
f) The AHA will be covered in detail at the pre-dive conference.

30.A.19 Emergency management plan. An emergency management plan will be prepared for each dive operation. The minimum content of the plan will be as follows:

a) Location and phone number of nearest operational recompression chamber if not located at the dive site and the Divers Alert Network (DAN) phone number (919-684-8111);

b) Location, directions to and phone number(s) of nearest hospital(s) or available physicians capable of treating dive injuries;
c) Location and phone number of nearest USCG Rescue Coordination Center, where appropriate;
d) Description of an emergency victim transport plan including phone numbers of appropriate emergency transport services;
e) Procedures and phone numbers or other means of communications to activate emergency services at the facility where the work is being performed;
f) Diver rescue procedures conducted by the dive team, including responsibilities of team members, best location(s) where injured divers may be removed from the water, and best location(s) for performing first aid/ stabilization prior to emergency medical assistance arrival.

30.A.20 Prior to the initial work on each dive operation, a Pre-Dive Conference shall be held with key personnel designated by the DDC to discuss the Dive Operations plan, AHA, and Emergency Plan and any modifications needed. For contractor operations, the pre-dive conference will also be attended by the USACE dive inspector or DDC and a representative of the Contractor with sufficient authority to implement any changes required by the USACE diving inspector or coordinator.

30.A.21 Prior to each dive, the entire dive team will be briefed in detail on the following (as a minimum):

a. Description of mission and location, including drawings and/or photographs pertinent to the mission and equipment and materials that are to be installed as part of the mission;
b. Description of diving apparatus/equipment and craft to be used;
c. Maximum working depth with estimated bottom times and water temperatures;
d. Names and duties of personnel on the team (when possible, incorporate at least one person on the dive that has previously performed the same or similar mission);
e. Discussion of AHA; and
f. Emergency procedures.

30.A.22 Upon completion of each diving operation or at the conclusion of each day, a dive team debriefing shall be conducted by the dive supervisor. At the debriefing divers are advised of the location of the nearest recompression chamber (if not located on site), the phone number for DAN or local dive medical facility, and cautioned on the limitations of their post dive activities including repetitive dives and flying.

30.A.23 If for any reason the dive mission is altered, minor to moderate revisions to the accepted dive plan will be reviewed and accepted by the DDC or ADC prior to continuing the operation. These revisions may include differences in time, date, dive team members, work methods/ tools used, and other changes that do not affect overall risk. This review may be conducted electronically or verbally and confirmed in writing after completion of the dive

operation. Major changes or those which modify high-risk activities, such as modifying pressure differential and hazardous energy controls, adding penetration diving, changing dive equipment modes (i.e. from SCUBA to SSA), discovery of unexpected contaminated diving conditions, etc. require a two-person review as outlined in 30.A.14. For contract operations, the project superintendent or the dive supervisor shall submit/ request the revised plan through the GDA for DDC acceptance.

30.A.24 All diving activities shall be conducted with full knowledge and close coordination with the GDA and on-site authorities such as the lockmaster/Project Manager, etc.

30.A.25 For each diver and dive, the following dive log information, as a minimum, shall be recorded and maintained at the dive location:

a. Full name;
b. Date, time and location of dive;
c. Maximum depth and bottom time;
d. Surface interval between dives;
e. Breathing medium and type of equipment used;
f. Group classification at the beginning and end of each interval and repetitive dive worksheet;
g. Underwater and surface conditions;
h. Depth(s) and duration(s) of any decompression stops;
i. Date and time of last previous dive if it occurred in the last 48 hours;
j. Name of Dive Supervisor(s) during dive;
k. General description of work performed; AND
l. For dives outside the no-decompression limits, deeper than 100 (30.5m) feet salt water (fsw), or using mixed-gas, include depth-time and breathing-gas profiles and decompression tables (including any modifications).

30.A.26 For each dive in which decompression sickness and/or pulmonary barotraumas is suspected or symptoms are evident, the following information shall be recorded and maintained:

a. Descriptions of signs and symptoms (including depth and time of onset);
b. Description and results of treatment; and
c. Name, address, and phone number of attending physician.

30.A.27 Prior to the dive, the Dive Supervisor shall assure, as a minimum, the following pre-dive checks are performed:

a. Breathing air tanks contain sufficient air supply to perform the required work (i.e., standby air tanks are on site and full to the capacity);
b. All diving equipment shall be checked for proper function prior to diver entry;
c. All necessary safety equipment specified herein is on site and functioning properly;
d. Lockout/tagout procedures are followed;

e. When applicable, crane signals are reviewed and radio communication with the crane operator is functioning properly;
f. When applicable, welding or cutting procedures are clearly reviewed, the proper welder polarity is set, and precautions have been taken to ensure that electrocution will not occur;
g. When applicable, blasting procedures are clearly reviewed and precautions have been taken to ensure unplanned/ unscheduled blasts will not occur;
h. A pre-dive briefing shall be given that includes, but is not limited to, the accident management plan, AHA, equipment checklist, diving logs, diving conditions, and diving procedures;
i. When applicable, manbaskets used for diver access shall be inspected and load tested prior to use.

30.A.28 Copies of the dive logs shall be submitted to the DDC after completion of the dive operation. For USACE dive teams, these records shall be maintained on file for two years.

30.B DIVING OPERATIONS

30.B.01 Staging areas, where the fully suited and equipped diver enters the water, shall be selected and configured based on a hazard analysis that includes an examination of:
a. ease of diver access to the water;
b. hazards to diver (currents, equipment, etc.) in route from surface to work area;
c. ability of standby diver to access the water immediately and to reach the diver quickly;
d. if used as the topside dive team station, the ability to protect topside members and the standby diver from weather, operational, and other hazards;
e. whether topside equipment can be stowed safely and function properly;
f. if diver entry to water is remote from the staging area, the standby diver shall be placed at the water entry or immediately accessible to it.

30.B.02 All Dive teams shall be manned in accordance with the criteria established in Appendix O.

30.B.03 A standby diver will be provided whenever a diver(s) is in the water to serve as immediate emergency assistance to the primary diver(s). Untethered SCUBA divers, working in "buddy" pairs, shall have one standby at the surface for each pair. A standby will deploy only after the dive supervisor assesses the situation and instructs him/ her to do so.

a) The standby diver shall be fully equipped to dive and readily available the entire time the diver is in the water. The standby shall don all specific gear (suits, harnesses, and equipment) they will wear/use and test all for proper operation before the primary diver leaves the surface. All gear shall be maintained operational and ready for immediate use for the duration of the dive. If any of the tested gear is exchanged or replaced during the dive, it shall be donned and tested by the standby.

b) The standby diver shall be dressed appropriately for the water and air temperature and remain fully suited up with helmet/ mask ready for immediate donning from the time the primary diver leaves the surface until reaching the work area/ working depth. At that point, the standby may remove the portions of his or her gear needed to prevent heat/cold stress and prevent fatigue. If the AHA identifies a need for the standby to remain fully dressed to deploy, it will address measures that will be taken to control these hazards (i.e., standby in water at surface). Any gear that has been removed must be maintained ready for immediate donning and use, accessible to the standby at the entry to the water.
c) If configuration of the surface staging area prevents safe, immediate entry of the standby into the water, the standby diver will be placed in the water fully dressed prior to the primary diver leaving the surface, and remain at the surface ready for deployment if needed.

30.B.04 Dive operations that require surface decompression as an integral part of the dive operation shall have a trained competent person, whose sole purpose is to attend to the chamber operation. In dive operations where the chamber is required for emergency, first aid, or used for other unexpected recompression events, a team member with other team duties (tender, console operations, etc.) not diving during the current dive may serve as the chamber operator so long as he is specifically trained and competent in hyperbaric chamber operations. If used for the latter purpose, all diving shall be suspended during the chamber operations. Whenever a chamber is on site, the competent chamber operator shall be capable of communicating with a diving physician. Divers completing a recompression dive will remain within 30 minutes drive time from a fully operable and staffed recompression chamber for a minimum of 2 hours after completing the recompression dive.

30.B.05 Dive operations will be conducted in full coordination with external operations and processes that may impact the safety of the dive.

a) When the operation of machinery or release of hazardous energy will affect the diver or dive team safety, the dive supervisor will develop a Hazardous Energy Control Plan (see Section 12). When diving at a facility with an existing Hazardous Energy Control Plan, the dive supervisor will review the facility's plan and establish positive control procedures with the facility leader.
b) When water traffic, land-based traffic, industrial operations, heavy equipment operation, or other operations exist that present a hazard to the diver or dive team, the dive supervisor shall coordinate with the controlling authorities to minimize the hazards.

30.B.06 Crane operations conducted to support diving operations shall follow the requirements of Section 16 of this manual. All working dives requiring communications between the divers and topside to direct crane load movements, etc., shall be performed in Surface Supplied Air mode. The crane operator will take direction from the tender or supervisor directly in

communication with the diver. Crane operations where the load is placed or removed underwater shall be considered Critical Lifts and the diver/ load director will participate in the Critical Lift Plan development as outlined in Section 16.H.

30.B.07 When dives will take place in an area or facility where potential or actual pressure differentials exist (locks, dams, spillways, powerhouses, etc.), the dive supervisor will develop specific plans and procedures, in coordination with the facility operator, to prevent diver exposure to pressure differentials. The plans and procedures shall be site-specific and include the following:

a. Identification of all potential exposure points (gate sills, valve openings, holes, etc.);
b. Means for identifying whether control structures/ mechanisms are fully in place (measurements of stop gates and openings, valve indicators, etc.);
c. Methods for checking pressure differential openings (observing current/ water flow, remote testing of opening area with objects (rope, sandbags, cinders, etc.);
d. Route diver will take from staging area to work area with specific designs to prevent diver and umbilical from uncontrolled pressure differential openings;
e. Procedures for immediate emergency pressure equalization or reduction, if possible, AND
f. Procedures for emergency diver extraction or rescue due to pressure differential exposure, including standby diver deployment precautions.

30.C SCUBA OPERATIONS

30.C.01 SCUBA diving operations shall not be conducted:

a. At depths greater than 100 ft (30.5 m);
b. On dives outside the no-decompression limits unless a dual lock, multi-place, recompression chamber (capable of recompressing diver at the surface to a depth equivalent to 165 ft (50.3 m) of sea water) is available at the dive location and is immediately available for use, a trained competent operator is on site, and the chamber is of sufficient size to accommodate the diver as well as an inside tender;
c. Against currents exceeding one knot;
d. In enclosed or physically confining spaces;
e. Using closed circuit or semi-closed circuit SCUBA;
f. In visibility less than 3 ft (0.9 m) unless line tended with diver/surface two-way voice communications;
g. In areas where pressure differentials exist and it cannot be positively verified that all potential leaks have been eliminated;
h. When the diver does not have direct access to the surface.

30.C.02 Specific operational requirements for SCUBA operations are as follows:

a. Each SCUBA diver shall be equipped with a bailout bottle with a minimum of 30 ft^3 (0.85 m^3) of air and separate regulator. An octopus is not considered to be an alternate air source.

b. Each diver shall be equipped with a buoyancy compensation device (BCD) and/or an inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve.

c. Each SCUBA diver shall be equipped with a submersible cylinder pressure gauge capable of being monitored by the diver during the dive.

d. Each SCUBA diver shall be equipped with a weight belt or assembly capable of quick release.

e. Each SCUBA diver shall be equipped with a depth gauge and knife.

f. SCUBA air cylinders shall comply with the following requirements:

(1) Air cylinders of seamless steel or aluminum that meet DOT 3AA and DOT 3AL specifications are approved for used on USACE projects;

(2) Each cylinder used on USACE projects must have identification symbols stamped into the shoulder of the tank; and

(3) SCUBA tanks used on USACE projects must be visually inspected internally at least annually and hydrostatically tested at least once every 5 years in accordance with DOT and the CGA regulations; test dates will be stamped into the shoulder of each tank.

g. A timekeeping device shall be used for recording diving times for all SCUBA diving operations. When two-way voice communications are not used, each dive supervisor and diver shall have a timekeeping device. When two-way voice communications are used, the dive supervisor, at a minimum shall have a timekeeping device.

h. Each tethered SCUBA diver shall wear a safety harness with a positive buckling device, attachment point for the safety line, and a lifting point to distribute the pull force of the line over the diver's body while maintaining the body in a heads-up vertical position when unconscious or inert.

30.D SURFACE SUPPLIED AIR (SSA) OPERATIONS

30.D.01 SSA operations shall not be conducted at depths greater than 190 ft (57.9 m) except that dives with bottom times of 30 minutes or less may be conducted to depth of 220 ft (67 m). Exceptional exposure dives, as defined by the US Navy Diving Manual, shall not be conducted except in emergency lifesaving situations. USACE in-house SSA operations shall not exceed a depth of 110 ft unless a waiver is requested by the DDC and approved by the HQUSACE Dive Safety Program Manager.

30.D.02 SSA equipment components shall be a type specifically designed to be used in diving support systems.

30.D.03 Dual lock, multi-place, recompression chambers shall be available and ready for used at the dive location for any dive outside the no-decompression limits or deeper than 100 ft (30.4 m). Sufficient oxygen shall be available to complete chamber operations.

30.D.04 A bell shall be used for dives with an in-water decompression time greater than 120 minutes, unless heavy gear is worn or diving is conducted in physically confining spaces.

30.D.05 Minimum specific operational requirements for SSA diving operations are as follows:

a. Each diver shall be continuously tendered while in the water, with one diver per tender, regardless of depth;

b. An underwater tender/diver shall be stationed at the underwater point of entry when any penetration diving is conducted or in enclosed or physically confining spaces;

c. Each diving operation shall have a primary breathing air supply sufficient to support divers for the duration of the planned dive, including decompression;

d. Each diver must have a reserve breathing supply available that can be turned on immediately by the diver in the event of loss of air. The reserve breathing air supply shall be of sufficient capacity to recover the diver and complete emergency recompression (if required) in the event of loss of primary air but no less than 30 ft^3 (0.85 m^3). Heavy-gear diving is exempted from these provisions because the gear carries its own reserve;

e. Each dive location shall have a reserve breathing air supply integral or in-line with the primary air source sufficient to safely terminate the dive and recover the diver(s) in the event of loss of the primary air supply;

f. For dives deeper than 100 ft (30.5 m) or outside the no decompression limits and using heavy gear, a spare air supply hose, to replace the diver's air hose should it become damaged, shall be available to the standby diver. An in-water support stage shall be provided to divers in water when using heavy gear, regardless of depth;

g. Electronic communication systems with an external speaker shall be incorporated in all SSA diving operations so the entire dive team can monitor communications. Communications devices shall be tested prior to each dive, maintained in an operable condition, and protected from damage during use and storage IAW the manufacturer's recommendations. All dive operations will be terminated in a safe, orderly fashion using line-pull signals if voice communications are lost. Defective electronic communication equipment shall not prevent a standby diver from deploying in an emergency if the dive supervisor determines it is safe for the diver to deploy and line-pull signals are used.

30.E MIXED-GAS DIVING OPERATIONS

30.E.01 Dual lock, multi-place, recompression chambers with a trained, competent operator shall be available and ready for use at the dive location for any mixed-gas dive. Sufficient oxygen shall be available to complete chamber operations. At extreme depth, mixed gas diving can only be done if:

a. A bell is used at depths greater than 220 ft (67 m) or when the dive involves in-water decompression time of greater than 120 minutes (except when heavy gear is worn or when diving in physically confining spaces), or
b. A closed bell is used at depths greater than 300 ft (91.4 m), except when diving is conducted in physically confining spaces.

30.E.02 Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive, including decompression.

30.E.03 Each diving operation shall have a reserve breathing gas supply integral or in-line with the primary air source sufficient to safely recover the diver(s) in the event of failure of the primary breathing gas supply.

30.E.04 When heavy gear is worn:
a. An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver, and
b. An in-water stage shall be provided to divers in the water.

30.E.05 An in-water stage shall be provided for divers without access to a bell for dives deeper than 100 ft (30.4 m) or outside the no-decompression limits.

30.E.06 When a closed bell is used, one dive team member in the bell shall be available and tend the diver in the water.

30.E.07 Oxygen Enriched Air.
a. The use of "Oxygen Enriched Air" (OEA) such as Nitrox (EANx) breathing mixtures by USACE in-house dive teams requires the specific initial approval of the HQUSACE Dive Safety Program Manager prior to the first use of such equipment. Requests for approval will be accompanied by a written program that identifies training, certification, and procedures for OEA use. Use of OEA by Contractors requires approval by the local DDC.
b. Navy or NOAA Nitrox Dive Tables or other decompression tables designed specifically for the OEA mixture being used shall be followed without exception.
c. The use of OEA/ Nitrox is considered mixed gas diving and requires a decompression chamber on site and ready for use.

30.E.08 Contractors must provide evidence of training and experience with OEA breathing mixtures prior to actual diving operations.

30.E.09 OEA breathing mixture shall be analyzed/ tested by the diver to assure proper mix prior to each use. No more than 40% OEA is allowed for normal diving operations. Higher OEA concentrations are allowable for in-water decompression at shallow safety stops.

30.F EQUIPMENT REQUIREMENTS

30.F.01 Equipment modifications, repairs, tests, calibrations, or maintenance shall be recorded by means of a tagging or logging system, and include the date and nature of work performed and the name of the individual performing the work.

30.F.02 Air compressor systems used on-site as a direct source to supply air to SSA divers (Direct Source Compressors) shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.

30.F.03 Direct Source compressors shall be of sufficient capacity to overcome any line loss or other losses and deliver a minimum 4.5 cfm (2.1 L/s) (actual) to each diver at the maximum diving depth.

30.F.04 All air compressor intakes shall be located away from/ upwind of areas containing exhaust or other contaminants. Compressors used in areas where there is known or suspected chemical air contamination (sandblasting operations, painting, etc.) shall be equipped with appropriate in-line air purifying absorbent beds and filters inserted into the supply line to assure breathing air quality. Oil -lubricated compressors containing a petroleum or potential CO-producing lubricant for the air pressurization pistons will not be used. Direct Source compressors shall be equipped specifically for their intended use and shall have a suitable approved means to regulate the pressure and a low air pressure alarm in the system. All monitor alarm systems shall be so designed and placed so that the dive supervisor will be made aware of the hazardous conditions. Direct Source compressors will have a Carbon Monoxide (CO) monitor with alarm in the following situations:

a. The compressor is powered by an internal combustion engine, and

b. Compressors used in close proximity to internal combustion engines that may/ will be running during dive operations (boat motors, generators, cranes, etc.). Air intake pipes shall be placed away from/ upwind of the exhaust source.

30.F.05 Air compressor systems will be tested by means of sampling at the connection to the distribution system.

a. All air compressors with a working pressure greater than 500 psi will be tested every six months by an accredited testing laboratory. Compressors with a working pressure less than 500 psi may be tested in-house with documentation every six months and must be tested by an accredited testing laboratory every two years. Lab accreditation shall be from NIST/NVLAP, American Association of Laboratory Accreditation (A2LA – for environmental or calibration) or similar recognized accreditation. Purchased air must be certified by the supplier that it has been tested and meets the standards below.

b. A copy of the certificate of analysis showing the breathing air meets the minimum acceptable criteria shall be provided to the GDA.

c. Air purity standards are as follows:

(1) Air shall not contain a level of carbon monoxide greater than 10 ppm;

(2) Air shall not contain a level of carbon dioxide greater than 1,000 ppm;
(3) Air shall not contain a level of oil mist greater than 5 milligrams per cubic meter (mg/m3);
(4) Air shall not contain a level of hydrocarbons other than methane greater than 25 ppm; and
(5) Air shall not contain a noxious or pronounced odor.

30.F.06 Breathing supply hoses.

a. Breathing air supply hoses shall be suitable for breathing gas service or shall be specifically manufactured for SSA use. Hoses shall have a maximum allowable working pressure equal to or greater than the maximum depth of dive relative to supply source plus 150 psi, and have a rated bursting pressure at least four times the working pressure.

b. Breathing air supply hoses shall have connectors made of corrosion resistant materials and have a working pressure at least equal to the working pressure of the hose to which they are attached: connectors must not be able to become accidentally disengaged.

c. Umbilicals shall be marked, beginning at the divers end, in 10 ft (3 m) increments to 100 ft (30.5 m) and in 50 ft (15.2 m) increments thereafter. USACE in-house dive teams shall use the following umbilical marking system found in the ADCI Consensus Standard 006 in order to assure consistency and interoperability:

Table 30-1

Umbilical Markings Distance (from diver's end)	Marking
10 ft [3 m]	one white band
20 ft [6.1 m]	two white bands
30 ft [9.2 m]	three white bands
40 ft [12.2 m]	four white bands
50 ft [15.2 m]	one yellow band
60 ft [18.3 m]	1 yellow/1 white
70 ft [21.3 m]	1 yellow/2 white
80 ft [24.4 m]	1 yellow/3 white
90 ft [27.4 m]	1 yellow/4 white
100 ft [30.5 m]	1 red band
150 ft [45.7 m]	1 red/1 yellow
200 ft [61 m]	2 red bands
250 ft [76.2 m]	2 red/1 yellow
300 ft [91.5 m]	3 red bands

APPENDIX 0

Ice and Cold Water Diving Operations

INTRODUCTION

Purpose

This appendix explains the special requirements for ice and cold water diving.

Scope

Polar regions and other cold weather environments are uniquely hostile to divers, topside support personnel, and equipment. Diving where ice cover is present can be extremely hazardous and requires special equipment as well as appropriate operating and support procedures. Awareness of environmental conditions, personnel and equipment selection, and adequate logistical support are vital to mission success and dive team safety.

OPERATIONS PLANNING

Normal diving procedures generally apply to diving in extremely cold environments. However, there are a number of significant equipment and procedural differences that enhance the diver's safety.

Planning Guidelines

The following special planning considerations relate to diving under/near ice cover or in water at or below a temperature of 37°F. **NOTE**: Minimum Ice thickness that will support Divers/Tenders is 4 inches.

- The task and requirement for ice diving should be reviewed to ascertain that it is operationally essential.
- Environmental conditions such as ice thickness, water depth, altitude, temperature, wind velocity, current, visibility, and light conditions should be determined. Ideally, a reconnaissance of the proposed dive site is performed by the Diving Supervisor or a person with ice-covered or cold water diving experience.
- The type of dive equipment chosen must be suited for the operation.
- Logistical planning must include transportation, ancillary equipment, provisioning, fuel, tools, clothing and bedding, medical evacuation procedures, communications, etc.

NOTE: The water temperature of 37°F was set as a limit as a result of Naval Experimental Diving Unit's regulator freeze-up testing. For planning purposes, the guidance above may also be used for diving where the water temperature is above 37°F.

Navigational Considerations

Conditions in cold and ice-covered water affect diver underwater navigation in the following ways:

- The proximity of the magnetic pole in polar regions makes the magnetic compass useless.
- The life of batteries in homing beacons, strobes, and communication equipment is shortened when used in cold water.
- Surface light is so diffused by ice cover that it is nearly impossible to determine its source.
- Direct ascent to the surface is impossible when under the ice and determining return direction is often hindered.
- In shallow ice-covered waters, detours are often required to circumvent keels or pressure ridges beneath the ice.
- With an ice cover, there are no waves and therefore no ripple patterns on the bottom to use for general orientation.

SCUBA Considerations

SCUBA equipment has advantages and disadvantages that should be considered when planning a cold water dive.

The **advantages** of using SCUBA are:

- Portability
- Quick deployment
- Minimal surface-support requirements.

The **disadvantages** of using SCUBA are:

- Susceptibility of regulator to freezing
- Depth limitations
- Limited communications
- Severely limited ability to employ decompression diving techniques
- Duration limitations of CO2 removal systems in closed-circuit UBA

SCUBA Regulators

The single-hose regulator is susceptible to freezing. The first and/or second stage of the single-hose regulator may freeze in the free-flow position after a few minutes of exposure in cold water. The single-hose regulator should be kept in a warm place before diving. It is important that the diver test the regulator in a warm place, then refrain from breathing it until submerging. When returning to the surface, the regulator should remain submerged and the diver should refrain from breathing from the regulator until resubmerging. The diver's time on

the surface should be kept to a minimum. Once under the water, chances of a freeze-up are reduced. However, if a regulator is allowed to free-flow at depth for as little as five seconds, freeze-up may occur. The diver should therefore avoid purging the second stage of the regulator when diving in cold water. If water needs to be purged from the mouthpiece, the diver should do so by exhaling into it.

Special Precautions

Single-hose regulators should be equipped with an antifreeze cap, which is a special, first-stage cap that can be filled with liquid silicone available from the manufacturer. Correct maintenance and application of an approved lubricant to the appropriate points are also essential. Extra precautions must also be taken to make sure that SCUBA cylinders are completely dry inside, that moisture-free air is used, and that the regulator is thoroughly dried prior to use.

Octopus and Redundant Regulators

Where water temperature is at or below 37°F, a redundant SCUBA system (twin SCUBA bottles, each having a K-valve and an approved cold water regulator) or twin SCUBA bottles with one common manifold and an approved cold water regulator (with octopus) shall be used.

Life Preserver

The use of life preservers with CO2 actuation is prohibited only when diving under ice. The accidental inflation of a life preserver will force the diver upward and may cause a collision with the undersurface of the ice. Should the diver be caught behind a pressure ridge or other subsurface ice structure, recovery may be difficult even with tending lines. Also, the exhaust and inlet valves of the variable volume dry suit will be covered if a life preserver is worn. In the event of a dry suit blow-up, the inability to reach the exhaust dump valve could cause rapid ascent and collision with the surface ice.

Face Mask

The diver's mask may show an increased tendency to fog in cold water. An anti-fog solution should be used to prevent this from occurring. Saliva will not prevent cold water fogging.

SCUBA Equipment

The minimum equipment required by every SCUBA diver for under-ice operations consists of:

- Wet suit/variable volume dry suit
- Approved cold water open-circuit SCUBA or closed-circuit UBA.
- Face mask or approved Full Faced Mask.
- Weight belt and weights as required
- Knife and scabbard
- Swim fins
- Wrist watch
- Depth gauge

- Submersible SCUBA bottle pressure gauge
- Harness such as an Integrated Divers Vest (IDV).
- Lifelines
- Stainless Steel Ice Screws

A variety of special equipment, such as underwater cameras and lift bags, is available to divers However, the effect of extreme cold on the operation of special equipment must be ascertained prior to use.

Surface-Supplied Diving System (SSDS) Considerations

Using SSDS in ice-covered or cold water requires detailed operations planning and extensive logistical support. This includes thermal protection for an elaborate dive station and recompression chamber and hot water heating equipment. In addition, dive equipment may require cold climate modification. Because of logistical considerations, SCUBA is used in most ice diving situations. However, SSDS may be required because of prolonged bottom times, depth requirements, and complex communications between topside and diver. When diving in cold water that is not ice covered, logistic and equipment support requirements are reduced; however, very cold water poses many of the same dangers to the surface-supplied diver as ice diving.

Advantages and Disadvantages of SSDS

The **advantages** of using SSDS are:

- Configuration supports bottom-oriented work.
- Hot water suit and variable volume dry suit offer diver maximum thermal and environmental protection.
- Communications cable offers audio communications.
- Gas supply allows maximum duration to the maximum depth limits of diving.

The **disadvantages** of using SSDS are:

- Air console may freeze up.
- Low-pressure compressors do not efficiently remove moisture from the air which may freeze and clog filters or fracture equipment. This is more likely when the water is very cold and the air is warm. Banks of high-pressure cylinders may have to be used.
- Buildup of air or gas under the ice cover could weaken and fracture thin ice, endangering tenders, other topside personnel, and equipment.
- Movement of ice could foul or drag diver's umbilical.
- Battery life of electronic gear is severely reduced.
- Carbon dioxide removal recirculator components may have to be heated.

- Decompression under extreme cold conditions may be dangerous due to water temperature, ice movement, etc.
- Umbilicals are rigid and difficult to maneuver.
- Failure of hot water heater during in water decompression must be considered during operational planning

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Effect of Ice Conditions on SSDS

Ice conditions can prevent or severely affect surface-supplied diving. In general, the ice field must be stationary and thick enough to support the dive station and support equipment. If the dive must be accomplished through an ice floe, the floe must be firmly attached to land or a stable ice field. Severe ice conditions seriously restrict or prohibit surface-supplied diving through the ice (i.e., moving, unstable ice or pack ice and bergs, and deep or jagged pressure ridges could obstruct or trap the diver). In cases where a diver is deployed from a boat in a fixed mooring, the boat, divers, and divers' umbilicals must not be threatened by moving ice floes.

Suit Selection

Custom wet suits designed for cold water diving, variable volume dry suits, and hot water suits have all been used effectively for diving in extremely cold water. Each has advantages and disadvantages that must be considered when planning a particular dive mission. All suits must be inspected before use to ensure they are in good condition with no seam separations or fabric cuts.

Wet Suits

Custom wet suits have the advantages of wide availability, simplicity and less danger of catastrophic failure than dry suits. Although the wet suit is not the equipment of choice, if used the following should be considered:

- The wet suit should be maintained in the best possible condition to reduce water flushing in and out of the suit.
- Wearing heavy insulating socks under the boots in a wet suit will help keep feet warm.

<u>CAUTION</u> - In very cold water, the wet suit is only a marginally effective thermal protective measure, and its use exposes the diver to hypothermia and restricts available bottom time. The use of alternative thermal protective equipment should be considered in these circumstances.

Variable Volume Dry Suits

Variable volume dry suits provide superior thermal protection to the surface-supplied or SCUBA diver in the water and on the surface. They are constructed so the entry zipper or seal and all wrist and neck seals are waterproof, keeping the interior dry. They can be inflated orally or from a low-pressure air source via an inlet valve. Air can be exhausted from the suit via a second valve, allowing excellent buoyancy control. The level of thermal protection can be

varied through careful selection of the type and thickness of long underwear. However, too much underwear is bulky and can cause overheating, sweating, and subsequent chilling of the standby diver. Dry suit disadvantages are increased swimmer fatigue due to suit bulk, possible malfunction of inlet and exhaust valves, and the need for additional weights for neutral buoyancy. Furthermore, if the diver is horizontal or deployed with the head below the rest of the body, air can migrate into the suit lower extremities, causing overinflation and loss of fins and buoyancy control. A parting seam or zipper could result in a dramatic loss of buoyancy control and thermal shock. Nevertheless, because of its superior thermal protection, the dry suit is an essential component of extremely cold water diving.

CAUTION - **Prior to the use of variable volume dry suits and hot water suits in cold and ice-covered waters, divers must be trained in their use and be thoroughly familiar with the operation of these suits.**

Extreme Exposure Suits/Hot Water Suits

Hot water suits provide excellent thermal protection. If their use can be supported logistically, they are an excellent choice whenever bottom times are lengthy. They are impractical for use by standby divers exposed on the surface. A hot water system failure can be catastrophic for a diver in very cold water since the hot water is a life support system under such conditions. Hot water temperature must be carefully monitored to ensure that the water is delivered at the proper temperature. When using the hot water suit, wet suit liners must be worn. The hose on the surface must be monitored to ensure it does not melt into the ice. When not in use, the heater and hoses must be thoroughly drained and dried to prevent freezing and rupture.

Clothing

Proper planning must include protecting tenders and topside support personnel from the environment. However, bulky clothing and heavy mittens make even routine tasks difficult for topside personnel. Waterproof outer gloves and boots may also be considered. Regardless of the type of clothing selected, the clothing must be properly fitted (loosely worn), and kept clean and dry to maximize insulation. In planning operations for such conditions, reduced efficiency resulting in longer on-site time must be considered. Refer to the Polar Operations Manual for complete information on thermal protection of support personnel and equipment.

Ancillary Equipment

A detailed reconnaissance of the dive site will provide the planner with information that is helpful in deciding what ancillary equipment is required. Diving under ice will require special accessory equipment such as a line with lights for underwater navigation, ice-cutting tools, platforms, engine protection kits, and stainless steel ice screws.

The method of cutting the hole through the ice depends on ice thickness and availability of equipment. Normally, two or more of the following tools are used: hand ice chipper, ice

handsaw, ice auger, chain saw, thermal ice cutter or blasting equipment. In addition, equipment to lift the ice block, remove the slush, and mark the hole is required. Sandbags, burlap bags, or pallets for the tenders to stand on are also needed. Ladders should be in place in case a tender falls into the hole. If there is a possibility of surface support personnel falling through the ice, floatable work platforms, such as an inflated Zodiac boat, should be used. With such flotation equipment, the operation could be continued or safely concluded if the ice breaks up.

Gasoline and diesel engines must be cold-weather modified to prevent engine freeze-up. Vibrations of engines running on the ice can be a problem and vibration dampening platforms may be required.

Dive Site Shelter

Tent equipment including framing and flooring material may be required to construct a dive site shelter and a windbreak. Depending on the severity of the climate, remoteness of the site, and duration of the mission, shelters can range from small tents to steel sea-land vans and elaborate insulated huts transported to the site and erected from kits. Dive site shelters should have storage areas for dry items and a place for drying equipment. Benches should be provided for dressing divers, flooring should be installed for insulation, and heating and lighting should be adequate. In an extremely cold and dry climate, fire and inadequate ventilation are ever-present dangers. A carbon monoxide detection kit should be available and periodic checks made of all living and working spaces. Fire extinguishers shall be available in each shelter.

PRE-DIVE PROCEDURES

Personnel Considerations

The supervisor of the dive must ensure that all personnel required to make the dive have been properly trained in ice diving techniques and are physically fit. No diver may be allowed to make the dive if, in the opinion of the Diving Supervisor, the diver is suffering from the psychological stress of an ice dive (anxiety, claustrophobia, or recklessness).

Dive Site Selection Considerations

The selection of the dive site will depend upon the purpose of the dive and the geographical environment of the area (ice thickness, ice surface conditions, etc.). Additionally, the diving method chosen, safe access routes, shelter location, emergency holes, and exposure of divers and required support personnel will also have a bearing on site selection.

Shelter

When ice diving is conducted, a shelter must be erected as close as possible to the diving site to reduce the probability of frostbite and equipment freeze-up. Normally, tents are not placed over the dive hole because they would restrict the movement of tenders and light available to

the diver. However, a windbreak should be constructed. A shelter of modular tents and space heaters is ideal; although precautions must be taken to ensure that the ice beneath the shelter is not weakened. Extreme caution must be used when diving for objects, such as downed aircraft, that have fallen through the ice; the area around the original hole may be dangerously weakened.

Entry Hole

Proper equipment should be used to cut a suitable hole or holes through the ice in order to leave a clean edge around the hole. Using a sledgehammer to break through the ice is not recommended as it will weaken the surrounding ice. The hole should be a rectangle 6 feet by 3 feet, or a triangle with six-foot sides. The triangular hole is easier to cut and is large enough to allow simultaneous exit by two divers. Slush and ice must be removed from the hole, not pushed under the ice surface, as it could slip back and block the hole. To assist exiting divers and improve footing for other team members on the ice surface, sand, wooden pallets, or burlap bags should be placed on the ice around the hole. Upon completing the dive, the hole must be clearly marked to prevent anyone from falling in accidentally. When possible, the pieces cut from the ice should be replaced to speed up the refreezing process.

Escape Holes. Escape holes provide alternative exit points and aid in searching for a lost diver. Downstream escape holes or emergency exit holes must be cut in the ice when diving in a river or bay where there is a current or tidal stream.

Navigation Lines

A weighted line should be hung through the hole to aid the diver in retaining his bearing and sense of direction. Suspending a light at the end of the line may be helpful, as well as attaching a series of strobe lights to indicate depth. After locating the work site, a distance line should be laid from the weighted line to the work site. Another method of aiding the diver in keeping his bearings in clear water is to shovel off the snow cover on the ice around the dive site in the form of a spoked wheel. When the ice and snow cover is less than 2 feet thick, the diver should be able to see the spokes leading to the dive hole located at the center of the wheel. The wheel should have a minimum diameter of 60 feet.

Lifelines

Diver tending lines are mandatory when diving under ice to help the diver relocate the entrance hole. A polypropylene braided or twisted line has proven to be the best lifeline. It has the advantage of floating up and away from the diver and is available in yellow, white, and orange for high visibility. A bowline or a D-ring and snap hook spliced into the lifeline is the easiest method of attaching the lifeline to the diver. The attachment of the lifeline on both ends must be absolutely secure. Do not tie the line to a vehicle, shovel, first aid box, or other portable equipment. The preferred method to secure the bitter end of the life-line is with a stainless steel ice screw threaded into the ice. Alternatively, a 4-inch by 4-inch by 2-foot board placed under the ice several yards away from the dive hole can be used to secure the bitter end of the

lifeline. The D-ring and snap hook allow the quickest transfer of the lifeline from diver to diver on the surface, provided the snap hooks are not frozen shut. The snap hooks should be checked for corrosion at frequent intervals. A wet lifeline must be kept off the bare ice to prevent it from freezing to the surface.

Equipment Preparation

The diver must wear a distress light that should be turned on upon entering the water. Divers should not be encumbered with unnecessary equipment during cold water dives. Snorkels should be removed and knives worn on the inside of the leg to help prevent the lifeline from snagging on the diver's equipment. Personnel, divers, and tenders must handle rubber accessories such as masks and fins carefully; extreme cold causes them to become brittle.

UNDERWATER PROCEDURES

Buddy Diving

Diving under the ice or in extremely cold waters requires the use of paired dive partners. When diving through the ice, the pair shall always be surface tended. The life-threatening consequences of suit failure, regulator freeze-up or other equipment problems make a solitary tended SCUBA diver particularly vulnerable. Divers must practice buddy breathing prior to the operation because of the increased possibility that buddy breathing will be required. Proficiency in the process will minimize loss of valuable time during an emergency. Using approved cold water SCUBA equipment will minimize or eliminate freeze-up problems.

Tending the Diver

The lifeline is to be held by the tender at all times. As an additional safety measure during ice diving, the end of the lifeline must be secured to a stationary object to prevent it from falling into the entry hole should it be dropped by the tender. It is recommended that the lifeline be marked at 10-foot intervals to allow the tender and Diving Supervisor to estimate the diver's position. However, the diver's radial position can only be roughly estimated. The dive team must be thoroughly familiar with the procedures for umbilical tending.

Tending line sensitivity and awareness of the diver's position by tenders may be difficult with the added factors of lifeline drag on subsurface ice formations, line drag over the lip of the under-ice hole, tending through heavy mittens, and the lack of surface bubbles.

Standby Diver

The standby diver and tender must be immediately available. The standby diver should be kept warm until the Diving Supervisor determines that the standby diver is needed. If possible a shelter or windbreak at the hole should be used. The lifeline of the standby diver should be twice the length of the diver's lifeline in order to perform a thorough circular search. The

standby diver must be dressed with the exception of fins, mask, and tanks. These will be ready to don immediately.

OPERATING PRECAUTIONS

Normal procedures generally apply to diving in extremely cold environments. However, the increased likelihood of regulator freeze-up calls for total familiarity with the buddy breathing procedures. This section outlines some of the precautions for operating in cold and ice-covered water.

General Precautions

General precautions for ice and cold water diving operations include:

- Divers should be well rested, have a meal high in carbohydrates and protein, and should not consume any alcohol. Alcohol dilates the blood vessels in the skin, thus increasing body heat loss.
- Bathing is an important health measure to prevent infectious diseases prevalent in cold environments. If necessary, the body can be sponge-bathed under clothing.
- After bathing, a soothing ointment or lotion should be applied to the skin to keep it soft and protect it against evaporation caused by the dry air.
- Shaving and washing the face should be done in the evening because shaving removes protective oils from the skin. Shaving too close can also remove some of the protective layer of the skin, promoting frostbite.

Ice Conditions

The inconsistency and dynamics of ice conditions in any particular area can make diving operations extremely hazardous. The movement of ice floes can be very significant over a relatively short period of time, requiring frequent relocation of dive sites and the opening of new access holes in order to work a fixed site on the sea floor. Diving from drifting ice or in the midst of broken free ice is dangerous and should be conducted only if absolutely necessary.

Differential movement of surface and subsurface pressure ridges or icebergs could close an access hole, sever a diving umbilical, and isolate or crush a diver. The opening of a rift in the ice near a dive site could result in loss of support facilities on the ice, as well as diver casualties.

Dressing Precautions

With a properly fitting suit and all seals in place, the diver can usually be kept warm and dry for short periods in even the coldest water. When dressing for an ice or cold water dive:

- Thermal protection suits should be checked carefully for fabric cuts and separations. Thermal protection suits should expose only a minimum of facial area.
- Mittens, boots, and seals should prevent water entry, while causing no restriction of circulation. Wearing a knitted watchcap under the hood of a dry suit is effective in

conserving body heat. With the cap pushed back far enough to permit the suit's face seal to seat properly, the head will be relatively dry and comfortable.

On-Surface Precautions

While on the surface:

- Suited divers should be protected from overheating and associated perspiring before entering the water. Overheating easily occurs when operating from a heated hut, especially if diver exertion is required to get to the dive site. The divers' comfort can be improved and sweating delayed before entering the water by cooling the divers face with a damp cloth and fanning every few minutes. Perspiration will dampen undergarments, greatly reducing their thermal insulating capabilities.
- While waiting to enter the water, divers should avoid sitting on or resting their feet on the ice or cold floor of a hut. Even in an insulated hut, the temperature at the floor may be near freezing.
- Time on the surface with the diver suited, but relatively inactive, should be minimized to prevent chilling of the diver. Surface time can also cool metal components of the diving gear, such as suit valves and SCUBA regulators, below the freezing point and cause the parts to ice up when the diver enters the water. Dressing rehearsals prior to diving will help minimize surface delays.
- When operating from an open boat, heavy parkas or windbreakers should be worn over the exposure suits.
- When operating at the surface in newly formed ice, care should be taken to avoid cutting exposed facial skin. Such wounds occur easily and, although painless because of the numbness of the skin, usually bleed profusely.
- Diving from a beach and without a support vessel should be limited to a distance that allows the divers to return to the beach if the suit floods.
- Extreme caution must be exercised when diving near ice keels in polar regions as they will often move with tidal action, wind, or current. In doing so, they can foul umbilical's and jeopardize the divers' safety.

In-Water Precautions

- Because severe chilling can result in impaired judgment, the tasks to be performed under water must be clearly identified, practiced, and kept simple.
- A dive should be terminated upon the onset of involuntary shivering or severe impairment of manual dexterity.
- If the exposure suit tears or floods, the diver should surface immediately, regardless of the degree of flooding. The extreme chilling effect of frigid water can cause thermal shock within minutes, depending on the extent of flooding.
- Divers and Diving Supervisors must be aware of the cumulative thermal effect of repetitive diving. A thermal debt can accumulate over successive diving days, resulting

in increased fatigue and reduced performance. The progressive hypothermia associated with long, slow cooling of the body appears to cause significant core temperature drop before shivering and heat production begins.

Postdive Precautions

Upon exiting cold water, a diver will probably be fatigued and greatly susceptible to additional chilling:

- If a wet suit was worn, immediate flushing with warm water upon surfacing will have a comforting, heat-replacing effect.
- Facilities must be provided to allow the diver to dry off in a comfortable, dry and relatively warm environment to regain lost body heat.
- The diver should remove any wet dress, dry off, and don warm protective clothing as soon as possible. Personnel should have warm, dry clothing, blankets, and hot non-alcoholic beverages available to them.

EMERGENCYPROCEDURES

Lost Diver

A diver who becomes detached from the lifeline and cannot locate the entrance hole should:

1. Ascend to the underside of the ice.
2. Remove weight belt and allow it to drop.
3. Thread an ice screw onto underside of the ice to maintain position.
4. Remain in a vertical position, to maximize vertical profile and thereby snag the searching standby diver's lifeline.
5. Watch for lifeline and the lifeline of the standby diver and wait for the standby diver to arrive. The lost diver MUST NOT attempt to relocate the hole. The diver must remain calm and watch for the standby diver.

Searching for a Lost Diver

As soon as the tender fails to get a response from the diver, the tender must notify the Diving Supervisor immediately. These procedures are to be implemented at once:

1. The Diving Supervisor shall immediately recall all other divers.
2. The Diving Supervisor must estimate the probable location of the lost diver by assessing the diver's speed and direction of travel.
3. As directed by the Diving Supervisor, the standby diver enters the water and swims in the indicated direction, a distance equal to twice that believed to be covered by the lost diver. The distance may be the full extent of the standby diver's lifeline since it is twice as long as the lost diver's lifeline.
4. The tender must keep the standby diver's lifeline taut.
5. The standby diver conducts a circular sweep.

6. When the lifeline snags on the lost diver, the standby diver swims toward the diver signaling the tender to take up slack.
7. Upon locating the lost diver, the standby diver assists the diver back to the hole.
8. If the first sweep fails, it should be repeated only once before moving the search to the most likely emergency hole.

Hypothermia

When diving in cold water, hypothermia may predispose the diver to decompression sickness. Hypothermia is easily diagnosed. The hypothermic diver loses muscle strength, the ability to concentrate and may become irrational or confused. The victim may shiver violently, or, with severe hypothermia, shivering may be replaced by muscle rigidity. Profound hypothermia may so depress the heartbeat and respiration that the victim appears dead. However, a diver should not be considered dead until the diver has been rewarmed and all resuscitation attempts have been proven to be unsuccessful.

Hypothermia demands immediate treatment and prompt evacuation to a medical facility. A hypothermic diver must not be allowed to walk; the diver should be transported in a horizontal position. Improper handling of the diver can cause dangerous rhythms of the heart and a drop in the body core temperature, known as After Drop.

ADDITIONAL REFERENCES

For information on extreme cold weather conditions and the polar environment, refer to:

- *A Guide to Extreme Cold Weather Operations* (Naval Safety Center, July 1986)
- *Polar Operations Manual* S0300-A5-MAN-010 (Naval Coastal Systems Center) (NCSC)
- *Guide to Polar Diving* (Office of Naval Research, June 1976)
- *UCT Arctic Operation Manual* NAVFAC P-992(To obtain a copy of this manual contact NAVFAC Ocean Facilities Programs.)

APPENDIX P

LIVEBOATING

Supporting a surface-supplied air or mixed-gas diver from a vessel that is underway is known as liveboating. This operation is one of the most hazardous diving operations, and is restricted to surface-supplied diving only. **Note:** Live boating will not be used without prior specific acceptance by the DDC.

Liveboating is not permitted for diving operations that:

- Utilize SCUBA equipment.
- Require in-water decompression time greater than two hours.
- Use surface-supplied air at depths greater than 190 fsw (except that surface-supplied air dives with a bottom time of less than 30 minutes may be conducted to depths of 220 fsw).
- Use mixed-gas at depths deeper than 220 fsw.
- Occur in sea states that would impede the diver's ability to safely perform the assigned work or impede the vessel's station-keeping ability.
- During periods of restricted visibility or during non-daylight hours. (One hour after sunset to one hour before sunrise)

The following requirements and procedures will be adhered to.

- Decompression dives utilizing in-water decompression shall only be utilized as a last resort. All effort will be made to conduct dives utilizing No-Decompression Limits.
- The propeller of the vessel must be stopped and the boat operator informed of diver entering and exiting the water.
- A divers ladder of sufficient size and strength shall be erected and extend at least 3 feet into the water.
- Any vessel utilized for liveboating shall employ a device designed to minimize the possibility of the diver's hose becoming entangled in the vessel's propeller. Such a device may be a propeller shroud, a weighted fair lead system. The use of a tender to prevent hose entanglement without some mechanical support is not sufficient to satisfy this requirement.
- Any vessel utilized for liveboating shall have a means of displaying Code Alpha, Civilian dive Flag and Restricted maneuvering shapes as appropriate.
- Two-way voice communications between the Diving Supervisor and boat coxswain are required. In addition visual line of sight shall be obtained between the diver tender and coxswain. Hand signals shall be addressed and understood in advance.
- Voice communication between topside and the diver is required. Loss of communication may be cause for termination of the dive, unless conditions dictate and in the opinion of the Diving Supervisor it is safe to continue.
- A standby diver is required for all liveboating operations.
- A diver-carried reserve breathing-gas supply shall be carried by each diver engaged in liveboating operations.

LIST OF CHANGES TO SAFE PRACTICES MANUAL

Change #	Date	Description
1.	4/22/09	Safety Inspection Checklist. Add to Annually "Visually Inspect all HP and LP Air hoses" Add to Annually "Test operate all Relief Valves" Change to Semi Annually " Calibrate/Compare all gauges"
2.	4/22/09	Appendix F & G Add " Primary air Pressure" (above Emergency Air Pressure) Add Check Box and "RNT Rule Applied"
3.	4/22/09	Appendix E Changed title to "Surface Supplied Pre-Mission" and modified checklist
4.	4/22/09	Appendix F Change line to "Verify EGS pressure and ensure the cylinder valve is shut and helmet supply valve is open, inform the diver".
5.	4/22/09	Operating Procedures- Surface Supplied Change first para. to " adjust first stage regulator to 150 psi.".
6.	1/15/10	Created Appendix O, "Ice and Cold Water Diving Operations"
7.	1/15/10	Operating Procedures- General, Add "Floatable Backboard/Stretcher"
8.	1/15/10	Operating Procedures & Checklist-SCUBA Change "Dive depths shall not exceed" to 100 FSW Add Para. H from EM-385 Tethered SCUBA diver harness. Add Para. A from Em-385 Bailout Bottle.
9.	4/1/10	Created Appendix P. Liveboating

STANDARD OPERATING PROCEDURE 109
FIRE PREVENTION AND PROTECTION

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving fire prevention.

2.0 SCOPE

This SOP applies to all site operations requiring fire prevention and protection. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements directly apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, consultation of other SOP's and regulatory references may be needed:

1. OSHA Construction Industry Standard 29 CFR, Part 1926, Subpart F, Applicable parts
2. OSHA General Industry Standard 29 CFR, Part 1910, Subpart L, Applicable parts
3. USACE EM 385-1-1, Section 9
4. NFPA 30, Flammable and Combustible Liquids Code Current Edition

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER (PM)

The Project Manager (PM) will be responsible for ensuring the availability of the resources needed to implement this SOP, and will also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented.

4.2 SENIOR UXO SUPERVISOR (SUXOS)

The Senior UXO Supervisor (SUXOS) will ensure that this SOP is trained and implemented for operations where fire protection and prevention is needed. The SUXOS will also ensure that

relevant sections of this SOP are discussed in the tailgate safety briefings, and that information related to its daily implementation is documented in the Site Operational Log.

4.3 UXO SUPERVISOR (UXOT3)

The UXO Supervisor (UXOT3) will be responsible for the field implementation of this SOP, and for implementing the safety and health requirements outlined in Section 5.0 of this SOP. In the absence of a SUXOS, the UXOT3 will be responsible for implementing the SUXOS's responsibilities, outlined in Paragraph 4.2.

4.4 UXO SAFETY OFFICER (UXOSO)

The UXO Safety Officer (UXOSO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, involved in operations shall be familiar with the potential safety and health hazards associated with the conduct of this SOP, and with the work practices and control techniques to be used to reduce or eliminate these hazards.

5.1 CAUSES OF FIRES AND EXPLOSIONS

Although fires and explosions may arise spontaneously, they are usually the result of carelessness during the conduct of site activities, such as moving drums, mixing/bulking of site chemicals, and during refueling of heavy or hand held equipment. Some potential causes of explosions and fires include:

1. Mixing incompatible chemicals which cause reactions that spontaneously ignite due to the production of both flammable vapors and heat
2. Ignition of explosive or flammable chemical gases or vapors by external ignition sources
3. Ignition of materials due to oxygen enrichment
4. Agitation of shock- or friction-sensitive compounds
5. Welding and cutting operations
6. Hot surfaces and frictional heat sources
7. Sparks, whether from static, electrical, or mechanical sources
8. Careless handling of matches, cigarettes, and other lighted materials

5.2 FIRE PREVENTION

Explosions and fires not only pose the obvious hazards of intense heat, open flames, smoke inhalation, and flying objects, but may also cause the release of toxic chemicals into the environment. Such releases can threaten both personnel on site and members of the general public. Site personnel conducting operations involving flammable or combustible material should follow the guidelines listed below to aid in the prevention of fires and explosions.

5.2.1 Ignition Sources

All sources of ignition will be prohibited within 50 feet of a potential fire or explosion hazard. Ignition sources which may be of concern are: smoking; small engines and exhausts; heavy equipment engines and exhaust; non-intrinsically safe electrical hand tools, lights, equipment, etc.; steel hand tools capable of creating sparks; open flames; non-intrinsically safe monitoring instruments; and room/area heating devices.

5.2.2 Site Inspections

To ensure adequate fire protection, the UXOSO will inspect the site daily to ensure that all flammable and combustible materials are being safely stored in appropriate containers in properly configured and segregated storage areas. The UXOSO will also ensure that sources of ignition are removed to a safe distance from storage areas.

5.2.3 Storage of Flammable and Combustible Materials

5.2.3.1 Approved Containers

Quantities of flammable liquids greater than one gallon shall be stored or handled in OSHA approved safety cans only. These cans have a built-in flame arrestor, and a tight-fitting self-closing lid to reduce the possibility of vapors escaping from the can. For quantities of flammable liquids of one gallon or less, the original container, or an OSHA-approved safety can, will be used for handling or storage. There will be no glass containers.

5.2.3.2 General Storage Requirements

Site personnel shall utilize the guidelines and procedures listed below when storing flammable and combustible materials on site.

1. Flammable materials will be stored in a segregated area located away from spark or ignition sources, with flagging, or other barrier materials, erected at a radius of fifty feet from the storage area, and "NO SMOKING, MATCHES, OR OPEN FLAME" signs posted at the fifty-foot barrier line.
2. If, due to site configuration, a fifty-foot radius barrier cannot be erected around the storage area, signs stating "NO SMOKING,

MATCHES, OR OPEN FLAME WITHIN 50 FEET" will be posted at the storage location.

3. For storage inside a building, no more than 25 gallons of flammable materials may be stored outside an approved fire cabinet, and no more than 60 gallons of flammable or 120 gallons of combustible liquids may be stored in each cabinet.
4. For storage of containers (of not more than 60 gallons each) outside, no more than 1,100 gallons will be stored in one designated area, and there must be at least five feet separating storage areas.
5. Outdoor storage areas will be at least 20 feet from the nearest building, and there will be a 12-foot-wide fire truck access lane within 200 feet of the storage area.
6. Storage areas outside will be graded to allow collection of spilled material, or provided with a 12-inch curbed or earthen dike containment system of sufficient volume to contain the contents stored in the area; provisions shall be made for drainage or collection of accumulated rain water or spilled materials.
7. Metal drums used for storing flammable/combustible liquids will be equipped with self-closing safety faucets, vent bung fittings, grounding cables, and drip pans, and will be stored outside buildings in an area approved by the UXOSO.
8. The storage area will be kept free of weeds, debris, and other combustible materials not related to the storage.
9. At least one fire extinguisher rated 20B units or greater will be placed between 25 and 75 feet of outdoor storage areas.

5.2.4 Dispensing Flammable and Combustible Liquids

When dispensing flammable or combustible liquids from one container to another, the following requirements shall apply:

1. Areas where flammable or combustible liquids are dispensed in quantities greater than five gallons must be at least 25 feet away from other operations.
2. Spill containment will be provided in the dispensing area.
3. All tanks, hoses, and containers of five gallons or less will be kept in metallic containers with a bonded contact during transfer operations.

4. Flammable liquids in containers in excess of five gallons can be transferred only when the two containers are electrically bonded, and the container being dispensed is grounded.
5. Natural or mechanical ventilation will be provided to maintain flammable vapors below 5% of the lower explosive limit.
6. Transfer of liquids by air pressure is not permitted. Use either a non-sparking hand pump or gravity feed.

5.2.5 Handling Liquids at Point of Final Use

When using flammable or combustible liquids at the point of final use, the following requirements shall apply:

1. Flammable liquids will be kept in closed containers.
2. Leakage or spillage of flammable or combustible liquids will be collected and disposed of quickly and properly.
3. No open flames or other sources of ignition will be allowed within 50 feet of operations involving flammable or combustible liquids.

5.2.6 Service and Refueling Areas

The following requirements will apply to service and refueling areas:

1. Only approved storage containers, trucks, and hoses will be used.
2. No smoking will be allowed within 50 feet of areas where fueling operations are being conducted, and conspicuous signs will be posted prohibiting smoking in the areas.
3. The motors of all equipment being fueled will be shut off during fueling.
4. A fire extinguisher of at least 20B units or greater will be located within 75 feet of fueling operations.

5.2.7 Handling and Dispensing

Site personnel shall utilize the guidelines and procedures listed in this paragraph when dispensing flammable and combustible materials.

5.3 FIRE PROTECTION

5.3.1 General Requirements

The general requirements listed below should be followed to help provide effective fire protection, and will apply to all sites:

1. All areas where potentially explosive/flammable atmospheres may accumulate will be monitored using a combustible gas indicator.

2. Prior to initiation of site activities involving explosive/flammable materials, all potential ignition sources will be removed or extinguished.
3. Non-sparking and explosion-proof equipment will be used whenever the potential for ignition of explosive/flammable gases, vapors, and/or liquids exist.
4. Dilution or induced ventilation may be used to decrease the airborne concentration of explosive/flammable atmospheres to below 5% of the lower explosive limit.

5.3.2 Training

All site personnel involved in operations where flammable, combustible liquids or materials are used, or encountered, will be given training as part of their initial mobilization training which will cover the anticipated hazards and relevant control techniques. This training will include fire extinguisher training covering the selection and use of fire extinguishers.

5.3.3 Fire Extinguishers

Portable fire extinguishers will be selected and conspicuously located on site IAW the type of fire or explosion hazard anticipated. To determine the size and type of extinguishers needed, consult the SSHP.

5.3.4 Fires

The decision to attempt to extinguish a fire using available site personnel and equipment will be made by the SSHO, who will evaluate the size of the fire and whether it involves explosives.

5.3.5 Small Fires

A small fire is defined as a fire that can most likely be extinguished by site personnel using one or two 10-20 lb. portable extinguishers. A small fire must also be free and clear of explosive materials, especially UXO/OE. If a small fire occurs, the SSHO will direct site personnel to perform the following, if safe to do so:

1. Evacuate unnecessary personnel to an upwind position.
2. Attempt to extinguish the fire using portable fire extinguishers, or by smothering.
3. Remove any essential or flammable items from the path of the fire.
4. Notify emergency response services (fire, police, ambulance, hospital, etc.), as needed.

5.3.6 Large Fires

A large fire is defined as a fire which cannot be extinguished or one which, due to its size, cannot be extinguished using one or two 10-20 lb. fire extinguishers. In the event that a large fire occurs and the fire does not involve explosive materials, the SSHO will direct personnel to conduct the following, if safe to do so:

1. Evacuate all non-essential personnel from the site to an upwind location.
2. Notify the fire department and other emergency response services, as needed.
3. Order the appropriate level of PPE to be worn by personnel responding to the fire.
4. Attempt to control the fire to the extent possible.
5. Remove any essential or flammable items from the path of the fire.

5.3.7 Fires Involving Explosive Materials

If a fire occurs which involves explosive materials such as chemicals, fuels, or UXO/OE, the SSHO will order the immediate evacuation of all site personnel to a predetermined upwind assembly point. The assembly point will be located at a safe distance from the site. The SSHO will then notify the fire department and any other emergency services (police, ambulance, hospital, etc.), as needed.

5.4 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following safety measures and personal protective equipment (PPE) will be used in preventing or reducing exposures associated with fire prevention and protection operations (see SOP 123). These requirements will be implemented, unless superseded by site-specific requirements stated in the Site Safety and Health Plan and approved by the OSHM.

1. Personnel who may come in contact with flammable or combustible liquids will be assigned appropriate PPE to avoid skin or eye contact with the material.
2. In the event of an on-site fire, the UXOSO will assess the situation, determine the potential hazards, and, if need be, assign levels of PPE to be worn during firefighting.

6.0 ATTACHMENTS

6.1 APPENDIX A - AUDIT CRITERIA

ATTACHMENT A

AUDIT CRITERIA

1.0 AUDIT CRITERIA

The following items related to fire protection and prevention operations will be audited to ensure compliance with this SOP:

1. The Daily Operational Log (Figure 1a & Figure 1b)
2. The Documentation of Training form for the initial site hazard training (Figure 2a, Figure 2b, & Figure 2c)
3. The Documentation of Training form for the Daily Tailgate Safety Briefing (Figure 3a & Figure 3b)
4. The Daily Safety Inspection Checklist (Figure 4)
5. The fire extinguisher inspection cards (attached to extinguisher by SSHO)

UXB Senior UXO Supervisor Daily Log

Date	Time	Event

Page 1 of 2

Figure 1a

UXB Senior UXO Supervisor Daily Log

Notes for Using This Log: This log is intended to be a continuous table that will extend from page to page. The header, footer and first row of the table will be carried to each new page and a running log of the pages will be kept in the footer. To extend the length of the table (i.e., add additional rows), simply place the cursor in the Event column of the last row and press the "Tab" key. For simplicity of use, make each new entry in a new line within the table. For the first event entry each day enter the date in the first row under the previous day's events, enter the time of the event, and then the event description. After that, just enter additional time and event information on successive rows. There is no need to enter a new date with every event recorded within a given date, since the rows in the date column can be merged at the end of the entries for a given date (see Example below). To merge the rows in the Date column at the end of the day, place your cursor in the row at the start of the day, click left mouse button, drag down and highlight all rows in the date column down to the last entry for the day. Release the left mouse button and with the cursor over part of the highlighted column click the right mouse button and select "Merge Cells" in the pop-up menu. Once you have mastered these instructions, or before final submission of this log, delete these instructions and the example table below.

Date	Time	Event
03/22/01	0700	Event 1
	0730	Event 2
	0800	Event 3
	Etc	Event 4
	Etc	Event 5
	Etc	Event 6
	1630	Event 7
03/23/01	0700	Event 1
	0745	Event 2
	01630	Event 3

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Figure 1b

UXB THREE-DAY ON-SITE TRAINING LOG

Location:	
Contract No.:	Task Order No.:
Site/Sr. UXO Supervisor:	SSHO:

The following site personnel have received the three-day supervised on-site training, as required by 29 CFR 1910.120. This training has included: a description of the site chain-of-command; site hazard information; use/care/maintenance of PPE; personnel and equipment decon procedures; safe work practices; medical/training requirements; and emergency response and evacuation procedures.

THREE-DAY TRAINING COURSE ATTENDANTS

NAME (printed)	SIGNATURE	ORGANIZATION	DATE

Page No.: _____

Figure 2a

UXB DOCUMENTATION OF TRAINING LOG
OE OPERATIONS

Date:	Instructor(s):	Time:	No.:
Location:		Contract Number:	Task Order:

Training Provided: G Initial Site Hazard Training G Weekly Safety Training G Other: _____
G Tailgate Safety Briefing G Task/Hazard Specific Training _____

I. TRAINING TOPICS COVERED

Work Plan and /SSHP: _____

UXO/OE Hazards: _____

Chemical Hazards: _____

Physical Hazards: _____

Emergency Procedures: _____

Other: _____

II. TRAINING COURSE ATTENDANTS

NAME (printed)	SIGNATURE	ORGANIZATION

Figure 2 b & Figure 3a

page 1 of 2

UXB DOCUMENTATION OF TRAINING LOG
OE OPERATIONS

II. TRAINING COURSE ATTENDANTS (continued)

NAME (printed)	SIGNATURE	ORGANIZATION

III. VERIFICATION

I certify that the personnel listed on this roster received the safety training described above. Site personnel not attending this training will be briefed before beginning their assigned duties.

Site Safety and Health Officer

Sr. UXO Supervisor / Project Manager

Figure 2c & Figure 3b

page 2 of 2

UXB SAFETY INSPECTION AND AUDIT LOG

DATE:	TIME:	LOG NO.:
CONTRACT NO.:	DELIVERY ORDER NO.:	
LOCATION:		
WEATHER CONDITIONS: _____		

I. AREAS INSPECTED: (List by grid number, team, or task) _____

II. INSPECTION RESULTS

Item Description	Pass	Item Description	Pass
1. Personal Protection (PPE) per SSHP	Y / N	9. UXO/OE Detection Equipment	Y / N
2. Work Practices Follow SSHP	Y / N	10. UXO/OE Detection Equipment Calibration	Y / N
3. Site Control/Decon per SSHP	Y / N	11. MSDS's and Container Labeling per SSHP	Y / N
4. First Aid Kit(s)/Eyewash Station(s)	Y / N	12. On- and Off-Site Communications	Y / N
5. Fire Extinguisher(s)	Y / N	13. Site Housekeeping	Y / N
6. Flammable Storage Areas	Y / N	14. Explosives / Ordnance Storage Areas	Y / N
7. Safety and Health Monitoring Equipment Use	Y / N	15. Other: (list)	Y / N
8. Monitoring Equipment Calibration	Y / N	16. Other: (list)	Y / N

III. CORRECTIVE ACTIONS RECOMMENDED (If required): _____

IV. REINSPECTION RESULTS (If required): _____

V. SIGNATURES:

I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary).

_____ Site Safety and Health Officer

_____ Sr. UXO Supervisor / Project Manager

Note: Safety Inspections are to be conducted each day and documented on this form. This form will also be used to document the Weekly Safety Audit conducted at the end of each work week. The weekly audit will not only indicate the present status of the site/site operations, but will also be used to note the current status of deficiencies noted during daily inspections. Daily inspection forms where deficiencies have been noted and the weekly audit will be faxed to the UXB Occupational Safety and Health Manager.

Figure 4

STANDARD OPERATING PROCEDURE 110
HAZARD COMMUNICATION

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the minimum safety and health requirements and procedures applicable to the conduct of operations involving the use of products containing hazardous substances.

2.0 SCOPE

This SOP applies to all site personnel, to include contractor and subcontractor personnel, and operations involved in the use of products containing hazardous substances. This SOP is not intended to contain all requirements needed to ensure regulatory compliance. Consult the documents listed in Section 3.0 of this SOP for additional compliance issues.

3.0 REGULATORY REFERENCES

The following Occupational Safety and Health Administration (OSHA) standards and U.S. Army Corps of Engineers (USACE) requirements directly apply to the conduct of operations associated with this SOP. In the event that other hazards are associated with the conduct of this SOP, consultation of other SOP's and regulatory references may be needed:

1. OSHA Construction Industry Standard 29 CFR, Part 1926.59
2. OSHA General Industry Standard 29 CFR, Part 1910.1200
3. USACE EM 385-1-1, Sections 6.A and 6.B

4.0 RESPONSIBILITIES

4.1 PROJECT MANAGER (PM)

The Project Manager (PM) shall be responsible for ensuring the availability of the resources needed to implement this SOP, and shall also ensure that this SOP is incorporated into plans, procedures, and training for sites where this SOP is to be implemented.

4.2 SENIOR UXO SUPERVISOR (SUXOS)

The Senior UXO Supervisor (SUXOS) will ensure that this SOP is trained and implemented in all operations involving the use of products containing hazardous substances. The SUXOS will also ensure that relevant sections of this SOP are discussed in the tailgate safety briefings, and that information related to its daily implementation is documented in the Site Operational Log.

4.3 UXO SUPERVISOR (UXOT3)

The UXO Supervisor (UXOT3) shall be responsible for the field implementation of this SOP, and for implementing the safety and health requirements outlined in Section 5.0 of this SOP. In the absence of a SUXOS, the UXOT3 shall be responsible for implementing the SUXOS's responsibilities, outlined in Paragraph 4.2.

4.4 UXO SAFETY OFFICER (UXOSO)

The Site Safety and Health Officer (UXOSO) will be responsible for ensuring that the safety and health hazards and control techniques associated with this SOP are discussed during the initial site hazard training and the daily tailgate safety briefings. The UXOSO will also be responsible for daily inspection of site operations and conditions to ensure their initial and continued compliance with this SOP and other regulatory guidelines.

5.0 PROCEDURE

All personnel, including contractor and subcontractor personnel, in operations involving hazardous substances shall be familiar with the potential safety and health hazards associated with the conduct of those operations, and with the work practices and control techniques to be used in order to reduce or eliminate these hazards.

5.1 MATERIAL SAFETY DATA SHEETS (MSDS)

5.1.1 MSDS Availability

An MSDS for each product containing a hazardous chemical to which employees are or may be exposed will be obtained and made readily available to all site employees. MSDS's will be located at each project site. The UXOSO will be responsible for obtaining and maintaining MSDS's. The UXOSO will also be responsible for reviewing MSDS's for significant safety and health information, which will then be passed on to the affected employees during formal training sessions. MSDS's will also be reviewed by the UXOSO for completeness. If an MSDS is missing or considered to be incomplete/insufficient, a new MSDS will be requested from the manufacturer. A copy of all MSDS's obtained for the site will be sent to the OSHM for further review, and will be included in the corporate MSDS file.

MSDS's will be available for all employees in their work area for review. If MSDS's are not available, or a new chemical being used on site does not have a corresponding MSDS, the UXOSO will obtain the MSDS from the manufacturer as soon as possible. An MSDS that does not specifically identify the hazardous chemicals contained in the project will be accepted if:

1. Approved by the OSHM
2. The information has been classified as a trade secret

3. The MSDS contains adequate information related to the physical and health hazards associated with the product

5.2 CHEMICAL INVENTORY

A Site-Specific Chemical Inventory will be maintained by the UXOSO. This inventory will include all products containing hazardous chemicals. The Hazardous Chemical Inventory Form (see Figure 2) will be used to maintain the site-specific chemical inventory. A copy is to be sent to the OSHM.

5.3 LABELING

5.3.1 Container Labeling

No container of hazardous chemicals will be released for use until the following label information is verified:

1. Identification of the chemical
2. Appropriate hazard warnings
3. Name and address of chemical manufacturer, or distributor (applies only to manufacturer's labels)

5.3.2 Secondary Container Labeling

To further ensure that employees are readily provided with information concerning chemicals in their work areas, the UXOSO will ensure that all secondary containers are properly labeled with an appropriate hazard communication label. This label must communicate the identity of the hazardous chemicals contained in the product and their appropriate physical and health hazard warnings.

5.4 EMPLOYEE INFORMATION AND TRAINING

5.4.1 General

The UXOSO will arrange for employee information and training at the time of initial assignment (for existing hazardous chemicals), whenever a new hazardous chemical is introduced into the work area, or when an employee changes job locations where new chemicals are encountered.

5.4.2 Required Information

Employees will be trained to recall, in simple language, the following basic information about each hazardous chemical:

1. The basic requirements of the OSHA Hazard Communication Standard, including employee rights under the regulation
2. Operations/processes where the potential exists for exposure to hazardous chemicals

3. Location of the written Hazard Communication (HAZCOM) Program, the Chemical Inventory, and the MSDS's
4. How chemicals may be detected/monitored (instrumentation, color, odor, state)
5. Physical hazards (i.e., flammability, reactivity)
6. Chemical hazards, including the effects a chemical has on the body (long- and short-term) through inhalation, ingestion, or skin contact
7. How workers can protect themselves from overexposure or emergency situations (engineering controls, work practices, PPE, and emergency procedures)
8. Steps that have been taken to lessen or prevent exposure to hazardous chemicals through implementation of the HAZCOM
9. Spill response procedures for chemical emergencies
10. Emergency and first aid procedures to follow in case of employee overexposure to any hazardous chemicals
11. How to read labels and review MSDS's to obtain appropriate hazard information

5.4.3 Documentation of Training

Hazard Communication Training will be documented by the UXOSO using the Employee Hazard Communication and Training Checklist (see Figures 3a and 3b).

5.5 HAZARDS FROM NON-ROUTINE TASKS

Periodically, employees are required to perform potentially hazardous, non-routine tasks which may involve chemical or physical hazards. Prior to starting work on such tasks, the UXOSO will give the affected employees information about the hazards to which they may be exposed. This training will be documented in the Site Training Log, and will include:

1. Specific hazards (chemical and physical)
2. Protective safety measures to be utilized
3. Measures that have been, or will be, taken to lessen the hazards, including ventilation, respirators, PPE, a standby person, and emergency procedures

5.6 INFORMING CLIENTS/SUBCONTRACTORS

Each client/subcontractor will be instructed to inform the UXOSO of any hazardous chemicals which they bring on site, and will provide a copy of the MSDS for each specific chemical(s).

The UXOSO will ensure that outside clients/subcontractors are provided with the following information to allow them to work safely on site:

1. Hazardous chemicals to which they may be exposed while on the job site
2. Precautions and protective measures to be taken by employees to avoid possible exposure
3. The rules and regulations regarding fire and ignition sources around flammable materials, and rules regarding smoking, welding, grinding, etc.

5.7 INDUSTRIAL HYGIENE SURVEY

Periodic surveys will be performed to evaluate the potential for employee exposure to chemicals on project sites. These surveys will be used to assess exposure levels and the effectiveness of engineering, work practices, and personal protective equipment controls. These efforts will be coordinated by the UXOSO and the SUXOS, and will include:

1. A walk-through evaluation of potential chemical exposures utilizing the chemical inventory, MSDS's, and, when required, air sampling equipment
2. A review of occupational illness records, for trends of hazard exposure
3. A review of engineering controls and personal protective measures
4. Recommendations for future control methods

Where a question exists concerning employee exposure to hazardous chemicals, engineering controls, or PPE requirements, the CIH will be contacted immediately.

5.8 SAFETY AND PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

The following operational precautions and personal protective equipment shall be used in preventing or reducing exposures associated with operations involving the use of products containing hazardous substances (see SOP 123 and SOP 125):

1. Operations where hazardous substances are used will be conducted in well-ventilated areas; and where needed and available, direct-reading instruments will be used to assess personnel exposure.
2. All personnel will wear chemical-protective gloves, clothing, etc., as specified by the MSDS, SSHP, or sampling.

6.0 ATTACHMENTS

6.1 APPENDIX A - AUDIT CRITERIA

APPENDIX A

AUDIT CRITERIA

1.0 AUDIT CRITERIA

The following items related to operations conducted under this SOP will be audited to ensure compliance with this SOP:

1. The Daily Operational Log (Figure 1a & Figure 1b)
2. The Site-Specific Chemical Inventory Forms (Figure 2)
3. Documentation of Hazard Communication Training (Figure 3a & Figure 3b)
4. The Documentation of Training form for the initial site hazard training (Figure 4a, Figure 4b, & Figure 4c)
5. The Documentation of Training form for the Daily Tailgate Safety Briefing (Figure 5a & Figure 5b)
6. The Daily Safety Inspection Checklist (Figure 6)

UXB Senior UXO Supervisor Daily Log

Date	Time	Event

Page 1 of 2

Figure 1a

UXB Senior UXO Supervisor Daily Log

Notes for Using This Log: This log is intended to be a continuous table that will extend from page to page. The header, footer and first row of the table will be carried to each new page and a running log of the pages will be kept in the footer. To extend the length of the table (i.e., add additional rows), simply place the cursor in the Event column of the last row and press the "Tab" key. For simplicity of use, make each new entry in a new line within the table. For the first event entry each day enter the date in the first row under the previous day' events, enter the time of the event, and then the event description After that, just enter additional time and event information on successive rows. There is no need to enter a new date with every event recorded within a given date, since the rows in the date column can be merged at the end of the entries for a given date (see Example below). To merge the rows in the Date column at the end of the day, place your cursor in the row at the start of the day, click left mouse button, drag down and highlight all rows in the date column down to the last entry for the day. Release the left mouse button and with the cursor over part of the highlighted column click the right mouse button and select "Merge Cells" in the pop-up menu. Once you have mastered these instructions, or before final submission of this log, delete these instructions and the example table below.

Date	Time	Event
03/22/01	0700	Event 1
	0730	Event 2
	0800	Event 3
	Etc	Event 4
	Etc	Event 5
	Etc	Event 6
	1630	Event 7
03/23/01	0700	Event 1
	0745	Event 2
	01630	Event 3

Page 2 of 2

Figure 1b

SITE-SPECIFIC CHEMICAL INVENTORY FORM

Site Name/Location: _____ Site Safety Officer: _____

DATE	PRODUCT NAME	SUPPLIER'S NAME AND ADDRESS	HAZARDOUS CHEMICALS	MSDS AVAILABLE	CONTAINER SIZE/TYPE	LOCATION STORED

Figure 2

DOCUMENTATION OF HAZARD COMMUNICATION TRAINING

SITE INFORMATION			
Site Name:			Date:
Location:		Instructor:	
TRAINING ELEMENTS COVERED			
Initial	Topic	Initial	Topic
	Requirements of 29 CFR 1910.1200		Target organs affected
	Elements of HAZCOM Program		Physical hazards (fire, explosion, etc.)
	Local of Program, MSDS's & Inventory		Detection of and protection from exposure
	Hazardous substance operations/processes		Spill/emergency response
	Acute/chronic health hazards		Labeling requirements
HAZARDOUS SUBSTANCES/PRODUCTS AND MSDS's REVIEWED			
Initial	Hazardous Substance/Product	Initial	Hazardous Substance/Product

TRAINING COURSE ATTENDANTS

My signature below indicates that I have received training in the above listed topics as they relate to the hazardous substances and products with which I work, and I am familiar with the requirements of the ***UXB*** Hazard Communication Program.

Name (printed)	Signature	Company/Organization

Figure 3a

Page 1 of 2

DOCUMENTATION OF HAZARD COMMUNICATION TRAINING		
Location:		Date:
TRAINING COURSE ATTENDANTS (cont.)		
My signature below indicates that I have received training in the above listed topics as they relate to the hazardous substances and products with which I work, and I am familiar with the requirements of the ***UXB*** Hazard Communication Program.		
Name (printed)	Signature	Company/Organization

Figure 3b

Page 2 of 2

UXB THREE-DAY ON-SITE TRAINING LOG

Location:	
Contract No.:	Task Order No.:
Site/Sr. UXO Supervisor:	SSHO:

The following site personnel have received the three-day supervised on-site training, as required by 29 CFR 1910.120. This training has included: a description of the site chain-of-command; site hazard information; use/care/maintenance of PPE; personnel and equipment decon procedures; safe work practices; medical/training requirements; and emergency response and evacuation procedures.

THREE-DAY TRAINING COURSE ATTENDANTS

NAME (printed)	SIGNATURE	ORGANIZATION	DATE

Page No.: _____

Figure 4a

UXB DOCUMENTATION OF TRAINING LOG
OE OPERATIONS

Date:	Instructor(s):	Time:	No.:
Location:		Contract Number:	Task Order:

Training Provided: G Initial Site Hazard Training G Weekly Safety Training G Other: _____
G Tailgate Safety Briefing G Task/Hazard Specific Training _____

I. TRAINING TOPICS COVERED

Work Plan and /SSHP: _____

UXO/OE Hazards: _____

Chemical Hazards: _____

Physical Hazards: _____

Emergency Procedures: _____

Other: _____

II. TRAINING COURSE ATTENDANTS

NAME (printed)	SIGNATURE	ORGANIZATION

Figure 4 b & Figure 5a

page 1 of 2

UXB DOCUMENTATION OF TRAINING LOG
OE OPERATIONS

II. TRAINING COURSE ATTENDANTS (continued)

NAME (printed)	SIGNATURE	ORGANIZATION

III. VERIFICATION

I certify that the personnel listed on this roster received the safety training described above. Site personnel not attending this training will be briefed before beginning their assigned duties.

_____ _____
Site Safety and Health Officer Sr. UXO Supervisor / Project Manager

Figure 4c & Figure 5b page 2 of 2

UXB SAFETY INSPECTION AND AUDIT LOG

DATE:	TIME:	LOG NO.:
CONTRACT NO.:	DELIVERY ORDER NO.:	
LOCATION:		

WEATHER CONDITIONS: _____

I. AREAS INSPECTED: (List by grid number, team, or task) _____

II. INSPECTION RESULTS

Item Description	Pass	Item Description	Pass
1. Personal Protection (PPE) per SSHP	Y / N	9. UXO/OE Detection Equipment	Y / N
2. Work Practices Follow SSHP	Y / N	10. UXO/OE Detection Equipment Calibration	Y / N
3. Site Control/Decon per SSHP	Y / N	11. MSDS's and Container Labeling per SSHP	Y / N
4. First Aid Kit(s)/Eyewash Station(s)	Y / N	12. On- and Off-Site Communications	Y / N
5. Fire Extinguisher(s)	Y / N	13. Site Housekeeping	Y / N
6. Flammable Storage Areas	Y / N	14. Explosives / Ordnance Storage Areas	Y / N
7. Safety and Health Monitoring Equipment Use	Y / N	15. Other: (list)	Y / N
8. Monitoring Equipment Calibration	Y / N	16. Other: (list)	Y / N

III. CORRECTIVE ACTIONS RECOMMENDED (If required): _____

IV. REINSPECTION RESULTS (If required): _____

V. SIGNATURES:

I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary).

_____ Site Safety and Health Officer

_____ Sr. UXO Supervisor / Project Manager

Note: Safety Inspections are to be conducted each day and documented on this form. This form will also be used to document the Weekly Safety Audit conducted at the end of each work week. The weekly audit will not only indicate the present status of the site/site operations, but will also be used to note the current status of deficiencies noted during daily inspections. Daily inspection forms where deficiencies have been noted and the weekly audit will be faxed to the UXB Occupational Safety and Health Manager.

Figure 6

Subject:	Procedure No.:	Effective Date:	Revision No.:
Electric Firing System	3-08.4	April 20, 2001	0
	Prepared By: Zeth Devore	Approved By: Bernard Godek, Director of Quality	Page No.: 1 of 7

Reviewed By: Charles H. Heaton, P.E.
Robert E. Hilliard
Theodore Rekart
Steven P. Clay, CIH, CSP
R. Josh Bowers, P.G.

Reference: UXB Corporate Explosives Management Plan
Army Technical Manual (TM) 60A 1-1-31 (Explosive Ordnance Disposal Procedures)
USACE *Safety and Health Requirements Manual* (EM 385-1-1)
CEHNC-OE-CX *Basic Safety Concepts and Considerations for Ordnance and Explosives (OE) Operations*

This Standard Operating Procedure is proprietary information of UXB International, Inc. and shall not be duplicated or disclosed, in whole or in part, for any purpose. This restriction pertains to all sheets of this procedure, including the header, footer, and text.

ELECTRIC FIRING SYSTEM

PURPOSE: To assist in the final disposal of unexploded ordnance, HE loaded components, propellants, and pyrotechnics. These procedures will be utilized by all UXB personnel engaged in demolition range activities. During disposal of UXO and related material, safety is the primary concern. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, fragmentation, and toxic releases.

STEP NO. & DESCRIPTION	SPECIFIC INSTRUCTIONS (S=Safety, O=Operational, Q=Quality Checks)
A. Activity Preparation	
A1. Demolition Supervisor will perform pre-operational briefing.	Briefing will consist of: Confirm only necessary personnel are in the area Headcount to confirm number of personnel present Overview of specific safety concerns and special safety precautions unique to the site Identify evacuation safe area Review general health and safety rules Review emergency medical evacuation procedure
A2. Inspect equipment.	(O) Inspect equipment in accordance with manufacturers' instructions.
A3. Notify police, fire, etc. that a demolition operation is commencing.	
B. Activity Commencement – Preparation and Priming	
B1. Identify the demolition location.	(S) Check for overhead wires, underground utilities, RF hazards, and potential fire hazards.
B2. Calculate the required amounts of explosive charges.	

STEP NO. & DESCRIPTION	SPECIFIC INSTRUCTIONS (S=Safety, O=Operational, Q=Quality Checks)
B3. Locate the firing position a safe distance away from the demolition location.	(S) Ensure that firing position is outside the minimum safe distance or suitable protection is provided for personnel. Minimum safe distance can be received from government sources, the default distances taken from DoD 6055.9-STD, or calculated by the following formulia: $D = 100\sqrt[3]{w}$ where D = Distance in meters W = weight of explosives
B4. Prepare and place explosive charges at the demolition location.	
B5. Place blasting caps at the demolition location.	(S) Locate the electric blasting caps at least 50 feet downwind from the explosives. (S) Keep blasting caps in a cap container before testing as specified in Step B9.
B6. Lay out the firing wire from the demolition location to the firing position.	(S) Do not drag firing wire over sand, which may generate a static charge.
B7. Test the firing wire with the wire leads open.	Separate the two firing wire leads at both ends of the firing wire. Touch the firing wire leads at one end of the firing wire to the posts of the galvanometer/test set. The instrument needle should not move or the lamp glow; if either occurs, the firing wire has a short circuit. Repair or replace firing wire and retest. Repeat until a good test is made.
B8. Test firing wire with the wire leads closed.	Twist the two firing wire conductors together at one end of the firing wire. Touch the firing wire conductors, at the other end of the firing wire, to posts of the galvanometer/test set. This action should cause a wide deflection of the needle or the lamp to glow. No movement of the needle indicates a break; a slight movement indicates a point of high resistance which may be caused by a dirty wire, loose wire connections, or wires with several strands broken off at connections. Repair or replace firing wire and retest. Repeat until a good test is made. Shunt both ends of firing wire.

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STEP NO. & DESCRIPTION	SPECIFIC INSTRUCTIONS (S=Safety, O=Operational, Q=Quality Checks)
B9. Test the blasting caps.	Ground yourself. Retrieve one blasting cap from the cap carrier. Remove the factory shunt from the blasting cap. Touch one end of the cap lead wire to one post of the galvanometer/test set and other cap lead wire to other post. If galvanometer's needle deflects slightly less than it did when the instrument was tested, the blasting cap is satisfactory. If not, the cap is defective and should not be used. On a galvanometer the deflection should read at least half-scale. On a test set the lamp should glow. Reshunt the cap lead wires. Return the tested cap to the cap carrier. Retrieve a second blasting cap from the cap carrier. Remove the factory shunt from the blasting cap. Touch one end of the cap lead wire to one post of the galvanometer/test set and other cap lead wire to other post. If galvanometer's needle deflects slightly less than it did when the instrument was tested, the blasting cap is satisfactory. If not, the cap is defective and should not be used. On a galvanometer the deflection should read at least half-scale. On a test set the lamp should glow. Reshunt the cap lead wires. Return the tested cap to the cap carrier.
B10. Request permission to prime explosives from demolition supervisor.	Do not proceed until permission is granted. (S) Reconfirm all unnecessary personnel have left the area.
B11. Prime explosives	Ground yourself. Prime with first blasting cap. Extend the lead wires of the electric blasting cap to its full length, keeping the blasting cap pointed away from all personnel and the donor charge. Unshunt the cap. Connect one blasting cap lead wire to one firing cable lead wire, then connect the other blasting cap lead wire to the other firing cable lead wire. Repeat priming process for 2nd blasting cap. Insulate the exposed portions of the wires with electrical tape to prevent shorting. Attach and secure the first blasting cap to the main explosive charge. Attach and secure the second blasting cap to the main explosive charge.
B12. Depart the demolition area and travel to firing point.	
B13. Take cover at the firing point.	
B14. Demolition Supervisor obtains a head count of team personnel.	
B15. Demolition Supervisor visually inspects immediate area for unauthorized personnel.	

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STEP NO. & DESCRIPTION	SPECIFIC INSTRUCTIONS (S=Safety, O=Operational, Q=Quality Checks)
B16. Test entire firing circuit.	Ground yourself. Unshunt firing circuit by untwisting the ends of the firing wire. Touch the two free ends of the firing wire to the two posts of the test instrument. This should cause a wide deflection of needle or lamp to glow. If the firing circuit is defective, shunt wire by twisting the ends of the firing wire. Proceed down-range and recheck circuits. If the splice is found defective, replace wires. If the cap is found defective, replace it. Return to firing point. Retest the entire circuit again to make sure that all breaks have been located before attempting to fire. Reshunt the firing circuit by twisting together the free ends of the firing wire.
B17. Exercise the blasting machine to ensure proper functioning.	
B18. Fire the shot.	Unshunt the firing wire by untwisting the ends of the firing wire. Fasten one end of the firing wire to one post of the blasting machine. Fasten second end of the firing wire to second post of the blasting machine. Yell **"Fire In The Hole"** three times Initiate charge by activating the blasting machine. Disconnect firing wire from blasting machine. Reshunt the firing circuit by twisting together the free ends of the firing wire.
B19. In the event of misfire, refer to procedures in Section C.	
B20. Observe a 5-minute wait time after the detonation.	(S) Wait time is to allow for fumes from the explosive detonation to clear, and to ensure that all detonations have completed.
B21. Inspect results of the demolition shot.	Demolition Supervisor departs firing point and travels to the demolition area. Inspect resulting pit for 'low orders' or 'kick outs'. Intact ordnance items that failed to detonate will be counter-charged and blown in place. Explosive residue will be collected and detonated. Surface sweep pit and remove any fragmentation; metal fragments will be examined to ensure complete detonation of the explosive material.
B22. Demolition Supervisor announces **"All Clear"** signal when he/she is confident the area is free of explosive hazards.	(S) Do not allow personnel out of the designated safe area until cleared to do so with the "All Clear" signal.
C. Electric Misfires	

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STEP NO. & DESCRIPTION	SPECIFIC INSTRUCTIONS (S=Safety, O=Operational, Q=Quality Checks)
Common causes of electric misfires include: inoperative or weak blasting machine or power source; improperly operated blasting machine or power source; defective and damaged connections, causing either a short circuit, a break in the circuit, or high resistance with resulting low current; faulty blasting caps; the use in the same circuit of blasting caps made by different manufacturers or of different design; and the use of more blasting caps than the power source rating permits. To clear an electric misfire, implement the following procedures.	
C1. The Demolition Supervisor will make three successive attempts to fire.	
C2. Check firing wire connections to blasting machine terminals to be sure that contacts are good.	
C3. Make two or three more attempts to fire charge.	
C4. Disconnect blasting machine and short firing wire.	
C5. Allow a minimum of 30 minutes to elapse before any further investigation.	(S) Observe the Wait Time unless it can be ascertained that the blasting cap failure is strictly electrical; if such a determination is made then corrective action may be taken immediately.
C6. Test firing circuit with circuit tester for breaks and short circuits, and correct any defects discovered.	
C7. Remove and disconnect old blasting caps and short wires. Place these items on the next demolition shot.	
C8. Connect wires of new blasting cap(s) to firing circuit and re-prime the charge.	
C9. Reconnect firing wire ends to blasting machine and fire charge(s).	
D. Activity Completion	
D1. Police up all equipment.	
D2. Notify police, fire, etc. that the operation is complete.	
D3. Demolition Supervisor will complete documentation.	Documentation includes: Demolition Material Accountability Form (UXB Form 03-00.1-1) Magazine Data Card (UXB Form 03-00.1-2)
D4. Back fill hole and reseed as necessary.	

SPECIAL REQUIREMENTS: Safety Precautions

Demolition Supervisor will maintain positive control of the positive block that prevents inadvertent functioning of the electrical firing device (key, handle).

Static electricity is an increased hazard when operating in an extremely cold climate or area of low humidity. Care must be taken to reduce the possibility of premature detonation of electric blasting caps and other electro-explosive devices.

In order to prevent misfires, insure that all blasting caps are included in the firing circuit; all connections between blasting cap wires, connecting wires, and firing wires are properly made; short circuits are avoided; grounds are avoided; and number of blasting caps in any circuit does not exceed the rated capacity of the power source on hand.

Ensure that the ends of the firing wire are twisted together when not testing.

Personnel working with electric blasting caps or other electro-explosive devices will not wear static producing clothing such as nylon, silk, or synthetic fiber.

Prior to making connection with the electric blasting cap, the firing circuit will be continuity tested.

Electric blasting caps will be connected to the firing circuit before connection to the main initiation charge.

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Electric blasting caps of different manufacturers or types will not be used in the same system.

The shunt will not be removed from the wires until the individual performing the operation has been grounded.

Test electric blasting caps for continuity with a galvanometer at least 50 feet downwind from any 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 connect to the firing circuit.

Do not pull on electrical lead wires of electric blasting caps, detonators or other electro-explosive devices; a detonation may occur.

Unroll the legs so that the cap is as far as possible from the operator and pointing away from him.

Place the blasting cap in a hole or behind a barricade before removing the shunt and testing for continuity. Make sure the cap does not point toward other personnel or explosives.

Use only authorized and serviceable testing equipment.

Do not connect the blasting machine to the firing wires until all pre-firing tests have been completed and until ready in all respects to fire the charge.

Do not hold the blasting cap directly in the hand when uncoiling leads. Hold the wires approximately 6 inches from the cap. This will minimize injury should the cap explode. The lead wires should be straightened by hand and not thrown, waved, or snapped to loosen the coils.

Do not remove the shunt from the lead wires of blasting caps except for testing for continuity or actual connection into the firing circuit. The individual removing the shunts should ground himself prior to this operation to prevent accumulated static electricity from firing the blasting cap.

18. Keep both ends of the firing wires shunted or twisted together except for testing or firing. Do not connect the blasting caps to the firing circuit unless the power end of the firing circuit leads are shunted.
19. Keep all parts of the firing circuit insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray current.

EQUIPMENT

ITEM	QUANTITY
Firing wire	Sufficient quantity
Blasting galvanometer or test set.	1
Blasting machine	1
Crimper	2
Radio	2
Knife	2
Cap box/container	1

MINIMUM PERSONAL PROTECTIVE EQUIPMENT:
Level D PPE (Boots, pants, shirt, work gloves, eye protection).

SPECIAL TRAINING AND REFRESHER REQUIREMENTS:
Only UXO personnel can handle UXO and explosives.

WAIVERS, EXEMPTIONS, SPECIFIC AUTHORIZATIONS, OR APPROVED DEVIATIONS THAT APPLY TO THIS OPERATION.
None.

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Excavation Ops. -- Manual and Mechanical	Prepared By: John J. Kierepka James Tomiko	Approved By: Richmond H Dugger, IV	Page No.: 1 of 7

REVIEWED BY: Richmond H. Dugger, IV

REFERENCE: 29 CFR 1910.120; Hazardous Waste Operations and Emergency Response; Occupational Safety and Health Administration

U.S. Army Corps of Engineers Basic Safety Concepts and Considerations for Munitions and Explosives of Concern (MEC) Response Action Operations EP 385-1-95a (27 Aug 2007)

DOD Ammunition and Explosives Safety Standards DOD 6055.9-STD (29 Feb 2008)

Methodologies for Calculating Primary Fragment Calculations Technical Paper # 16 (1 Dec 2003)

U.S. Army Corps of Engineers Safety and Health Requirements for Munitions and Explosives of Concern (MEC) Operations ER 385-1-95 (27 Aug 2004)

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EXCAVATION OPERATIONS – MANUAL AND MECHANICAL

PURPOSE OF OPERATION: To safely excavate (manually and/or mechanically) and characterize detected anomalies and document results.

STEP NO. & DESCRIPTION	SPECIFIC INSTRUCTIONS (S=Safety, O=Operational, Q=Quality Checks)
A. Activity Preparation	
A1. Conduct equipment checkout.	(O) Daily checkout of detection instruments to include: Prepare equipment using instructions from the manufacturer's operating manual Insert batteries and confirm that extra batteries are available in the equipment box Perform check in an area that has been previously swept and determined to be free of anomalies by testing the detector against two known sources Place source item on the ground Hold detector a minimum of 12-inches from the source Confirm the detector responds with a tone or an LED read-out If detector does not respond, tag the detector and document the problem (Q) Known source items in the Test Grid are to be buried at different depths, in accordance with the site-specific Work Plan. (O) Perform daily operational checks on the mechanical excavation equipment.

B. Activity Commencement	
B1. Team Leader will perform pre-operational team briefing.	(S) Briefing will consist of: Review general health and safety rules Confirm team has task-specific PPE Address excavation operations (manual and mechanical), anomalies deeper than the Work Plan approved depth Confirm the number of personnel present Identify grid boundaries Identify location of evacuation Safe Area Identify boundaries of Exclusion Zone OSHA trenching precautions (SOP 3-18)
B2. Team Leader will establish Exclusion Zone.	(O) Per Work Plan
B3. Re-acquire anomalies.	(O) Per Work Plan (O) If the anomaly cannot be re-acquired, contact the UXO Team Leader and site-specific Work Plan for further direction.
C. Manual Excavation Operations	
C1. Begin manual excavation.	(S) Two UXO personnel will comprise the manual excavation team (minimum). (O) For large anomalies, use detection instrument to delineate the extent of the anomaly and selection of the excavation location. (O) Dig and remove several shovels of soil from the excavation site. Use a detection instrument to check the excavated soil and hole to confirm the location and position of any anomaly.
C2. Repeat dig and detection routine until either: the anomaly is reached the maximum excavation depth is reached (per the Work Plan) the Team Leader determines a reasonable effort has been made to recover the item manually, and mechanical excavation is required (Proceed to Step D, Mechanical Excavation Operations, below)	(O) Use detection instrument to determine if there are any anomalies located in the sod. **If no anomaly is located**, set the sod aside for future replant. **If an anomaly is located**, hand remove enough of the sod to make a positive identification of the anomaly.
C3. Uncover the anomaly only to the extent required for positive identification.	(O) Refer to SOP 3-7, Access and Identification. (O) Refer to the Work Plan to determine the disposition requirements, and SOP 3-8, Demolition Operations.
C4. Proceed to Section E, Completion of Excavation.	
D. Mechanical Excavation Operations	

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D1. Team Leader will conduct a Mechanical Excavation Briefing.	(O, S) Establish an exclusion zone around the equipment by having the operator fuly extend the bucket and touch to the ground, swinging the full arc of motion of the bucket and creating a line in the soil. If this method is not used due to surface UXO or other safety considerations, physical barriers shall be used. (O,S) Review standard hand signals STOP – clinched fist CUT ENGINE - hand across neck TURN AROUND – raised hand overhead moving in small circle MOVE FORWARD – arms raised and chest level, palms inward, hands moving inwards to chest MOVE BACKWARD – arms raised to chest level, palms outward, hands moving outwards from chest
D2. If not previously done manually, remove enough sod for mechanical excavation operations.	(O) Use detection instrument to determine if there are any anomalies located in the sod. **If no anomaly is located**, set the sod aside for future replant. **If an anomaly is located**, manually remove enough of the sod to make a positive identification of the anomaly.
D3. Excavate the soil in 6-inch increments.	(S) Excavation equipment shall be located upwind of the excavation, where possible. (O, S) Remaining outside the exclusion zone, visually watch the excavation process (as the safety observer) for suspect material that may be encountered. Immediately halt operations when a closer inspection is required. When excavation equipment is in operation, remain outside the exclusion zone and upwind of the equipment. (Dust and chemical precaution.) (O) Excavated material will be placed at least 2-feet from the excavation hole. (O,S) Excavations will be concentrated to the side, and at least 12-inches away from the suspected edge of the anomaly to avoid digging on top of the item. (O) Excavate in 6-inch layers. Use a detection instrument to check the location of the anomaly after each 6-inch layer.
D4. After the removal of 6-inch increment, visually and geophysically recheck the hole and the soil removed from the hole.	If it is necessary to enter the excavation equipment's exclusion zone, all equipment lifting parts must be swung to the full lateral extent of the machine's reach and placed on the ground. The equipment operator must remove his feet and hands from the controls, and raise his hands clear of the controls to indicate that it is safe to enter the exclusion zone.
D5. Excavate to the depth stated in the Work Plan, or until the excavation is within 12-inches of the anomaly.	Ensure that confined space entry, shoring, and trenching procedures are applied, if required. (O) Use detection instrument indication to determine distance from anomaly.

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D6. If the excavation is within 12-inches of the anomaly, cease mechanical excavation and commence manual excavation (Section C, Manual Excavation Operations).	
D7. If the anomaly is deeper than the investigation depth stated in the Work Plan, mark and record the location of the anomaly and refer to the Work Plan for further guidance.	
E. Completion of Excavation	
E1. Complete clearance of the grid, verify that the hole is clear of further anomalies, and fill the hole with excavated materials.	(O, S) Use detection instrument to verify the clearance of excavation hole.
F. Activity Completion	
F1. Team Leader will complete and submit the appropriate forms.	(O) Excavation Accountability Form (UXB form 3-07-8)

SPECIAL REQUIREMENTS: Only UXO qualified personnel will conduct excavation operations.

EQUIPMENT:

ITEM	QUANTITY (4-Man Team)
Picks	1 (minimum)
Shovels	2 (minimum)
Geophysical Detection Instrumentation	2 (minimum)
Trowels	2 (minimum)
Mechanical Excavation Equipment	As Required

MINIMUM PERSONAL PROTECTIVE EQUIPMENT:
Unless otherwise directed in the site-specific Work Plan, personnel PPE shall consist of:

- Coveralls/Work Pants
- Work Boots
- Work Gloves
- Eye Protection
- Hard Hat (if working in the vicinity of heavy equipment)
- Ear Protection (if working in the vicinity of heavy equipment)

SPECIAL TRAINING AND REFRESHER REQUIREMENTS:
Site-specific briefing on UXO items previously located at the site.

WAIVERS, EXEMPTIONS, SPECIFIC AUTHORIZATIONS, OR APPROVED DEVIATIONS THAT APPLY TO THIS OPERATION. Not Applicable

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Hazard Analysis

OPERATION: Excavation Operations

PREPARER: J. Tomiko

REVIEWER: Steve Clay, CIH, CSP

ITEM NO.	DESCRIPTION OF OPERATION	DESCRIPTION OF HAZARD	EFFECT ON OPERATION	HAZARD		RAC Without Control	RECOMMENDED CONTROL	RAC With Control
				Severity	Probability			
	To safely excavate (manually and/or mechanically) and characterize geophysically detected anomalies and document results.	Injury from unintentionally hitting and detonating a UXO.	Explosion/destruction	I	D	2	Use detection instrument and avoidance by digging to the side of anomaly location. Establish procedures to stop mechanical excavation a minimum of 12-inches from the anomaly and continue manually.	IE(3)
		Physical injury to operator and personnel around the heavy equipment due to over turning of the equipment, striking of individuals in close proximity to the equipment, and backing up in to the equipment.	Personal injury	II	C	2	Establish clear zones at the maximum radius of the bucket. PPE consisting of head, foot, and eye protection.	IIID(3)
		Cave-in of excavated soils.	Personal injury	III	D	3	Establish procedures for material excavated to be at least 2-feet from the edge of the hole. Adhere to benching/sloping guidelines (Attachment 1) If anomaly is deeper than maximum depth stated in Work Plan, stop excavation operation. Use OSHA approved confined space techniques for excavation depths greater than 4 feet.	IIID(3)

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Hazard Analysis

OPERATION: Excavation Operations

PREPARER: J. Tomiko

REVIEWER: Steve Clay, CIH, CSP

ITEM NO.	DESCRIPTION OF OPERATION	DESCRIPTION OF HAZARD	EFFECT ON OPERATION	HAZARD		RAC Without Control	RECOMMENDED CONTROL	RAC With Control
				Severity	Probability			
		Unearth an item, other than UXO, which may be hazardous – e.g., gas cylinders, batteries, solvents, paint, asbestos, etc.	Health hazard due to unknown toxicity of the substance	III	D	3	Establish procedures for the appropriate notification actions to be taken – Stop Excavation.	IIID(3)

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Attachment 1
U.S. Army Corps of Engineers
Safety and Health Requirements Manual
Sloping and Benching

Section 25.C

25.C.01 Sloping or benching of the ground shall be in accordance with one of the systems outlined in “a” through “c” below:

For excavations less than 6m (20 ft) in height, the maximum slope shall be 34° measured from the horizontal (1-1/2 horizontal to 1 vertical).

The design shall be selected from and be in accordance with written tabulated data, such as charts and tables. At least one copy of the tabulated data shall be maintained at the job site during excavation. The tabulated data shall include:

identification of the parameters that affect the selection of a sloping or benching system drawn from the data

identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe

explanatory information as may be necessary to aid the user in correctly selecting a protective system from the data

the identity of the registered professional engineer who approved the data

The sloping or benching system shall be designed by a registered engineer. At least one copy of the design shall be maintained at the job site during excavation. Designs shall be in writing and include:

the magnitudes and configurations of the slopes that were determined to be safe for the particular excavation

the identity of the registered engineer who approved the design.

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APPENDIX E:
MC SAMPLING & ANALYSIS PLAN

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1.0 FIELD SAMPLING PLAN

This Field Sampling Plan (FSP), with its associated appendix, describes the procedures, sequence, and resources that will be utilized while conducting munitions constituents (MC) Sampling activities associated with the Remedial Investigation (RI) at three Munitions Response Sites (MRSs) located on Martha's Vineyard, Massachusetts.

1.1 PROJECT BACKGROUND

The three sites include the Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and the Tisbury Great Pond MRS. The MRS boundaries were defined based on previous investigations and archival searches. The three MRSs to be investigated under this FSP are depicted on Figure 1-2 of the *Remedial Investigation Work Plan* and described in the following sections.

1.1.1 Former Cape Poge Little Neck Bomb Target MRS

The Former Cape Poge Little Neck Bomb Target MRS is located on Chappaquiddick Island, which is located within the Town of Edgartown, Martha's Vineyard, Massachusetts. The Site encompasses an area of approximately 800 acres: 1) approximately 153 acres of land; 2) approximately 83 acres of beach: 3) approximately 500 acres of inland water; and 4) approximately 64 acres of ocean. The Cape Poge Little Neck MRS has become part of the Cape Poge Wildlife Refuge, which is owned and managed by The Trustees of Reservations (TTOR).

The topography of Little Neck can generally be described as a relatively flat maritime shrub thicket, salt marsh and maritime beach. Salt marshes are composed of Salt Marsh Cordgrass, Salt Meadow Cordgrass, Black Grass, Salt Marsh Fleabane and glassworts, with Marsh Elder and Groundsel Tree along their fringes

The topography of Cape Poge can generally be described as relatively flat dunes with cedar, maritime interdunal swale, maritime dunes and maritime beach. Cape Poge contains maritime Eastern Red Cedar woodland thickets of Blackberry, Bristly Dewberry, Black Huckleberry, Greenbrier and Groundsel Tree. Interdunal swales are found in small depressions in the Cedars. The swales are ephermal and form when winds scour sand until the water table is reached (TTOR 2004 Cape Poge & Wasque Management Plan, The Trustees of the Reservation).

The soils can be characterized as undulating or rolling, very deep, excessively drained soils composed of windblown deposits; nearly level beaches; and nearly level, very deep, poorly drained mucky peat formed in organic deposits along coastal shorelines. The area north of Little neck can best be characterized as nearly level, very deep, excessively drained, sandy soils formed in glacial outwash on outwash plains and moraines (USACE 2009 Draft Preliminary Assessment Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, MA).

The Former Cape Poge Little Neck Target MRS and the island of Martha's Vineyard are relicts of the last ice age and the warming trends that followed. Repeated glaciations scraped soil and rock from the mainland of New England. Eighteen thousand years age the glaciers reached their southernmost extent and began to melt and retreat, depositing the rock and soil, once trapped within the ice, as terminal moraines. These terminal moraines can be found on Martha's Vineyard and Chappaquidick.

The geological deposits that make up the Former Cape Poge Little Neck MRS consist of recent beach and marsh sediments, glacial deposits, interglacial deposits and glacially deformed ancient coastal plain sediments. The county consists mostly of deposits from the last glacial stage, but in places consists of glacial or interglacial deposits as much as 300,000 years old. The Quaternary section and coastal plain deposits overlie solid bedrock and range from 500 feet thick on the north shore of Martha's Vineyard to 900 feet thick on the south shore (USACE 2009 Draft Preliminary Assessment Cape Poge Little neck Bomb Target Site Chappaquiddick Island, MA).

1.1.2 Former Moving Target Machine Gun Range at South Beach MRS

The Former Moving Target Machine Gun Range at South Beach is located within the town of Edgartown along the southern shore of Martha's Vineyard, Massachusetts. The South Beach MRS encompasses approximately 478 acres: 1) approximately 18.7 acres of land; 2) approximately 182.7 acres of beach; 3) approximately 7.7 acres of inland water; and 4) approximately 268.7 acres of ocean. Due to extensive beach erosion, the former range is now thought to be approximately 150 yards off South Beach (USACE 2009 Draft Preliminary Assessment Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, MA). South Beach is owned and managed by the Commonwealth of Massachusetts, Department of Conservation and Recreation (DCR), and managed by the Edgartown Parks and Recreation Department from the first of May through Labor Day of each year.

1.1.3 Tisbury Great Pond MRS

The Tisbury Great Pond MRS is located within the towns of Chilmark and West Tisbury, Martha's Vineyard, Massachusetts. The Site encompasses approximately 768 acres: 1) approximately 198.1 acres of land; 2) approximately 61.5 acres of beach; 3) approximately 456.3 acres of inland water; and 4) approximately 52.4 acres of ocean. The majority of the Site is owned by the Commonwealth of Massachusetts, TTOR, and private landowners (USACE 2008 Site Inspection Report for Tisbury Great Tisbury Great Pond has elevations that range from sea level to three feet above mean sea level near the coast line in the southern portion of the site to approximately 15 feet in the northern portion. The majority of the area is flat with sand dunes, some of which are approximately 5 to 10 feet high (USACE 2008 Site Inspection Report for Tisbury Great Pond). The shoreline gently slopes downward to the coast. There is a large dune separating Tisbury Great Pond from the Atlantic Ocean. At times (at least once per year), the

barrier dune is breached to allow Tisbury Great Pond to discharge freshwater to the Atlantic Ocean and allow saltwater to enter the pond (USACE 2008 Site Inspection Report for Tisbury Great Pond).

The vegetation surrounding Tisbury Great Pond consists of predominantly low grasses and areas of barren beaches. The northern portion is covered with numerous tree and shrub species. Common species found throughout the site are poison ivy, beach plum and bayberry. Tree species found in the northern portion of the site include maple, various pine tree species, oak and beech.

Surface soil in the southern near-shore portion of the site is predominantly medium to fine grained, clean, brownish-yellow sand with trace quantities of silt. These soils are excessively drained and have a high permeability. The thickness of this surface soil layer varies considerably and ranges from 0 to 5 feet below ground surface to tens of feet thick in other areas. Surface soil in the northern portion of the site is similar in composition, thin (0 to 6-inch) layer of loamy sand present with appreciable organic content. Surface soil adjacent to the Tisbury Great Pond shoreline contains large amounts of fine sediments including fine sands, silts, clays, and a high organic material content. The subsurface soil unit is glacial till deposited over successive glacial events dating back to more than 300,000 years ago and as recently as 10,000 years ago. The glacial till is composed of sand, gravel, cobbles and boulders with trace quantities of fines deposited as the glaciers receded. The glacial till deposits extend to depths as much as 500 feet below ground surface (USACE 2008 Site Inspection Report for Tisbury Great Pond).

1.2 PROJECT ORGANIZATION

The Project Manager will be the single point of contact for USAESCH, with the organizational structure and lines of communication highlighted in Figure 1-1.

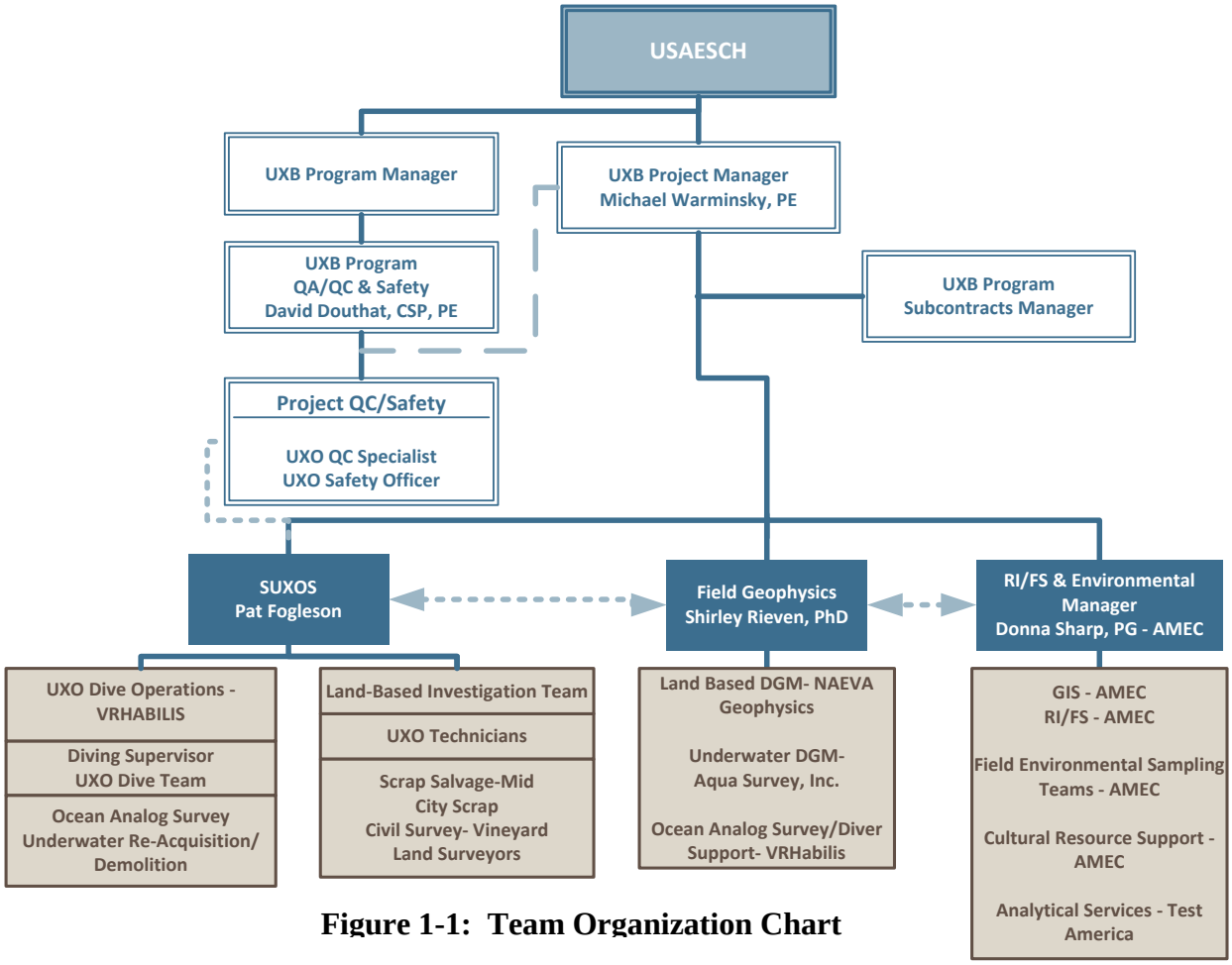


Figure 1-1: Team Organization Chart

1.3 PROJECT PURPOSE AND SCOPE

The data quality objectives (DQOs) for MC sampling conducted at Former Cape Poge Little Neck Bomb Target Site MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and the Tisbury Great Pond MRS will be achieved by sample collection, laboratory chemical analyses, and data interpretation. The goal is to collect the necessary data to determine nature and extent of MC and perform an adequate risk assessment to evaluate risk to human health and the environment.

The primary scope of the RI is to collect soil (surface and subsurface), surface water, sediment and groundwater samples to evaluate the nature and extent of contamination.

1.4 NON-MEASUREMENT DATA ACQUISITION

Non-measurement data will not be acquired for MC sampling.

1.5 FIELD ACTIVITIES

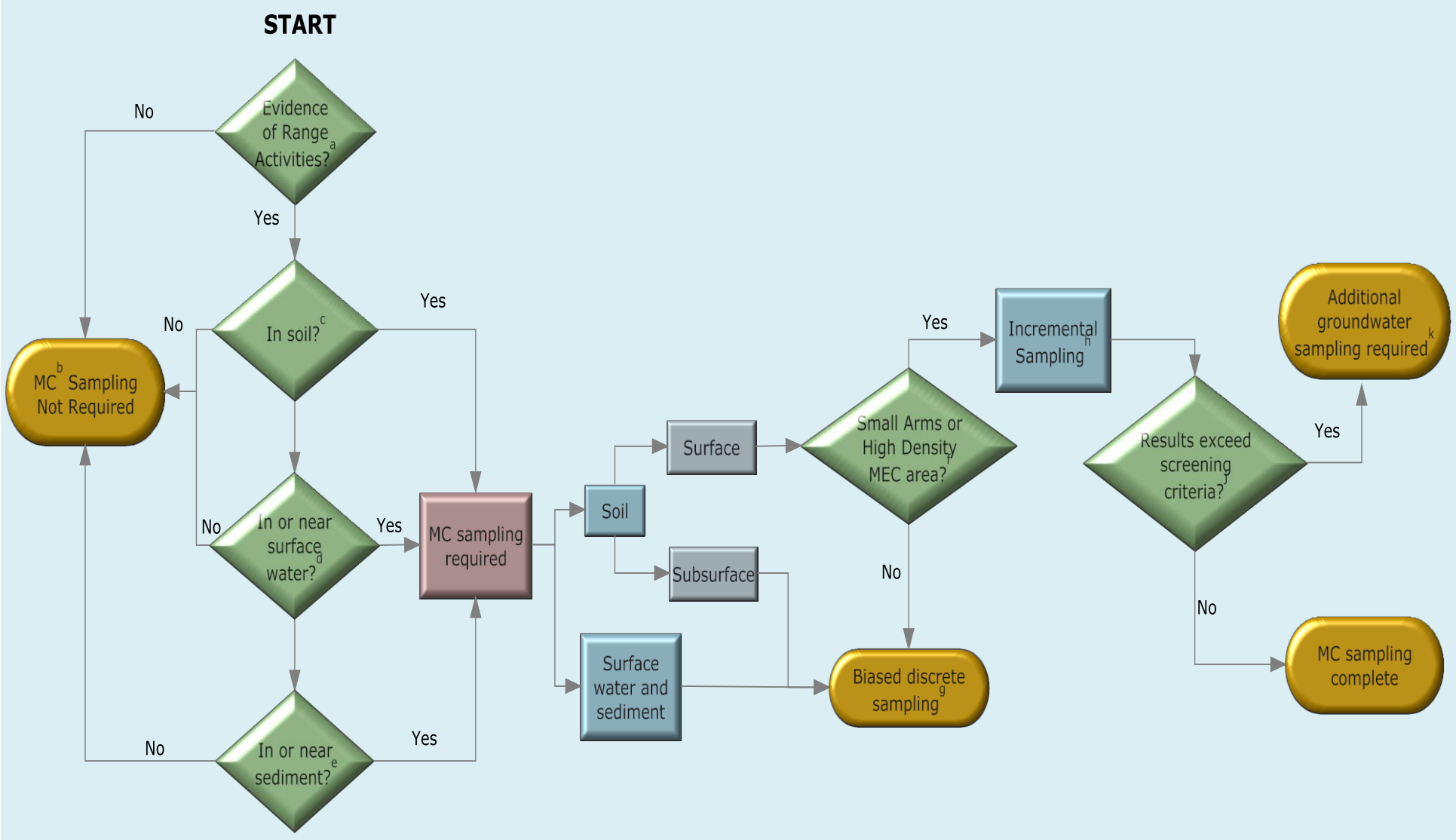
Biased, representative, consistent and defensible soil, surface water, groundwater and sediment

data will be collected at the three MRSs. This data will be used to determine the nature and extent of MC at each MRS. Actual sample locations and quantities will be determined based on the geophysical and anomaly investigation results. The MC Sampling Logic, discussed in Section 1.5.1, will be followed when making determinations on sample locations and quantities.

1.5.1 Decision Logic

The decision logic for MC sampling is summarized in Figure 1-1.

Figure 1-1: MC Sampling Logic



Notes: [a]Evidence of Range Activities includes munitions and explosives of concern, small arms and small arms training history, munitions debris, and impact craters, etc.

[b]MC – Munitions Constituents – Compounds related to munitions identified at the MRS during previous investigations or current Remedial Investigation intrusive activities.

[c]Soil sampling will be conducted in areas where vegetation growth is possible. MC sampling will not be conducted on beach sand or in the ocean where sorption of potential compound to sand particles is not likely.

[d]Surface Water does not include the open ocean. Surface water for this project consists of inland ponds, Shear Pin Pond, Drunkards Cove, Tisbury Great Pond, and a small portion of Katama Bay adjacent to South Beach.

[e]Sediment will be co-located with the surface water of the inland water bodies.

[f]Small Arms activities were observed at the Moving Target Machine Gun Range MRS. High Density MEC areas will be identified based on digital geophysical mapping and intrusive investigation results.

[g]Biased discrete samples for surface soils may be collected in areas where MEC is present, but not part of a high density area. Biased discrete subsurface soil sampling will be conducted from a minimum of 1 foot below ground surface. Within Incremental Sampling (IS) decision units, subsurface samples will be collected from 1 to 2 feet with a minimum of 2 subsurface samples per decision unit. In addition, a subsurface soil sample will be collected beneath any identified breached munition.

[h]IS will follow the USACE's Interim Guidance 09-02 (2009) on Implementation of IS for the Military Munitions Response Program. Decision Units will be determined based on historical use and may be adjusted based on results of the geophysical and intrusive investigation. For instance, at the Moving Target Machine Gun Range at South Beach, each firing line, impact berm and range floor will be considered a separate decision unit. In areas where high MEC densities are identified, the decision unit will be determined based on the size of the area identified.

[j]Screening criteria include background values for inorganics and EPA Regional Screening Values for explosives.

[k]Groundwater will be sampled for the MC s that exceed the screening criteria for soil, surface water, and sediments. Groundwater sample locations will be determined based on the results of the other media. Per the TPP Meeting #1, a current well survey at each MRS will be conducted and a subset of the public access wells will be sampled for the munitions constituents at each MRS.

1.5.2 Groundwater

Sample Collection Procedures

Prior to groundwater sampling activities, a well inventory will be conducted to determine which already installed wells, if any, will be representative of shallow groundwater at the MRS. If wells are identified as suitable for sample collection, or if a groundwater monitoring wells is installed, the EPA Region 1 January 2010 Low Flow – Low Stress groundwater sampling guidance will be used to collect the sample. An overall process for collecting groundwater samples will be as follows:

1. A new pair of clean disposable gloves will be donned at the sampling location.
2. Using a peristaltic pump, the well will be micro-purged prior to sampling until field measurements are stable.
3. Once field measurements have stabilized, a sample will be collected by filling a sample container directly from the pump tubing.
4. After the sample bottle is filled, the caps will be placed on the bottles.
5. A security seal will be placed around the lid of the sample container (initial & date).
6. Samples will be stored in coolers provided by the laboratory.
7. A temperature blank will be placed in each cooler sent to the laboratory for analysis.
8. The sample will be packaged for shipment to the laboratory.

1.5.3 Soil (Surface and Subsurface)

Sample Collection Procedures

The process for collecting discrete soil samples is as follows:

1. A new pair of clean disposable gloves will be donned at each sampling location.
2. Soil borings will be advanced using hand augers or hand trowels.
3. Soil will be collected from the locations/intervals determined after the completion of the geophysical and anomaly investigations.
4. Samples will be collected 4-ounce glass jars provided by the laboratory. A scoop/trowel/spoon will be used to fill the sample bottles and ensure immediate, proper labeling of the sample. Pre-labeling sample containers is recommended, if possible.
5. After the sample bottle is filled, the cap will be placed on the bottle.
6. A security seal will be placed across the lid of the sample container (initial & date).
7. The sample will be packaged for shipment to the laboratory.

The process for collecting incremental soil samples is as follows:

1. A new pair of clean disposable gloves will be donned at each sampling location.
2. The decision unit dimensions will be established based on historical data and geophysical/intrusive investigation results.
3. GPS coordinates for each decision unit corner will be recorded in the field sampling logbook.
4. A random number generator to will be used to determine a statistically random starting location near one of the four corners.
5. A minimum of 50 aliquiots of soil will be collected using the 5 cm depth IS sampling tool.
6. Samples will be placed in a new, clean gallon-size polyethylene bag.
7. The total number of aliquots will be recorded in the field logbook.
8. After the entire increment sample is collected, the bag will be sealed, properly labeled and taped closed.
9. The sample will be packaged for shipment to the laboratory.

1.5.4 Sediment

Sample Collection Procedures

The process for collecting sediment samples is as follows:

1. A new pair of clean disposable gloves will be donned at each sampling location.
2. Using an electro-vibracoring system, a 4-inch diameter steel core barrel with a flexible core liner will be advanced to a maximum depth of one foot below sediment surface.
3. Cores will be retrieved from the flexible liners and placed into sample containers.
4. Sediment will be collected from the locations/intervals determined after the completion of the geophysical and anomaly investigations.
5. After the sample bottle is filled, the cap will be placed on the bottle.
6. A security seal will be placed across the lid of the sample container (initial & date).
7. The sample will be packaged for shipment to the laboratory.

1.5.5 Surface Water

Sample Collection Procedures

The process for collecting surface water samples is as follows:

1. A new pair of clean disposable gloves will be donned at each sampling location.

2. Surface water will be collected from the locations/intervals determined after the completion of the geophysical and anomaly investigations. Surface water samples co-located with sediment samples will be collected before the sediment sample to avoid introducing sediment into to surface water sample.
3. Surface water grab samples will be collected and immediately placed into a laboratory provided bottle/container.
4. After the sample bottle is filled, the cap will be placed on the bottle.
5. A security seal will be placed across the lid of the sample container (initial & date).
6. The sample will be packaged for shipment to the laboratory.

1.5.6 Background Sampling

Background samples will be collected to establish the screening criteria for metals and perchlorate (surface water and sediment). Sample locations will be determined based on the results of the geophysical and anomaly investigation. Background sample locations will be collected within the MRS boundaries, if possible, in apparent un-impacted areas. If necessary, background samples will be collected outside of the MRS boundaries. Table 1-1 summarizes the background sampling activities for each MRS.

Table 1-1: Background Sampling Summary per Munitions Response Site

Environmental Media		Number of Samples	Analytical Methods
Surface Soil	Discrete Samples	10	EPA Methods 6010B and 6020
	Incremental Samples	1 (in triplicate)	EPA Methods 6010B and 6020
Subsurface Soil		10	EPA Methods 6010B and 6020
Surface Water		10	EPA Methods 6010B, 6020, and 6860 (Great Tisbury Pond MRS only)
Sediment		10	EPA Methods 6010B, 6020, and 6860 (Great Tisbury Pond MRS only)

Background concentrations will be compared against the delineation criteria outlined in the UFP-QAPP (Attachment II).

1.5.7 Analytical Methods Rationale

The primary constituents of concern for this investigation are metals, perchlorate, and explosives. The analytical methodologies will consist of:

- EPA Method 6010B (metals);
- EPA Method 6020 (antimony);

- EPA Method 6860 (perchlorate); and,
- EPA Method 8330B (explosives).

The analytical laboratory selected for this investigation is TestAmerica Denver. For sample shipment, data quality issues and analytical questions, the TestAmerica Denver PM is as follows:

ATTN: Debra Henderer
4955 Yarrow Street
Arvada, CO 80002
Tel 303.736.0134
Cell 303.358.4011
http://www.testamericainc.com

1.5.8 Land Surveying

Formal land surveying will not be conducted during the RI field activities. Sample locations will be determined by means of a hand-held Trimble GPS unit with an accuracy greater than 1 meter and shall be recorded in the field logbook.

1.6 Field Quality Assurance/Quality Control (QA/QC)

Quality control samples that will be collected during this investigation include duplicate/replicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, equipment rinse blanks (ERB), and temperature blanks.

1.6.1 Duplicate/Replicate Samples

A replicate (solid)/duplicate (liquid) sample is a second sample collected at the same location as the original sample. Duplicate/replicate sample results are used to assess precision of the sample collection process. Duplicate samples are collected simultaneously or in immediate succession, using identical recovery techniques, and treated in an identical manner during storage, transportation, and analysis. The frequency of collection for field duplicates is 1 per 10 field samples per matrix sampled.

1.6.2 Incremental Sampling (IS) IS Quality Control Samples

Reproducibility of incremental sampling (IS) results by replicate sampling is key to demonstrating that data are scientifically defensible and representative (USAEPA, 2006b, Method 8330B), and the only means by which confidence can be quantified. In lieu of collecting field duplicates for the IS samples, a triplicate IS sample will be collected at each MRS during incremental sampling as specified in the USAESCH Implementation of Incremental Sampling (IS) of Soil for the MMRP, Interim Guidance Document (IGD) 09-02.

1.6.3 MS/MSD Samples

One pair of samples (MS/MSD) will be collected for every twenty (20) samples taken per matrix sampled and shall be a split sample of the replicate/ duplicate samples, whenever possible.

1.6.4 Equipment Rinse Blanks

Equipment rinse blanks (ERBs) are collected after equipment decontamination by the field personnel on reusable sampling equipment only. ERBs are collected for the data user to evaluate the usability of the data. ERBs are collected by pouring Grade II Reagent deionized water over decontaminated sampling equipment. Rinse water is collected directly into the sample container, labeled, security sealed, and submitted to the laboratory at the same time as the environmental samples.

1.6.5 Temperature Blanks

Temperature blanks are provided by the laboratory with the sample containers and coolers. They will be submitted to the laboratory along with the samples at a rate of one per cooler and are used to evaluate if samples arrive at the laboratory within the 4°C $\pm$2°C criteria.

1.7 DOCUMENTATION

Every field project shall have a Field Logbook and shall be completed and maintained as specified in this Section. Soil boring logs and/or sample collection logs shall be completed in accordance with this Section and shall be maintained in project files.

1.7.1 Photographs

Photographs will be collected as the field team deems necessary and shall minimally consist of photos showing the sample collection for each type of environmental media.

1.7.2 Field and Equipment Logbooks

The following logbook step-wise procedure shall be used to track field data integrity and accountability.

- Logbooks should be bound and each page in the logbook numbered and dated.
- Observations, data, and calculations should be recorded at the time they are made.
- Unless prohibited by weather, pens with permanent ink should be used to record all data.
- Logbook entries should be legible and contain pertinent, accurate and inclusive documentation of project activities.

- Upon completion of the field investigation, the end of project entries in the logbook should be clearly indicated. This may be accomplished by noting “End” on the last page of notes and dating and initialing the notation.
- In order to demonstrate continuity of the project and to preclude questioning of the integrity of the data collection process, pages should not be removed from bound logbooks under any circumstances.
- Data or other information that has been entered incorrectly will be corrected by drawing a line through the incorrect entry and initialing or signing and dating the lined-through entry. Under no circumstances should the incorrect material be erased, made illegible or obscured so that it cannot be read.

The following information will be included either on the front cover or the first page of all logbooks at a minimum:

- Project name
- Project location
- Project identification number
- Project leader (full name)
- Sample team leader (full name) and initials
- Sample team member(s) (full name) and initials

The following additional information shall be included in all logbooks when samples are collected:

- Date and time of collection
- Sample station identification
- Method of collection
- Number and type of containers
- Sample collection equipment
- Equipment type
- Physical description of sample
- Matrix sampled
- Sample team member duties (calibration, collection, deployment, etc.)
- Sample preservation (including ice), if applicable

- Indication of sample team member duties (i.e., John Doe collected samples, Jane Doe compiled notes, labeled containers, etc.)
- Conditions that may adversely impact quality of samples, if applicable (rain, wind, smoke, dust, extreme temperature, etc.)
- GPS coordinates (non-logging GPS units), if applicable
- Location of electronic data file backups, if applicable
- Monitoring of condition of ice in coolers or sampler
- Other pertinent information

1.7.3 Variance and Auxiliary Logs

The following Logs shall be collected and retained in project files for a retention time of ten years from sample collection. Sampling related forms to be used during field activities are located in Attachment I.

Variance Form

Variances from the WP must be formally documented on the Variance Form located in Attachment I.

Sample Collection Logs

Sampling collection logs for both soil and groundwater samples, shall be completed while environmental samples are collected for laboratory analysis, as certain field conditions, environments, other notes may assist in the interpretation of analytical results. Sample collection logs are presented in Attachment I.

1.8 Sample Packaging and Shipping Requirements

The instructions contained in this Section are to be used by field personnel when collecting and handling samples for packing and shipping. On the occasion that AMEC field personnel determine that any of the instructions described in this section are inappropriate, inadequate or impractical and that another procedure must be used, the variance must be documented in the field log book, along with a description of the circumstances requiring its use. At a minimum, the following items are necessary to complete the actions required by this Section:

- Indelible black-ink pens
- Field logbook
- Ziploc® bags
- Sample containers

- Coolers
- Blue Ice® (or equivalent)
- Strapping tape or duct tape
- Garbage bags
- Sample labels
- Chain-of-custody forms
- Custody seals

1.8.1 Sample Containers

Sample containers to be used for this project are presented in the UFP-QAPP (Attachment II).

1.8.2 Sample Preservation, Packaging, and Shipment

Once the samples have been collected, it is important that the sampler properly package the samples for shipment/transport and ensure that the samples are sent to the appropriate laboratory as quickly as possible. Sample preservation requirements are specified in the UFP-QAPP (Attachment II). Prompt and proper packaging of samples will:

- Protect the integrity of samples from changes in composition or concentration caused by bacterial growth or degradation from increased temperatures;
- Reduce the chance of leaking or breaking of sample containers that would result in loss of sample volume, loss of sample integrity, and exposure of personnel to toxic substances; and
- Help ensure compliance with shipping regulations.

Prior to shipment, samplers should conduct an inventory of the contents of the shipping cooler or container against the corresponding Chain of Custody (CoC) Record when packing for shipment to the laboratory. An inventory will ensure that the proper number of containers have been collected for each analysis of the samples, that the required QC samples and cooler temperature blanks are included, and the correct Sample Numbers have been assigned to each sample.

Sample transportation, if possible, shall be coordinated with Ms. Debra Henderer, TestAmerica Denver, at (303) 736-0134. Samples will be shipped in accordance with applicable Department of Transportation requirements (49 CFR 171 through 49 CFR 178) and EPA sample-handling, packaging, and shipping methods (40 CFR 262). On-Site shipments will comply with Site-specific and Packaging and Transportation requirements for transporting samples. Sample shipping personnel are responsible for ensuring that the sample shipment will comply with all applicable shipping regulations.

Samplers must properly place the necessary paperwork in the shipping cooler. All paperwork must be placed in a plastic bag or pouch and then secured to the underside of the shipping cooler lids (Figure 1-2). Necessary paperwork includes CoC Records in concert with any project specific documentation. Samplers should contact the RI Technical Lead or the MC Sampling Field Manager for specific paperwork requirements.

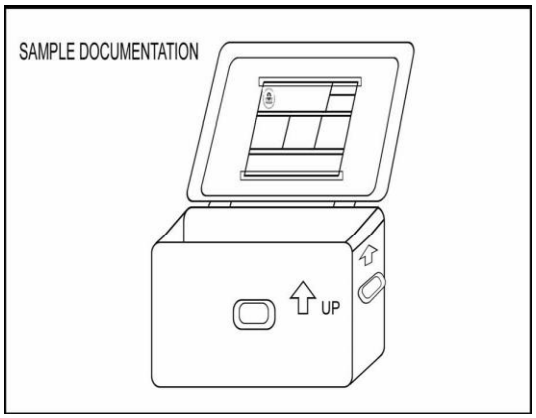


Figure 1-2 : Shipping Cooler

After samples are packaged within shipping coolers, samplers must carefully secure the top and bottom of the coolers with tape, place return address labels clearly on the outside of the cooler, and attach the required chain-of-custody seals. Custody seals will be placed on all shipping containers to ensure that tampering or unauthorized opening does not compromise sample integrity.

1.8.3 Sample Identification

Sample identification provides a method for tracking each sample through collection, analysis, and data reduction. Sample labels shall be pre-printed whenever possible. The field sample nomenclature will be completed once the number and locations of samples has been determined. Table 1-2 summarizes the sample nomenclature for this project.

Table 1-2 Sample Nomenclature

Station ID	Sample Location/ID Number	Matrix	Depth (bgs)
CP0X MG0X TG0X	SB00X	Soil	TBD
CP0X MG0X TG0X	SW00X	Surface Water	Surface only
CP0X MG0X TG0X	SD00X	Sediment	0-3 inches
CP0X MG0X TG0X	GW00X	Groundwater	TBD

MG: Former Moving Target Machine Gun Range at South Beach
CP: Former Cape Poge Little Neck Bomb Target Site
TG: Tisbury Great Pond

A Station ID will correspond with a unique location within an MRS. Sample IDs will be numbered sequentially and represent a unique sample. For example, a surface soil sample

collected at a location within the Former Cape Poge Little Neck Bomb Target Site MRS will be identified as CP01-SB001. A subsurface soil sample collected at the same location but at a different depth will be identified as CP01-SB002. A surface water sample collected within the Former Cape Poge Little Neck Bomb Target Site MRS would be identified as CP02-SW001.

NOTE: Sample intervals shall be documented on the sample collection log and in the field logbook.

1.9 INVESTIGATIVE DERIVED WASTE

As part of the RI, Investigation Derived Waste (IDW) will be generated and requires specific handling procedures and management practices. This section details the procedures and practices that the UXB team will follow to handle IDW material. The following section provides a description of the IDW that will be generated during the investigation.

IDW generated from field investigation activities will be collected, sampled, characterized, and labeled by the sampling team. Manifesting (or Bills of Lading), management, transportation, and disposal of IDW will also be coordinated by the UXB team. IDW will be handled in an efficient and timely manner, utilizing cost-effective methods.

This IDW Management Plan is compliant with guidance provided in the EPA guidance document entitled *Management of Investigation-Derived Wastes During Site Investigations* (EPA, 1991).

During the field effort, waste container information shall be kept in the field logbook and shall include the following information:

- Waste container identification number
- Type of waste
- Volume of waste
- Date waste generated
- Source of waste
- Reference to available analytical data

All containers will also include this information on the label. A “Pending Analysis” label shall be affixed to the waste container at the initiation of accumulation. In addition, a contact name and number will be provided on the waste container.

Excess soil from soil boring material shall be spread on the ground within the berm area since a response action involving the berm will be conducted in the near future.

IDW wash water generated from field activities will be contained in a Department of Transportation approved drum. The drum will be labeled as specified in this Section and shall be

temporarily staged either at each sampling location. After containerizing equipment rinse water, composite samples of the IDW will be collected. Samples will be submitted to an analytical laboratory for applicable SW-846 analyses (as discussed in the UFP-QAPP) to address requirements for proper management and disposal.

Based on the analytical results from the sampling activities, recommendations for disposal options will be developed and submitted to the CENAE and USAESCH. If the analytical results indicate that the IDW wash water meets the pre-treatment standards, IDW water may be discharged to the sanitary sewer. If the analytical results indicate that IDW water is above the RCRA regulatory limits, the decontamination water will be disposed of at an approved facility.

Non-hazardous PPE will be containerized in a household-type trash bag and may be disposed of in an onsite trash receptacle/dumpster.

1.10 EQUIPMENT DECONTAMINATION PROCEDURES

Sampling equipment will be decontaminated to ensure sample integrity and accurate analytical results. A decontamination station will be required on-site to decontaminate sampling equipment (e.g., shovels, trowels, hand augers, etc.). The equipment will be decontaminated after each sample has been collected. The procedure for field decontamination of sampling equipment is as follows:

1. Remove any gross contamination (solid particles) from the equipment by brushing and then rinsing with potable water. Wash equipment with a brush and Luminox® solution.
2. Rinse with potable water.
3. Rinse with deionized water.
4. Allow equipment to air dry thoroughly. Unless the equipment is going to be used immediately, it must be wrapped in new aluminum foil, shiny side out, to keep it clean until needed. For large bulky equipment, new plastic wrap can be substituted for the aluminum foil.

1.11 THREE-PHASE INSPECTION PROCEDURES

The Three-Phase Control Process will be utilized during MC sampling acitivities to ensure that project activities comply with the approved plans, procedures, and specifications. The elements of the Three-Phase Control Process are:

- Preparatory phase;
- Initial phase; and
- Follow-up phase.

The UXB PM will ensure that the Three-Phase Control Process is implemented for each definable feature of work performed during the project. Each control phase is important for obtaining a quality product. However, the preparatory and initial inspections are particularly valuable in preventing problems. Production sampling work must not be performed until successful preparatory and initial phase inspections have been completed.

The UXB PM, the MC Sampling Field Manager, and other key personnel must work together to ensure that project objectives are being achieved. The Field Manager will communicate observations to the PM on a regular basis. This may be accomplished through staff meetings, project QC meetings, surveillance reports, QC reports, and e-mail correspondence.

1.11.1 Preparatory Phase

A preparatory phase inspection will be performed prior to beginning the field sampling work. The purpose of the inspection is to review plans, specifications, SOPs, and other applicable documents, and to verify that necessary resources, conditions, and controls are in place before work starts. This review will be conducted with the personnel responsible for performing the work, including managers, supervisors, and site personnel to ensure that all involved know what is expected and understand their role. The Field Manager will be responsible for confirming that:

- Personnel required for the activity are identified and positions filled;
- Personnel have received and reviewed a copy of the SAP and Site Safety and Health Plan (SSHP);
- Training has been identified and completed;
- Preliminary work and coordination have been completed;
- Equipment and materials required to perform the activity have been identified and are available; and
- Reviews have been conducted.

Deficiencies identified during preparatory phase inspections will be documented and corrective action taken prior to beginning work. The Field Manager will verify with the PM that corrective action has been completed and is appropriate before production work can begin.

1.11.2 Preparatory Phase

Initial phase inspections are performed when a work process begins for each crew or team performing the process. The purpose of the inspection is to verify that work complies with procedures and contract specifications, establish acceptable levels of workmanship, review the Preparatory Phase Inspection Checklist, and resolve any differences of interpretation. Initial

phase inspections may be repeated when acceptable levels of quality are not demonstrated or at the discretion of the Field Manager.

The Field Manager will be responsible for conducting initial phase inspections and verifying that:

- Compliance with procedures and specifications has been achieved;
- Acceptable levels of workmanship are being performed;
- Corrective action taken during the preparatory phase inspection has resolved the deficiency and prevents recurrence; and
- Any differences of interpretation are resolved.

Deficiencies identified during initial phase inspections will be documented, and corrective action will be taken. The Field Manager will verify with the PM that corrective action has been completed and is appropriate to prevent recurrence of the condition. When corrective action cannot be completed in a timely manner (i.e., 2 days), or the root cause is not known, immediate corrective action that fixes the deficiency may be taken and verified, and work may be continued pending root cause analysis and more appropriate corrective action.

1.11.3 Follow-Up Phase

Follow-up phase inspections will be performed after a work process has begun and periodically throughout the work process. The purpose of the inspections will be to ensure that the process is being completed in accordance with agreed-upon standards, to identify changes in the process, and to ensure that the level of quality meets expectations. The Field Manager will be responsible for monitoring work processes taking place and verifying continued compliance with contract specifications and requirements.

1.12 NON-CONFORMANCE

Corrective action is initiated whenever there is a non-conformance or deviation to procedures and requirements in the applicable planning documents. The investigation procedures discussed in this FSP are designed to perform the work in a timely and effective manner. If unforeseen field conditions arise, modifications to the FSP may be necessary.

Deviations from this FSP that do not jeopardize sample integrity or violate the intent of the approach will be fully documented in the field logbook. Major problems that cannot be corrected onsite will be discussed with the CENAE and USAESCH PMs within 24 hours of occurrence. This will be followed by a written record of the problem along with a discussion of the corrective actions taken, their effectiveness, and qualitative and quantitative effect on the data's quality. This written record will be used in data evaluation. The CENAE and USAESCH

PMs will be notified of any problems that cannot be corrected without compromising sample integrity.

All project personnel have the responsibility, as part of their normal work duties, to promptly identify deviations, solicit approved correction and report conditions which are not in accordance with the FSP. If unanticipated field conditions are encountered that significantly impact the project, UXB's Project Manager will be notified immediately. Any conditions that result in a field change will, at a minimum, be reported to the CENAE and USAESCH PMs.

UXB will follow the FSP procedures at all times. If it is discovered that FSP procedures are not being followed, UXB will evaluate the impact to the project's quality and will document the cause of the change. Corrective action will be taken to prevent further deviation from the FSP. The UXB, CENAE and USAESCH PMs will be informed about the problem and the corrective action will be documented in the Daily Report.

2.0 REFERENCES

1. Environmental Protection Agency (EPA 1991), *Management of Investigation-Derived Wastes During Site Investigations*, Office of Emergency and Remedial Response. OERR Directive 9345.3-02.
2. United States Army Corps of Engineers (USACE, 2001), EM-200-1-3, *Requirements for the Preparation for Sampling and Analysis Plans.*
3. Cold Regions Research Environmental Laboratory (CRREL, 2007), *Protocols for Collection of Surface Soil Samples at Military Training and Testing Ranges for the Characterization of Energetic Munitions Constituents.*
4. Department of Defense (DoD, 2009), *Quality Systems Manual for Environmental Laboratories, Version 4.1*.
5. DoD (DoD, 2009a), Environmental Laboratory Accreditation Program.
6. Intergovernmental Data Quality Task Force (IDQTF, 2005), *Uniform Federal Policy for Quality Assurance Project Plans: Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs.*

ATTACHMENT I

FIELD FORMS

Variance Request Form

VARIANCE REQUEST FORM		
Variance #:	**DATE**	
LOCATION:	**Client Representative:**	
1. Description (items involved, submit sketch, if applicable): (Use Continuation Sheet if Necessary)		
2. Reason for Change (Use Continuation Sheet is Necessary)		
3. Recommended Disposition (Submit sketch, if applicable): (Use Continuation Sheet if Necessary)		

Preparer of Variance Form (Print name and sign)	Preparer's Title	Date
AMEC Project Manager (Print name and sign)	Accepted (Y/N)	Date
AMEC Quality Manager (Print name and sign)	Accepted (Y/N)	Date
ANG Project Manager (Print name and sign)	Accepted (Y/N)	Date

Soil Sample Collection Form

		COC Number	
	☐ Associated QC Sample		
		Task	
Location Code		Collection Date	
Sample Number		Collection Time	
Sample Name		Start Depth	
Sample Method		End Depth	
Sample Type		Sample Matrix	
Sample Equipment		Sample Team	
Analytical Method		Container	

COMMENTS: (i.e., ambient conditions such as drizzling, raining, temperature, recent rain event, murky water, soil texture, etc.)

Sketch Location:

Coordinates: _____ Format Type: _____

Logged by/Date: _____ Reviewed by/Date: _____

Example Chain of Custody Form

amec

EARTH & ENVIRONMENTAL

Chain of Custody Record/Analysis Request

Temperature of samples upon lab arrival: _____

ISSUING OFFICE:	Knoxville
Project Name: Nashville ANG Base	Job No.:276220129
Project Manager: Paula Bond	Phone No.: 865-671-6774
Sampler (s): Charles Burgess (615) 333-0630	

ESC Lab Sciences
12065 Lebanon Road
Mt. Juliet, TN 37122
ph: (800) 767-5859
fax: (615) 758-5859

Attn: Mark Beasley

Station ID	Sample ID	Time Collected	Date Collected	Sample Type (reg, dup, eqb, ms,msd)	Matrix (soil, sed, sw)	Depth (ss, ds)	Container Type	TAL Metals (SW-6010B)	PAHs (SW-8270)						HNO_3	HCl	Ice	COMMENTS
							Total # of Containers											

RELINQUISHED BY:	RECEIVED BY:		RELINQUISHED BY:	Comments:
Signature:	Signature:		Signature:	To pre-arrange sample pick-up, call ESC Lab Nashville Sample Courier: Mr. Dennis Wood @ (615) 519-1307
Printed Name:	Printed Name:		Printed Name:	
Firm:	Firm:		Firm:	
Date/Time:	Date/Time:		Date/Time:	

ss: surface soil, ds: deep soil

ATTACHMENT II

UNIFORM FEDERAL POLICY – QUALITY ASSURANCE PROJECT PLAN

QAPP WORKSHEET #1 - TITLE AND APPROVAL PAGE

Title: Remedial Investigation Work Plan
Site Name/Project Name: Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and Tisbury Great Pond MRS
Site Location: Martha's Vineyard, Massachusetts
Revision Number: Draft 00
Revision Date: August 2, 2010

Lead Organization
UXB International, Inc.
169R Main Street, 2nd Floor
Flemington, New Jersey 08822
(908) 237-4592
ATTN: Michael Warminsky, PE
Mike.Warminsky@uxb.com

Preparer's Name and Organizational Affiliation
Preparer's Address, Telephone Number, and E-mail Address

Same as above.

Preparation Date (Day/Month/Year): August 2, 2010

Contractor's Project Manager:
Michael Warminsky, PE, UXB International, Inc. _____ Signature

Approval Signatures:

Lead Agency's Project Manager:
Carol Ann Charette, US Army Corps of Engineers, New England District (CENAE) _____ Signature

Technical Support and Contracting Agency's Project Manager:
Ralph Campbell, US Army Engineering and Support Center, Huntsville (USAESCH) _____ Signature

QAPP WORKSHEET #2 - QAPP IDENTIFYING INFORMATION

Site Name/Project Name: Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and Tisbury Great Pond MRS
Site Location: Martha's Vineyard, Massachusetts
Title: Remedial Investigation Work Plan
Revision Number: Draft 00
Revision Date: August 2, 2010
Contractor Name: UXB International, Inc.
Contract Number: W912DY-04-D-0019
Task Order: 0006

1. Identify guidance used to prepare QAPP: *Uniform Federal Policy for Quality Assurance Project Plans* (IDQTF 2005a and 2005b); *Guidance for Quality Assurance Project Plans* (EPA QA/G-5) (EPA 2002); *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4 2006) (EPA 2006)
2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
3. Identify approval entity:
4. Indicate whether the QAPP is a generic or a project-specific QAPP. (circle one)
5. List dates of scoping sessions that were held: March 23-24, 2010
6. List dates and titles of QAPP documents written for previous site work, if applicable: Not Applicable
7. List organizational partners (stakeholders) and connection with lead organization:
US Army Corps of Engineers, New England District (CENAE), US Army Engineering and Support Center, Huntsville (USAESCH), Massachusetts Department of Environmental Protection (MA DEP) and the Environmental Protection Agency (EPA), Trustees of Reservations (TTOR), Department of Conservation and Recreation (DCR), Town of Edgartown, Town of West Tisbury, Town of Chilmark, Wampanoag Tribe of Gay Head (Aquinnah), Dukes County, Riparian Association
8. List data users:
CENAE and USAESCH
9. If any required QAPP elements and required information are not applicable to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusion below: Not Applicable

The following table provides a "cross-walk" between the QAPP elements outlined in the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP Manual), the necessary information, and the location of the information within the text document and corresponding QAPP Worksheet.

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Worksheet No.
2.1 Title and Approval Page	- Title and Approval Page	1
2.2 Document Format and Table of Contents 2.2.1 Document Control Format 2.2.2 Document Control Numbering System 2.2.3 Table of Contents 2.2.4 QAPP Identifying Information	- Table of Contents - QAPP Identifying Information	2
2.3 Distribution List and Project Personnel Sign-Off Sheet 2.3.1 Distribution List 2.3.2 Project Personnel Sign-Off Sheet	- Distribution List - Project Personnel Sign-Off Sheet	3 4
2.4 Project Organization 2.4.1 Project Organizational Chart 2.4.2 Communication Pathways 2.4.3 Personnel Responsibilities and Qualifications 2.4.4 Special Training Requirements and Certification	- Project Organizational Chart - Communication Pathways - Personnel Responsibilities and Qualifications - Special Personnel Training Requirements	5 6 7 8
2.5 Project Planning/Problem Definition 2.5.1 Project Planning (Scoping) 2.5.2 Problem Definition, Site History, and Background	- Project Scoping Session Participants Sheet - Problem Definition, Site History, and Background	9 10
2.6 Project Quality Objectives and Measurement Performance Criteria 2.6.1 Development of Project Quality Objectives Using the Systematic Planning Process 2.6.2 Measurement Performance Criteria	- Site-Specific Project Quality Objectives - Measurement Performance Criteria	11 12
2.8 Secondary Data Evaluation	- Sources of Secondary Data and Information - Secondary Data Criteria and Limitations	13
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QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Worksheet No.
3.1 Sampling Tasks 3.1.1 Sampling Process Design and Rationale 3.1.2 Sampling Procedures and Requirements 3.1.2.1 Sampling Collection Procedures 3.1.2.2 Sample Containers, Volume, and Preservation 3.1.2.3 Equipment/Sample Containers Cleaning and Decontamination Procedures 3.1.2.4 Field Equipment Calibration, Maintenance, Testing, and Inspection Procedures 3.1.2.5 Supply Inspection and Acceptance Procedures 3.1.2.6 Field Documentation Procedures	- Sampling Design and Rationale - Sample Location Map - Sampling Locations and Methods/Standard Operating Procedures (SOP) Requirements - Analytical Methods/SOP Requirements - Field Quality Control Sample Summary - Sampling SOPs - Project Sampling SOP References - Field Equipment Calibration, Maintenance, Testing, and Inspection	17 18 19 20 21 22
3.2 Analytical Tasks 3.2.1 Analytical SOPs 3.2.2 Analytical Instrument Calibration Procedures 3.2.3 Analytical Instrument and Equipment Maintenance, Testing, and Inspection Procedures 3.2.4 Analytical Supply Inspection and Acceptance Procedures	- Analytical SOPs - Analytical SOP References - Analytical Instrument Calibration - Analytical Instrument and Equipment Maintenance, Testing, and Inspection	23 24 25

QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Worksheet No.
3.3 Sample Collection Documentation, Handling, Tracking, and Custody Procedures 3.3.1 Sample Collection Documentation 3.3.2 Sample Handling and Tracking System 3.3.3 Sample Custody	- Sample Collection Documentation, Handling, Tracking, and Custody SOPs - Sample Container Identification - Sample Handling Flow Diagram - Example Chain-of-Custody (COC) Form and Seal	27 26
3.4 Quality Control Samples 3.4.1 Sampling Quality Control Samples 3.4.2 Analytical Quality Control Samples	- QC Samples - Screening/Confirmatory Analysis Decision Tree	28
3.5 Data Management Tasks 3.5.1 Project Documentation and Records 3.5.2 Data Package Deliverables 3.5.3 Data Reporting Formats 3.5.4 Data Handling and Management 3.5.5 Data Tracking and Control	- Project Documents and Records - Analytical Services - Data Management SOPs	29 30
4.1 Assessments and Response Actions 4.1.1 Planned Assessments 4.1.2 Assessment Findings and Corrective Action Responses	- Assessments and Response Actions - Planned Project Assessments - Audit Checklists - Assessment Findings and Corrective - Action Responses	31 32
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QAPP Element(s) and Corresponding Section(s) of UFP-QAPP Manual	Required Information	Crosswalk to QAPP Worksheet No.
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5.3 Streamlining Data Review 5.3.1 Data Review Steps To Be Streamlined 5.3.2 Criteria for Streamlining Data Review 5.3.3 Amounts and Types of Data Appropriate for Streamlining	Not Applicable	Not Applicable

QAPP WORKSHEET #3 - DISTRIBUTION LIST

List those entities to whom copies of the approved QAPP, subsequent QAPP revisions, addenda, and amendments are sent.

QAPP Recipient	Title	Organization	Telephone Number	E-mail Address
Carol Ann Charette	CENAE Project Manager	CENAE	(978) 318-8605	Carol.a.chartette@usace.army.mil
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Ron Citterman	MC Sampling Field Manager	AMEC	(865) 671-6774	ron.citterman@amec.com
Deborah Henderer	Laboratory Project Manager	TestAmerica	(303) 736-0100	Debra.Henderer@testamericainc.com
Glenn Esler	AMEC Environmental Chemist/ Data Validation Specialist	AMEC	(503) 639-3400	glenn.esler@amec.com

Abbreviations and Acronyms:

CENAE = US Army Corps of Engineers, New England District
USAESCH = US Army Engineering and Support Center, Huntsville
UXB = UXB International, Inc.
AMEC = AMEC Earth & Environmental, Inc.
RI = Remedial Investigation
MC = Munitions Constituents
TestAmerica = TestAmerica Laboratories, Inc.
MADEP = Massachusetts Department of Environmental Protection
EPA = US Environmental Protection Agency

QAPP WORKSHEET #4 - PROJECT PERSONNEL SIGN-OFF SHEET

List the entities to whom copies of the approved QAPP, subsequent QAPP revisions, addenda and amendments are sent.

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Carol Ann Charette	CENAE Project Manager	(978) 318-8605		
Ralph Campbell	USAESCH Project Manager	(256) 895-1621		
Kim Meacham	USAESCH Technical Oversight	(256) 895-1667		
Michael D'Auben	USAESCH Chemist	(256) 895-1460		
Joanne Deardon	MADEP Regulator	(617) 292-5788		
Anne Malewicz	MADEP Regulator	(617) 292-5659		
Mike Moran	MADEP Regulator	(617) 292-2971		
Desiree Moyer	EPA Regulator	(617) 918-1257		
Mike Warminsky	UXB Project Manager	(908) 237-4592		
Donna Sharp	RI Technical Lead	(865) 671-6774		
Ron Citterman	MC Sampling Field Manager	(865) 671-6774		
Deborah Henderer	Laboratory Project Manager	(303) 736-0100		
Glenn Esler	AMEC Environmental Chemist/ Data Validation Specialist	(503) 639-3400		

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AMEC = AMEC Earth & Environmental, Inc.
EPA = US Environmental Protection Agency
RI – Remedial Investigation
MC = Munitions Constituents
TestAmerica = TestAmerica Laboratories, Inc.
MADEP = Massachusetts Department of Environmental Protection

QAPP WORKSHEET #5 - PROJECT ORGANIZATIONAL CHART

An organizational chart is provided in the RI Work Plan as Figure 2-1.

QAPP WORKSHEET #6 - COMMUNICATION PATHWAYS

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Overall contractual implementation of the project	USAESCH Project Manager	Ralph Campbell	(256) 895-1621	Primary point of contact for USAECSH.
Overall technical implementation of the project	CENAE Project Manager	Carol Ann Charette	(978) 318-8605	Primary point of contact for CENAE.
Technical, quality-related issues and Point of Contact for this project	UXB Project Manager	Mike Warminsky	(908) 237-4592	Will be notified via phone/email of significant technical or quality-related issues.
Stop Work for Quality or Safety Issue	All UXB Employees and Subcontractors	-	-	Employees must notify their supervisor, who in turn notifies the UXB Project Manager (verbal, electronic). If the CENAE calls a 'stop-work', the CENAE PM will notify the UXB PM (electronic, written)
Changes to MC SAP/QAPP or other plans, designs, or procedures	RI Technical Lead	Donna Sharp	(865) 671-6774	Notify UXB's Project Manager for approval of changes to the SAP/QAPP.
Deviation(s) from MC SAP/QAPP	MC Sampling Field Manager	Ron Citterman	(865) 671-6774	Will notify the UXB PM who in turn will contact the CENAE PM.
Sample quality issue (e.g., broken sample bottles, incorrect preservation)	TestAmerica PM	Deborah Henderer	(303) 736-0100	Will notify the MC Sampling Field Manager, who will then contact the UXB PM and/or to determine impacts to the end data use.
Corrective action(s) for sample quality issues	RI Technical Lead	Donna Sharp	(865) 671-6774	Will respond to issue from laboratory with potential corrective action (verbal, written or electronic)

Abbreviations and Acronyms:
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UXB = UXB International, Inc.
RI = Remedial Investigation
MC = Munitions Constituents
TestAmerica = TestAmerica Laboratories, Inc.
SAP = Sampling and Analysis Plan
QAPP = Quality Assurance Project Plan

QAPP WORKSHEET #7 - PERSONNEL RESPONSIBILITIES AND QUALIFICATIONS TABLE

Name	Title	Organizational Affiliation	Qualifications (as appropriate)	Responsibilities
CENAE Project Manager	Carol Ann Charette	CENAE	Project management, MEC/MC technical support	– Performs project management for the CENAE – Acts as lead interface with agencies – Ensures that the project scope of work requirements are fulfilled
USAESCH Project Manager	Ralph Campbell	USAESCH	Contract management	– Performs project management for the USAESCH – Provides direction to the contractor's project team, according to the USAESCH's contracting process – Ensures that the project scope of work requirements are fulfilled – Oversees the project cost and schedule
UXB Project Manager	Mike Warminsky	UXB	Professional Engineer, contract management	– Coordinates work activities of UXB's personnel and subcontractors, and ensures that all personnel adhere to the administrative and technical requirements of the project – Monitors and reports the progress of work, and ensures that the project deliverables are completed on time and within project budget – Monitors the budget and schedule, and notifies the client and the CENAE and USAESCH PMs of any changes that may require administration actions – Ensures adherence to the quality requirements of the contract, project scope of work, and the QC Plans – Ensures that all work meets the requirements of the technical specifications and complies with applicable codes and regulations – Ensures that all work activities are conducted in a safe manner in accordance with the Site Safety and Health Plan – Serves as the primary contact between CENAE/USAESCH and UXB for actions and information related to the work and including appropriate technical personnel in the decision-making – Coordinates satisfactory resolution and completion of evaluation and acceptance report for nonconformance reports
Donna Sharp	RI Technical Lead	AMEC	Professional Geologist, training and experience in RI field sampling and management activities	– Routes quality issues to the UXB PM. – Coordinates and manages RI activities

Name	Title	Organizational Affiliation	Qualifications (as appropriate)	Responsibilities
Worksheet# 7 (continued)				
Ron Citterman	MC Sampling Field Manager	AMEC	Environmental Scientist, munitions constituents experience	– Supervises field activities – Coordinates with the contract laboratory – Coordinates for data validation
David Douthat	Contractor's Corporate Health and Safety Officer	UXB	Professional Engineer, Certified Safety Professional	– Oversees all aspects of safety on this project – Documents site conditions and photographs field activities during site audits – Ensures that all fieldwork is conducted in accordance with the RI Work Plan – Provides direction to field staff and subcontractors
Deborah Henderer	TestAmerica PM	TestAmerica	Experienced chemist and/or project manager	– Oversees tasks with the analytical laboratory – Monitors the quality of laboratory operations – Communicates issues to the MC Sampling Field Manager – Resolves issues and providing resolution document
Glenn Esler	Data Validation Specialist	AMEC	Analytical Chemist	– Reviews data packages received from the analytical laboratory. – Qualifies analytical results based on validation results

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USAESCH = US Army Engineering and Support Center, Huntsville
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AMEC = AMEC Earth & Environmental, Inc.
RI = Remedial Investigation
MC = Munitions Constituents
TestAmerica = TestAmerica Laboratories, Inc.

QAPP WORKSHEET #8 - SPECIAL PERSONNEL TRAINING REQUIREMENTS TABLE

Project Function	Specialized Training – Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
Sample Collection	40-Hour Hazardous Waste Operations and Emergency Response	Various	Prior to field work	Sampling personnel	Sampling Technicians and Supervisors	UXB Personnel Files
Sample Collection	UXO Safety Briefing	UXB Safety, Health, and Environmental Training Program	Prior to field work	Sampling personnel	Sampling Technicians and Supervisors	Project File

QAPP WORKSHEET #9 - PROJECT SCOPING SESSION PARTICIPANTS SHEET

Title: Remedial Investigation Work Plan
Site Name/Project Name: Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and Tisbury Great Pond MRS
Site Location: Martha's Vineyard, Massachusetts
Revision Number: Draft 00

Date of Session: March 23-24, 2010
Scoping Session Purpose: Technical Project Planning

Name	Title	Affiliation	Phone #	E-mail Address
Carol Ann Charette	CENAE Project Manager	CENAE	(978) 318-8605	Carol.a.chartette@usace.army.mil
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Kim Meacham	USAESCH Technical Oversight	USAESCH	(256) 895-1667	Kim.k.meacham@usace.army.mil
Mike Warminsky	UXB Project Manager	UXB	(908) 237-4592	Mike.Warminsky@uxb.com
Tracy Bergquist	UXB Senior Environmental Specialist	UXB	(770) 329-1745	
John Kierepka	UXB MEC Operations Manager	UXB	(703) 395-0129	John.kierepka@uxb.com
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Jennifer Rand	West Tisbury Representative	West Tisbury	(508) 696-0102	execsec@westtisbury-ma.gov
Joanne Deardon	MADEP Representative	MADEP	(617) 292-5788	Joanne.Dearden@state.ma.us
Anne Malewicz	MADEP Representative	MADEP	(617) 292-5659	Anne.Malewicz@state.ma.us
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Marilyn Wortman	Town of Edgartown Parks Representative	Town of Edgartown Parks	(508) 627-6145	mwortman@edgartown.ma.us
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Mary Jane Pease	President	TGP	(508) 645-2260	

Comments/ Decisions:	1. Groundwater be sampled regardless of soil, sediment, or surface water analytical results. 2. Sampling strategy should be evaluated by risk assessors and chemists. 3. Incremental sampling as opposed to discrete surface sampling will be conducted. Subsurface samples will be biased discrete. 4. Media of interest for MC consists of soil, groundwater, surface water and sediment. 5. CERCLA background guidance will be used for collection of background samples. Background data sets will be collected and evaluated per MRS, not combined. 6. Comparison of samples against action levels for delineation will be made against EPA Regional Screening Levels (May 2010) or Massachusetts DEP Reportable Concentrations delineation criteria, whichever is more stringent.

QAPP WORKSHEET #10 - PROBLEM DEFINITION

Data Quality Objectives

Step 1. Problem Statement:

The objective of the MC investigation is to determine the nature and extent of MC at each MRS.

Step 2. Identify Decisions to be Made:

a. Within each MRS: Is there evidence of MEC/MD warranting MC sampling?
b. Within each MRS: Are the media-specific concentrations of MC in excess of screening criteria?
c. Within each MRS: Has MC nature and extent been horizontally and vertically delineated?

Step 3. Identify Information Inputs:

Previous investigation information is presented in QAPP Worksheet #13 and RI geophysical and investigation investigations of the MRSs.

Step 4. Define the Boundaries of the Study:

The exact locations of MC sampling activities will be determined after completion of the geophysical and anomaly investigation. The spatial boundaries of each MRS are illustrated in Figures 3-1, 3-2, and 3-3 of the RI Work Plan.

Step 5. Develop the Analytical Approach (Decision Rules):

The selected screening levels for the constituents involved in this project are presented in Worksheet #15, which was taken from the EPA Regional Screening Levels Master Table, May 2010 and the Massachusetts DEP, Reportable Concentrations. The selected screening criteria were the more stringent of the two. Data obtained from this investigation will be validated and undergo a 10% data validation.

Step 6. Specify Performance or Acceptance Criteria:

Decision errors for the MC sampling activities associated with project are limited to the field and analytical QC processes. The analytical requirements are defined on Worksheet #12.

Step 7. Develop the Plan for Obtaining Data

The sampling strategy is presented on the following pages. A minimum of 10% of collected analytical data will be validated for use in determining if a response action is necessary

QAPP WORKSHEET #11 - PROJECT QUALITY OBJECTIVES/SYSTEMATIC PLANNING PROCESS STATEMENTS

WHO WILL USE THE DATA?

CENAE and USAESCH will use the data collected to support decisions on whether future response actions are warranted.

WHAT WILL THE DATA BE USED FOR?

CENAE and USAESCH will use the analytical data collected to support decisions on whether future response actions are warranted in an effort to eliminate, reduce, or control unacceptable risks to human health or the environment. Data will also be used to update the Munitions Response Site Prioritization Protocol (MRSPP) for each MRS.

WHAT TYPE OF DATA ARE NEEDED?

Definitive data: biased, representative, consistent and defensible soil, sediment and surface water, and potentially groundwater data for each of the three MRSs identified in the RI Work Plan. IDW characterization data will be collected for proper IDW disposal.

HOW "GOOD" DO THE DATA NEED TO BE IN ORDER TO SUPPORT THE ENVIRONMENTAL DECISION?

Data are needed of a quality to support decisions on whether future response actions are required. Analytical data will be conducted in accordance with the performance criteria established in the DoD QSM V4.1. Quality control data for field and analytical performance criteria are presented in Worksheet #12.

HOW MUCH DATA ARE NEEDED?

The number of samples will be determined after the geophysical and anomaly data has been processed.

WHERE, WHEN, AND HOW SHOULD THE DATA BE COLLECTED/GENERATED?

The data will be collected as described in the MC Sampling and Analysis Plan. Sample locations will be determined based upon the geophysical and anomaly investigation. Samples will be collected during the RI investigation. Field data is scheduled to be collected from mid-December, 2010 through June 2011.

WHO WILL COLLECT AND GENERATE THE DATA?

UXB will oversee sample collection activities and provide samples to an off-site analytical laboratory. The laboratory, TestAmerica Laboratories, Inc., will generate definitive data using specific analytical methods and guidelines. AMEC will validate 10% of the data generated from this sampling event.

HOW WILL THE DATA BE REPORTED?

The analytical laboratory will tabulate and compile analytical results and associated QA/QC information. The data generated by the off-site laboratory will be reported in a Contract Laboratory Program (CLP)-equivalent data package format (hardcopy) and electronic data deliverable (EDD) format. Results from the off-site laboratory are to be reported in standard units for the matrix and analysis (e.g., µg/kg or mg/kg for soil and sediment samples and µg/L or mg/L for aqueous samples).

HOW WILL THE DATA BE REVIEWED OR VALIDATED?

Generated analytical data will be reviewed and verified by the UXB PM. Analytical data will be reviewed by the laboratory prior to release to UXB. A Level IV data validation will be performed by UXB in accordance with the DoD QSM V4.1 or the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 2004) and the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 1999). The validation will, at a minimum, evaluate sample receipt conditions, holding times, calibrations, method blanks, surrogate recovery, laboratory control samples, MS/MSD, analyte identification, and calculation verification. AMEC will validate 10% of the data generated from this sampling event.

HOW WILL THE DATA BE ARCHIVED?

Generated hardcopy data (field- and/or laboratory-related) will be stored in the project files, including any revised data packages. UXB will maintain project records for a minimum of 10 years. Hard copy materials are archived and maintained in a long term storage facility. Laboratory analytical data will be submitted in the SEDD 2A format, which will be parsed for use in the Automated Data Review software.

QAPP WORKSHEET #12 - MEASUREMENT PERFORMANCE CRITERIA TABLE

Matrix	Solids, Aqueous
Analytical Group	Munitions Constituents
Concentration Level	NA

Sampling Procedure[a]	Analytical Method/SOP[b]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
See QAPP Worksheet #18	• 6010B • 6020 • 6860 • 8330B	Precision (field)	≤ 50% RPD when detected concentrations >5x QL; Difference ≤QL if concentrations < 5x QL	Field Duplicate compared to Primary Sample	S&A
		Precision (laboratory)	Refer to the Method/SOP QC Acceptance Limits (Worksheet #28): Table 1. Method 6010 Table 2. Method 6020 Table 3. Method 6860 Table 4. Method 8330B	Matrix Spike Duplicate	A
		Precision (laboratory)	≤ 30% RPD	Laboratory Triplicate (Single sample prepared and analyzed in triplicate; then, compared to primary sample results)	A
		Accuracy	Refer to the Method/SOP QC Acceptance Limits (Worksheet #28): Table 1. Method 6010 Table 2. Method 6020 Table 3. Method 6860 Table 4. Method 8330B	Laboratory Control Sample	A

Matrix	Solids, Aqueous
Analytical Group	Munitions Constituents
Concentration Level	NA

Sampling Procedure[a]	Analytical Method/SOP[b]	Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	QC Sample Assesses Error for Sampling (S), Analytical (A) or both (S&A)
See QAPP Worksheet #18	• 6010B • 6020 • 6860 • 8330B	Accuracy	Refer to the Method/SOP QC Acceptance Limits (Worksheet #28): Table 1. Method 6010 Table 2. Method 6020 Table 3. Method 6860 Table 4. Method 8330B	Matrix Spike	A
		Accuracy	± 20% of expected value.	Low level calibration check and interference check solutions	A
		Accuracy	• Inorganics: ± 10% of expected value. • Organics: ± 20% of expected value.	Continuing Calibration verification (CVV) (Method 6020)	A
		Accuracy	• Inorganics: ± 10% of expected value. • Organics: ± 20% of expected value.	Second Source Calibration (ICV)	A
		Accuracy	Refer to the Method/SOP QC Acceptance Limits (Worksheet #28), Table 4. Method 8330B	Surrogate Compounds	A
		Accuracy	Refer to the Method/SOP QC Acceptance Limits (Worksheet #28): Table 1. Method 6010 Table 2. Method 6020 Table 3. Method 6860 Table 4. Method 8330B	Method Blank	A
		Completeness	90%-100% acceptable data	Data evaluation by project decision-makers	S&A

[a]Reference number from QAPP Worksheet #18.
[b]Reference number from QAPP Worksheet #23.

QAPP WORKSHEET #13 - SECONDARY DATA CRITERIA AND LIMITATIONS TABLE

Secondary Data	Data Source	Data Generator(s)	How Data May Be Used	Limitations on Data Use
Site Inspection Report, Tisbury Great Pond	Alion Science and Technology, September, 2008	Alion Science and Technology, Soil, sediment, surface water, and background samples collected in January 2008.	As preliminary assessment data	Raw data files detailing sampling locations and results are needed and, if available, will be included in the RI Report. However, if raw data files are not available, this report will only be referenced in the RI report.
Cape Poge Little Neck Bomb Target Site Preliminary Assessment	US Army Corps of Engineers, St. Louis District	US Army Corps of Engineers, St. Louis District; historical research at various archives and records holding facilities; primarily textual, cartographic and photographic research and analysis effort	As preliminary assessment data	None
Time Critical Removal Action at the Former Cape Poge Little Neck Bomb Target Site, and the Former Moving Target Machine Gun Range at South Beach	EOD Technologies, Inc.	EOD Technologies, Inc.; removal action was conducted in 2009 on land and in water; included demolition of ordnance and removal and recovery of range-related debris, MD, and cultural debris.	As preliminary assessment data	None

QAPP WORKSHEET #14 - SUMMARY OF PROJECT TASKS

Sampling Tasks:

1. Biased discrete surface and subsurface soil samples will be collected from locations determined based upon the results of the geophysical and anomaly investigations are completed.
2. Biased discrete surface water samples will be collected from locations determined based upon the results after the geophysical and anomaly investigations.
3. Sediment samples will be collected and co-located with surface water samples.
4. Incremental surface soil sampling methods will be conducted in small arms or high density MEC areas. Locations will be determined after the geophysical and anomaly investigations are completed. One triplicate sample will be collected for MC samples and one for background per MRS.
5. A well inventory will be conducted to determine locations of groundwater samples.
6. Groundwater samples will be collected from existing wells identified in the well inventory survey. Additional groundwater samples may be collected if soil analytical results exceed screening criteria.
7. Soil, surface water and sediment background samples will be collected per MRS.
8. Pre- and Post-detonation samples will be collected in the event that munitions detonation is required.
9. Investigation derived waste samples (generated during collection of rinsate samples) will be collected.

Analysis Tasks: The following methods will be used for analyzing the identified environmental media in each MRS unless otherwise specified:

- SW 6010 (metals) in soil, surface water, groundwater, and sediment
- SW 6020 (antimony) in soil, surface water, groundwater, and sediment
- SW 6860 (perchlorate) in surface water and sediment (Tisbury Great Pond MRS only)
- SW 8330B (explosives) in soil, groundwater, surface water, and sediment

Quality Control Tasks: Quality control tasks are specified in QAPP Worksheet #20

Secondary Data: MC sample data from the Tisbury Great Pond Site Inspection will be included in the Tisbury Great Pond data discussion in the RI Report.

Data Management Tasks: As discussed in Worksheet #11, analytical data will be submitted the SEDD 2A format, which will be parsed for use in the Automated Data Review software.

Documentation and Records: Chain-of-custody forms, sample labels, field forms, and field logbook entries will be completed during field activities.

Data Packages: Level IV data packages will be provided to UXB from Test America. Data validation packages will be included in the RI Report.

Assessment/Audit Tasks: Pre-investigation "readiness review" to be performed by the contractor's Program Manager and/or Project Manager. The UXB PM and RI Technical Lead will be responsible for verifying compliance with the work plan.

Data Review Tasks: Analytical data will be reviewed by the laboratory prior to release for data validation. A Level IV data validation will be performed using criteria specified in the DoD QSM V4.1, the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA 1999) and the *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 2004). The validation will, at a minimum, evaluate sample receipt conditions, holding times, calibrations, method blanks, surrogate recovery, laboratory control samples, MS/MSD, analyte

identification, and calculation verification. The validation will be performed using project-specific criteria.

QAPP WORKSHEET #15 - REFERENCE LIMITS AND EVALUATION TABLE

Matrix: Soil
Analytical Group: Methods 6010 (metals), 6020 (antimony), 6860 (perchlorate), and 8330B (explosives)

Analyte	CAS Number	Human Health Screening Criterion[b] (mg/kg)		Ecological Screening Criterion[c] (mg/kg)		Project QL (mg/kg)	Published Analytical Method Limits		Achievable Laboratory Limits[a]	
							Method QL (mg/kg)	Method MDL (mg/kg)	QL (mg/kg)	MDL (mg/kg)
Antimony	7440-36-0	20	(2)	0.142	(2)	1	NA	NA	0.2	0.014
Copper	7440-50-8	3,100	(1)	5.4	(2)	25	NA	NA	5	0.217
Iron	7439-89-6	55,000	(1)	200	(3)	400	NA	NA	80	3.8
Lead	7439-92-1	300	(2)	0.0537	(2)	4.5	NA	NA	0.9	0.27
Nickel	7440-02-0	20	(2)	38	(1)	12	NA	NA	4	0.123
Perchlorate	14797-73-0	55	(1)			0.003	NA	NA	0.0006	0.00021
1,2-Dinitrobenzene	528-29-0	6.1	(1)			0.5	NA	NA	0.1	
1,3,5-Trinitrobenzene	99-35-4	2,200	(1)	0.376	(2)	0.5	NA	NA	0.1	0.0138
1,3-Dinitrobenzene	99-65-0	6.1	(1)	0.655	(2)	0.5	NA	NA	0.1	0.0166
2,4,6-Trinitrotoluene	118-96-7	19	(1)			0.5	NA	NA	0.1	0.0307
2,4-Dinitrotoluene	121-14-2	0.7	(2)	1.28	(2)	0.5	NA	NA	0.1	0.0147
2,6-Dinitrotoluene	606-20-2	61	(1)	0.328	(2)	0.5	NA	NA	0.1	0.0191
2-Amino-4,6-dinitrotoluene	35572-78-2	150	(1)			0.5	NA	NA	0.1	0.0329
2-Nitrotoluene	88-72-2	2.9	(1)			1	NA	NA	0.2	0.0472
3-Nitrotoluene	99-08-1	2.9	d			1	NA	NA	0.2	0.0640
4-Amino-2,6-dinitrotoluene	19406-51-0	150	(1)			0.5	NA	NA	0.1	0.0299
4-Nitrotoluene	99-99-0	30	(1)			1	NA	NA	0.2	0.0365
HMX (Octogen)	2691-41-0	1	e			0.5	NA	NA	0.1	0.0227
Nitrobenzene	98-95-3	4.8	(1)	1.31	(2)	4	NA	NA	2	0.085
RDX	121-82-4	1	(2)			0.6	NA	NA	0.2	0.0430
Tetryl	479-45-8	240	(1)			1	NA	NA	0.2	0.0436

[a] Laboratory-specific MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method. MDLs may be subject to update.
[b] Criteria for human health were identified as the lower of the following:

1) USEPA Risk Screening Level(RSL; residential selected as the most stringent; http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2010.pdf) – designated with a (1)
2) MADEP Method 1 Soil Standard (S1 value selected for the greatest stringency; http://www.mass.gov/dep/cleanup/laws/0975_6a.htm) – designated with a (2)

[c] Criteria for ecological were identified using the lower of the following:

1) USEPA EcoSSL (lowest of avian, mammalian, plant or invertebrate; http://www.epa.gov/ecotox/ecossl) – designated with a (1)
2) Region 5 Ecological Screening Level (ESL; http://www.epa.gov/reg5rcra/ca/ESL.pdf) – designated with a (2)
3) Region 4 Ecological Screening Value (ESV; http://www.epa.gov/region4/waste/ots/otsguid.html) – designated with a (3)

[d] No value identified; criterion for 2-isomer used

[e] No value identified; criterion for RDX used; RDX has slightly lower Minimal Risk Levels (MRLs) identified by ATSDR (http://www.atsdr.cdc.gov/mrls/pdfs/atsdr_mrls_december_2009.pdf)

Abbreviations and Acronyms :CAS Number – Chemical Abstracts Service Registry Number; Mg/kg – milligram per kilogram; MDL – method detection limit; NA – not applicable; QL – quantitation limit

Analytes in all media will be screened against site-specific background as part of the risk process.

Blanks indicate no screening values or suitable proxy could be identified.

QAPP WORKSHEET #15 - REFERENCE LIMITS AND EVALUATION TABLE (CONT'D)

Matrix: Sediment
Analytical Group: Methods 6010 (metals), 6020 (antimony), 6860 (perchlorate), and 8330B (explosives)

Analyte	CAS Number	Human Health Screening Criterion[b] (mg/kg)	Ecological Screening Criterion[c] (mg/kg)		Project QL (mg/kg)	Published Analytical Method Limits		Achievable Laboratory Limits[a]	
						Method QL (mg/kg)	Method MDL (mg/kg)	QL (mg/kg)	MDL (mg/kg)
Antimony	7440-36-0		2	(1)	1	NA	NA	0.2	0.014
Copper	7440-50-8		31.6	(3)	25	NA	NA	5	0.217
Iron	7439-89-6		20,000	(1)	400	NA	NA	80	3.8
Lead	7439-92-1		35.8	(3)	4.5	NA	NA	0.9	0.27
Nickel	7440-02-0		22.7	(3)	12	NA	NA	4	0.123
Perchlorate	14797-73-0				0.003	NA	NA	0.0006	0.00021
1,2-Dinitrobenzene	528-29-0		1.2	(5)	0.5	NA	NA	0.1	
1,3,5-Trinitrobenzene	99-35-4		1.2	(5)	0.5	NA	NA	0.1	0.0138
1,3-Dinitrobenzene	99-65-0		0.00861	(2)	0.5	NA	NA	0.1	0.0166
2,4,6-Trinitrotoluene	118-96-7		420	(5)	0.5	NA	NA	0.1	0.0307
2,4-Dinitrotoluene	121-14-2		0.0416	(1)	0.5	NA	NA	0.1	0.0147
2,6-Dinitrotoluene	606-20-2		0.1006	(4)	0.5	NA	NA	0.1	0.0191
2-Amino-4,6-dinitrotoluene	35572-78-2		7	(5)	0.5	NA	NA	0.1	0.0329
2-Nitrotoluene	88-72-2		5.6	(5)	1	NA	NA	0.2	0.0472
3-Nitrotoluene	99-08-1		4.9	(5)	1	NA	NA	0.2	0.0640
4-Amino-2,6-dinitrotoluene	19406-51-0		1.9	(5)	0.5	NA	NA	0.1	0.0299
4-Nitrotoluene	99-99-0		4.06	(1)	1	NA	NA	0.2	0.0365
HMX	2691-41-0		27,000	(5)	0.5	NA	NA	0.1	0.0227
Nitrobenzene	98-95-3		1.285	(4)	4	NA	NA	2	0.085
RDX	121-82-4		0.013	(1)	0.6	NA	NA	0.2	0.0430
Tetryl	479-45-8		100	(5)	1	NA	NA	0.2	0.0436

[a] Laboratory-specific MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method. MDLs may be subject to update.
Abbreviations and Acronyms: CAS Number – Chemical Abstracts Service Registry Number; Mg/kg – milligram per kilogram; MDL – method detection limit; NA – not applicable; QL – quantitation limit
[b] Sediment criteria are generally for protection of ecological resources. Soil criteria can be used as conservative human health screening levels.
[c] Criteria for ecological endpoints were identified as the lowest of

1) Region 5 Ecological Screening Level (ESL; http://www.epa.gov/reg5rcra/ca/ESL.pdf) – designated with a (1)
2) Region 3 Freshwater Screening benchmark (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/screenbench.htm) – designated with a (2)
3) MADEP Freshwater Sediment Screening Benchmarks (FSSBs; www.mass.gov/dep/cleanup/laws/sedscrn.doc) – designated with a (3)
4) Region 6 Toxicity Reference Values (TRVs; http://www.epa.gov/earth1r6/6pd/rcra_c/protocol/appe-all.pdf)
5) Los Alamos National Laboratory (LANL) ECORISK Database Release 2.5 (October, 2010); http://www.lanl.gov/environment/cleanup/ecorisk.shtml
6) – designated with a (5); 1,3-nitrobenzene used as a surrogate for the 1,2- isomer Region 4 Ecological Screening Value (ESV; http://www.epa.gov/region4/waste/ots/epatab4.pdf) were also reviewed but were higher than the Region 5 ESLs

QAPP WORKSHEET #15 - REFERENCE LIMITS AND EVALUATION TABLE (CONT'D)

Matrix: Surface water (aqueous samples)
Analytical Group: Methods 6010 (metals), 6020 (antimony), 6860 (perchlorate), and 8330B (explosives)

Analyte	CAS Number	Human Health Screening Criterion (ug/l)[b]		Ecological Screening Criterion (ug/l)[c]		Project QL (mg/kg)	Published Analytical Method Limits[a]		Achievable Laboratory Limits[a]	
							Method QL (ug/l)	Method MDL (ug/l)	QL (ug/l)	MDL (ug/l)
Antimony	7440-36-0	5.6	(1)	80	(2)	6	NA	NA	6	0.07
Copper	7440-50-8	1,300	(1)	1.58	(2)[d,e]	75	NA	NA	15	1.38
Iron	7439-89-6	300	(1)	1,000	(1)	500	NA	NA	100	22
Lead	7439-92-1			2.5	[e,f]	4.5	NA	NA	0.9	0.27
Nickel	7440-02-0	610		52	[e,f]	40	NA	NA	40	1.29
Perchlorate	14797-73-0			59	[g]	0.25	NA	NA	0.05	0.0088
1,2-Dinitrobenzene	528-29-0			20	(5)	1	NA	NA	0.2	
1,3,5-Trinitrobenzene	99-35-4			10	(5)	5	NA	NA	1	0.2
1,3-Dinitrobenzene	99-65-0			20	(5)	2	NA	NA	0.4	0.0887
2,4,6-Trinitrotoluene	118-96-7			90	(5)	2	NA	NA	0.4	0.0724
2,4-Dinitrotoluene	121-14-2	0.11	(1)	44	(2)	2	NA	NA	0.4	0.0838
2,6-Dinitrotoluene	606-20-2			60	(4)	1	NA	NA	0.2	0.0645
2-Amino-4,6-dinitrotoluene	35572-78-2			20	(5)	1	NA	NA	0.2	0.0507
2-Nitrotoluene	88-72-2			8,000	(4)	2	NA	NA	0.4	0.0855
3-Nitrotoluene	99-08-1			750	(3)	2	NA	NA	0.4	0.0834
4-Amino-2,6-dinitrotoluene	19406-51-0			22,000	(4)	1	NA	NA	0.2	0.0577
4-Nitrotoluene	99-99-0			1,900	(3)	5	NA	NA	1	0.2
HMX	2691-41-0			330	(5)	2	NA	NA	0.4	0.0876
Nitrobenzene	98-95-3	17	(1)	220	(2)	2	NA	NA	0.4	0.091
RDX	121-82-4			190	(5)	.6	NA	NA	0.2	0.0523
Tetryl	479-45-8			5,800	(4)	1.2	NA	NA	0.24	0.0793

[a] Laboratory-specific MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method. MDLs may be subject to update.
[b] Criteria for human health are the National Recommended Water Quality Criteria (lower of water consumption + fish/aquatic organism consumption http://water.epa.gov/scitech/swguidance/waterquality/standards/current/index.cfm; where no human health-based criterion is available, the groundwater benchmarks can be used as analytical detection targets
[c] Criteria for ecological endpoints were identified using the

1) National Recommended Water Quality Criteria (chronic freshwater value; http://water.epa.gov/scitech/swguidance/waterquality/standards/current/index.cfm - – designated with a (1); if not available, lowest of:
2) Region 5 Ecological Screening Level (ESL; http://www.epa.gov/reg5rcra/ca/ESL.pdf) – designated with a (2)
3) Region 3 Freshwater Screening benchmark (http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/screenbench.htm) – designated with a (3)
4) Los Alamos National Laboratory (LANL) ECORISK Database Release 2.5 (October, 2010); http://www.lanl.gov/environment/cleanup/ecorisk.shtml – designated with a (4).
5) From Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel. 1999. "Nitroaromatic Munition Compounds: Environmental Effects and Screening Values." *Review of Environmental Contamination and Toxicology 161:1-156* – designated with a (5). (Note: 1,3-dinitrobenzene used as a surrogate for 1,2-dinitrobenzene)

Region 4 Ecological Screening Value (ESV; http://www.epa.gov/region4/waste/ots/epatab4.pdf) were also reviewed but were higher than the Region 5 ESLs

[d] The site-specific NRWQC should be calculated using the Biotic Ligand Model (BLM); value shown for analytical target purposes is the Region 5 ESL

[e] Applies to dissolved form only

[f] The site-specific NRWQC should be calculated using the harness-based algorithm; value shown for analytical target purposes is based on 100 ppm hardness

[g] MADEP lowest ecological criterion

Abbreviations and Acronyms: CAS Number – Chemical Abstracts Service Registry Number; ug/l – microgram per liter; MDL – method detection limit; NA – not applicable, QL – quantitation limit

QAPP WORKSHEET #15 - REFERENCE LIMITS AND EVALUATION TABLE (CONT'D)

Matrix: Groundwater (aqueous samples)
Analytical Group: Methods 6010 (metals), 6020 (antimony), 6860 (perchlorate), and 8330B (explosives)

Analyte	CAS Number	Human Health Screening Criterion[b] (ug/l)		Ecological Screening Criterion[c] (ug/l)	Project QL (ug/l)	Published Analytical Method Limits		Achievable Laboratory Limits[a]	
						Method QL (ug/l)	Method MDL (ug/l)	QL (ug/l)	MDL (ug/l)
Antimony	7440-36-0	6	(1,3)	--	6	NA	NA	6	0.07
Copper	7440-50-8	1,300	(1)	--	75	NA	NA	15	1.38
Iron	7439-89-6	26,000	(2)	--	500	NA	NA	100	22
Lead	7439-92-1	10	(3)	--	4.5	NA	NA	0.9	0.27
Nickel	7440-02-0	100	(3)	--	40	NA	NA	40	1.29
Perchlorate	14797-73-0	2	(3)	--	0.25	NA	NA	0.05	0.0088
1,2-Dinitrobenzene	528-29-0	3.7	(2)	--	1	NA	NA	0.2	
1,3,5-Trinitrobenzene	99-35-4	1100	(2)	--	5	NA	NA	1	0.2
1,3-Dinitrobenzene	99-65-0	3.7	(2)	--	2	NA	NA	0.4	0.0887
2,4,6-Trinitrotoluene	118-96-7	2.2	(2)	--	2	NA	NA	0.4	0.0724
2,4-Dinitrotoluene	121-14-2	0.22	(2)	--	2	NA	NA	0.4	0.0838
2,6-Dinitrotoluene	606-20-2	37	(2)	--	1	NA	NA	0.2	0.0645
2-Amino-4,6-dinitrotoluene	35572-78-2	73	(2)	--	1	NA	NA	0.2	0.0507
2-Nitrotoluene	88-72-2	0.31	(2)	--	2	NA	NA	0.4	0.0855
3-Nitrotoluene	99-08-1	3.7	(2)	--	2	NA	NA	0.4	0.0834
4-Amino-2,6-dinitrotoluene	19406-51-0	73	(2)	--	1	NA	NA	0.2	0.0577
4-Nitrotoluene	99-99-0	4.2	(2)	--	5	NA	NA	1	0.2
HMX	2691-41-0	200	(3)	--	2	NA	NA	0.4	0.0876
Nitrobenzene	98-95-3	0.12	(2)	--	2	NA	NA	0.4	0.091
RDX	121-82-4	0.61	(2)	--	.6	NA	NA	0.2	0.0523
Tetryl	479-45-8	150	(2)	--	1.2	NA	NA	0.24	0.0793

[a] Laboratory-specific MDLs and QLs are limits that an individual laboratory can achieve when performing a specific analytical method. MDLs may be subject to update.
[b] Criteria for human health were identified as the lower of the following:
1) USEPA Maximum Contaminant Levels (MCLs); http://water.epa.gov/drink/contaminants/index.cfm#List

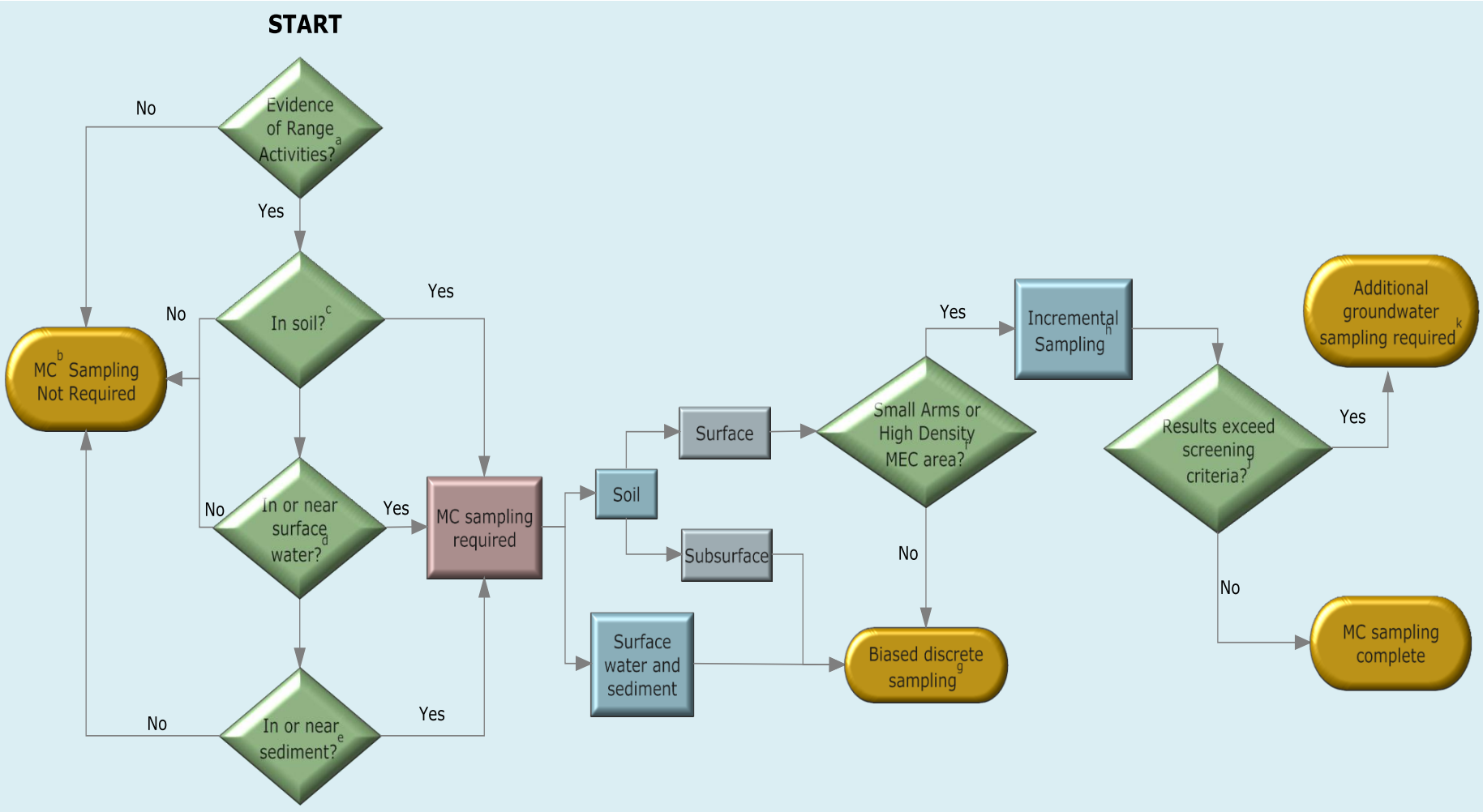
2) USEPA Risk Screening Level (RSL); Tapwater screening values; http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2010.pdf)
3) MADEP Method 1 Groundwater Standards (GW1 value selected for the greatest stringency; http://www.mass.gov/dep/cleanup/laws/0975_6a.htm)

[c] EPA ecological criteria for groundwater were not identified. MADEP GW-3 standards are intended to protect surface water; so selecting the lowest groundwater standard is protective of surface water. Lead is the only constituent where the GW-3 standard was lower than the GW-1 standard or the EPA values.

Abbreviations and Acronyms: CAS Number – Chemical Abstracts Service Registry Number; ug/l – microgram per liter; MDL – method detection limit; NA – not applicable, QL – quantitation limit

QAPP WORKSHEET #16 - PROJECT SCHEDULE/TIMELINE TABLE

The Project Schedule is located in Figure 2-2 of the RI Work Plan.


START
Evidence of Range Activities?[a]
No
Yes
In soil?[c]
No
Yes
MC[b] Sampling Not Required
In or near surface water?[d]
No
Yes
In or near sediment?[e]
No
Yes
MC sampling required
Soil
Surface
Subsurface
Surface water and sediment
Small Arms or High Density MEC area?[f]
Yes
No
Incremental Sampling[h]
Biased discrete sampling[g]
Results exceed screening criteria?[j]
Yes
No
Additional groundwater sampling required[k]
MC sampling complete

- [a]Evidence of Range Activities includes munitions and explosives of concern, small arms and small arms training history, munitions debris, and impact craters, etc.
- [b]MC – Munitions Constituents – Compounds related to munitions identified at the MRS during previous investigations or current Remedial Investigation intrusive activities.
- [c]Soil sampling will be conducted in areas where vegetation growth is possible. MC sampling will not be conducted on beach sand or in the ocean where sorption of potential compound to sand particles is not likely.
- [d]Surface Water does not include the open ocean. Surface water for this project consists of inland ponds, Shear Pin Pond, Drunkards Cove, Tisbury Great Pond, and a small portion of Katama Bay adjacent to South Beach.
- [e]Sediment will be co-located with the surface water of the inland water bodies.
- [f]Small Arms activities were observed at the Moving Target Machine Gun Range MRS. High Density MEC areas will be identified based on digital geophysical mapping and intrusive investigations results.
- [g]Biased discrete samples for surface soils may be collected in areas where MEC is present, but not part of a high density area. Biased discrete subsurface soil sampling will be conducted from a minimum of 1 foot below ground surface. Within Incremental Sampling (IS) decision units, subsurface samples will be collected from 1 to 2 feet with a minimum of 2 subsurface samples per decision unit. In addition, a subsurface soil sample will be collected beneath any identified breached munition.
- [h]IS will follow the USACE's Interim Guidance 09-02 (2009) on Implementation of IS for the Military Munitions Response Program. Decision Units will be determined based on historical use and may be adjusted based on results of the geophysical and intrusive investigation. For instance, at the Moving Target Machine Gun Range at South Beach, each firing line, impact berm and range floor will be considered a separate decision unit. In areas where high MEC densities are identified, the decision unit will be determined based on the size of the area identified.
- [j]Screening criteria include background values for inorganics and EPA Regional Screening Values for explosives.
- [k]Groundwater will be sampled for the MC s that exceed the screening criteria for soil, surface water, and sediments. Groundwater sample locations will be determined based on the results of the other media. Per the TPP Meeting #1, a current well survey at each MRS will be conducted and a subset of the public access wells will be sampled for the munitions constituents at each MRS.

QAPP WORKSHEET #18 - SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS TABLE

Station ID	Sample Location/ID Number	Matrix	Depth (bgs)	Analytical Group	Concentration Level	Number of Samples (including # of duplicates)	Sampling SOP Reference	Rationale for Sampling Location*
CP0X MG0X TG0X	SB00X	Soil	TBD	Metals Method 6010/ Antimony Method 6020 Explosives 8330B	Low-level	TBD	Refer to worksheet #21	Refer to worksheet #20
CP0X MG0X TG0X	SW00X	Surface Water	Surface only	Metals Method 6010/ Antimony Method 6020 Explosives 8330B Perchlorate 6860 (at TBGP only)	Low-level	TBD	Refer to worksheet #21	Refer to worksheet #20
CP0X MG0X TG0X	SD00X	Sediment	0-3 inches	Metals Method 6010/ Antimony Method 6020 Explosives 8330B Perchlorate 6860 (at TBGP only)	Low-level	TBD	Refer to worksheet #21	Refer to worksheet #20
CP0X MG0X TG0X	GW00X	Groundwater	TBD	Metals Method 6010/ Antimony Method 6020 Explosives 8330B	Low-level	TBD	Refer to worksheet #21	Refer to worksheet #20

*Sample locations and numbers will be determined using the rationale summarized in worksheet #20 after the geophysical and intrusive investigations are complete.

SB: soil boring;
WS: surface water
SD: sediment
GW: groundwater

TBD: to be determined;
MG: Former Moving Target Machine Gun Range at South Beach
CP: Former Cape Poge Little Neck Bomb Target Site
TG: Tisbury Great Pond

QAPP WORKSHEET #19 - ANALYTICAL SOP REQUIREMENTS TABLE

Matrix	Estimated No. of Samples	Analytical Group	Analytical and Preparation Method/SOP Reference	Containers (number, size, and type)	Preservation Requirements	Maximum Holding Time (preparation/ analysis)
Soil/Sediment	TBD	Metals	Method 6010B/DV-MT-0019 & 0021	1 x 4 oz glass	Cool to <6°C	180 days
Water	TBD	Metals	Method 6010B/DV-MT-0019 & 0021	1 x 250mL, HDPE	HNO_3, pH < 2; Cool to <6°C	180 days
Soil/Sediment	TBD	Metals (Antimony)	Method 6020/DV-MT-0018 & 0022	1 x 4 oz glass	Cool to <6°C	180 days
Water	TBD	Metals (Antimony)	Method 6020/DV-MT-0018 & 0022	1 x 250mL, HDPE	HNO_3, pH < 2; Cool to <6°C	180 days
Soil/Sediment	TBD	Perchlorate	Method 6860/DV-LC-0024	1 x 125mL, HDPE	Cool to <6°C	28 days
Water	TBD	Perchlorate	Method 6860/DV-LC-0024	1 x 4 oz amber	Cool to <6°C	28 days to extraction/ 28 days to analysis
Soil/Sediment	TBD	Explosives	Method 8330B/DV-LC-0002	1 x 1 kg glass or HDPE for multi-incremental sampling	Cool to <6°C	14 days
Water	TBD	Explosives	Method 8330B/DV-LC-0002	2 x 1 L, amber	Cool to <6°C	7 days

Note: One temperature blank shall be included in each cooler

.

QAPP WORKSHEET #20 - FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

Matrix	Analytical Group	Analytical and Preparation SOP Reference[a]	No. of Sampling Locations	No. of Field Duplicates	No. of Field Triplicates	No. of Extra Volume Laboratory QC (e.g., MS/MSD) Samples	Estimated No. of Source Blanks	Estimated No. of Rinsates[b]	No. of PE Samples
Soil/Sediment	Metals	Method 6010B/DV-MT-0019 & 0021	TBD	10%	1 per MRS (surface soil)	5%	0	20%	0
Water	Metals	Method 6010B/DV-MT-0019 & 0021	TBD	10%	NA	NA	20%	NA	0
Soil/Sediment	Metals (Antimony)	Method 6020/DV-MT-0018 & 0022	TBD	10%	1 per MRS (surface soil)	5%	0	20%	0
Water	Metals (Antimony)	Method 6020/DV-MT-0018 & 0022	TBD	10%	NA	NA	20%	NA	0
Soil/Sediment	Perchlorate	Method 6860/DV-LC-0024	TBD	10%	1 per MRS (surface soil)	5%	0	20%	0
Water	Perchlorate	Method 6860/DV-LC-0024	TBD	10%	NA	NA	20%	NA	0
Soil/Sediment	Explosives	Method 8330B/DV-LC-0002	TBD	10%	1 per MRS (surface soil)	5%	0	20%	0
Water	Explosives	Method 8330B/DV-LC-0002	TBD	10%	NA	NA	20%	NA	0

Notes : MS/MSD: Matrix spike/matrix spike duplicate pair
PE: Performance evaluation
SOP: Standard operating procedure
TBD: To be determined
[a]Specify the appropriate reference letter or number from the Analytical SOP References Table (Worksheet #23).
[b]If dedicated sampling equipment is used, no source or rinsate blanks will be collected.

QAPP WORKSHEET #21 - PROJECT SAMPLING SOP REFERENCES TABLE

Reference Number	Title, Revision Date, and/or Number	Originating Organization of Sampling SOP	Equipment Type	Modified for Project Work? (Y/N)	Comments
SESDPROC-301-R1	Groundwater Sampling 01 November 2007	EPA*	TBD	N*	None
SESDPROC-300-R1	Soil Sampling 01 November 2007	EPA*	Hand shovels, hand augers	N*	None
SESDPROC-200-R1	Sediment Sampling 01 November 2007	EPA*	Electro-vibracoring system or Ponar grab samplers	N*	None
SESDPROC-201-R1	Surface Water Sampling 01 November 2007	EPA*	Stainless steel scoop	N*	None
Interim Guidance 09-02	Implementation of Incremental sampling of Soil for the Military Munitions Response Program 20 July 2009	USACE	IS sampling tool	N*	None
SESDPROC-202-R1	Management of Investigation Derived Waste 01 November 2007	EPA*	NA, only aqueous IDW anticipated	N*	None
SESDPROC-209-R1	Packing, Marking, Labeling, and Shipping of Environmental and Waste Samples 01 November 2007	EPA*	NA	N*	None

Notes: *Guidance provided by the EPA Region IV Field Standard Operating Procedures of the Science and Ecosystem Support Division. Information not pertaining to UXB operations or this project was removed.
TBD = To Be Determined
NA = Not Applicable

QAPP WORKSHEET #22 - FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION TABLE

Field Equipment	Calibration Activity	Maintenance Activity	Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference[a]
YSI	Calibration	Functionality	Functionality	Daily, before groundwater monitoring	Most units: Verification of calibration passes if result is within +20% certified/ expected value	Troubleshoot problem(s), repeat calibration. If check fails again, obtain new unit and calibrate new unit for use. Document in field logbook.	MC Sampling Field Manager	Refer to manufacturer specifications and document in field logbook.
Turbidity Meter	Calibration	Functionality	Functionality	Daily, before groundwater monitoring	Most units: Verification of calibration passes if result is within +20% certified/ expected value	Troubleshoot problem(s), repeat calibration. If check fails again, obtain new unit and calibrate new unit for use. Document in field logbook.	MC Sampling Field Manager	Refer to manufacturer specifications and document in field logbook.

QAPP WORKSHEET #23 - ANALYTICAL SOP REFERENCES TABLE

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
Method 6010B	SW846 Method 6010B	Definitive	Metals	ICP/AES	TestAmerica	N
Method 6020	SW846 Method 6020	Definitive	Metals (antimony)	ICP/MS	TestAmerica	N
Method 6860	SW846 Method 6860 January 2007	Definitive	Perchlorate	IC/ESI/MS	TestAmerica	N
Method 8330B	SW846 Method 8330B October 2006	Definitive	Explosives	HPLC	TestAmerica	N

QAPP WORKSHEET #24 - ANALYTICAL INSTRUMENT CALIBRATION TABLE

Refer to Worksheet #28, which presents a consolidated table of calibration and quality-related performance criteria for this project.

QAPP WORKSHEET #25 - ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
ICP	Replace disposables, flush lines, clean injector and torch, Perform Hg alignment, check purge windows	Intensity of 1PPM Manganese STD within criteria	Check connections	Daily or as needed	Intensity of 1PPM Manganese STD within criteria	Replace, investigate injector, reanalyze	TestAmerica Analyst	TestAmerica Quality Assurance Manual – Section 21
ICP	Replace pump windings and gas tanks, check standard and sample flow	Monitor ISTD counts for variation	Instrument performance and sensitivity	As needed	Monitor ISTD counts for variation	Replace windings, recalibrate and reanalyze	TestAmerica Analyst	TestAmerica Quality Assurance Manual – Section 21
ICP/MS	Replace disposables, clean/change nebulizer, torch, and cones	Tuning	Instrument performance and sensitivity	Daily or as needed	Tune and CCV pass criteria	Recalibrate	TestAmerica Analyst	TestAmerica Quality Assurance Manual – Section 21
Ion Chromatograph	Replace disposables, check for leaks and eluent levels, change columns and bed supports as needed, clean conductivity cell	Analytical standards	Instrument performance and sensitivity	Daily or as needed	CCV pass criteria	Recalibrate	TestAmerica Analyst	TestAmerica Quality Assurance Manual – Section 21
HPLC	Replace columns, DAD flow cell windows and ball-valve cartridges as needed, clean/change filters, check eluent reservoirs	Sensitivity check	Instrument performance and sensitivity	Daily or as needed	CCV pass criteria	Recalibrate	TestAmerica Analyst	TestAmerica Quality Assurance Manual – Section 21
LC/MS & IC/MS/MS	Replace columns as needed, change filters and seals, clean lenses and needles, check eluent reservoirs	Sensitivity check	Instrument performance and sensitivity	Daily or as needed	CCV pass criteria	Recalibrate	TestAmerica Analyst	TestAmerica Quality Assurance Manual – Section 21

QAPP WORKSHEET #26 - SAMPLE HANDLING SYSTEM

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
Sample Collection (Personnel/Organization): M Field Sampling Team
Sample Packaging (Personnel/Organization): UXB Field Sampling Team
Coordination of Shipment (Personnel/Organization): UXB Field Sampling Team
Type of Shipment/Carrier: Expedited delivery/commercial vendor (common carrier)
SAMPLE RECEIPT AND ANALYSIS (ONSITE)
Sample Receipt (Personnel/Organization): NA
Sample Custody and Storage (Personnel/Organization): NA
Sample Preparation (Personnel/Organization): NA
Sample Determinative Analysis (Personnel/Organization: NA
SAMPLE RECEIPT AND ANALYSIS (OFFSITE)
Sample Receipt (Personnel/Organization): Sample Custodian, TestAmerica Laboratories, Inc
Sample Custody and Storage (Personnel/Organization Sample Custodian, TestAmerica Laboratories, Inc
Sample Preparation (Personnel/Organization): Sample Custodian, TestAmerica Laboratories, Inc
Sample Determinative Analysis (Personnel/Organization): Analytical Chemist, TestAmerica Laboratories, Inc
SAMPLE ARCHIVING
Field Sample Storage (No. of days from sample collection): Samples to be shipped/couriered within 24 hours properly preserved.
Sample and Extract/Digestate Storage: Disposal of the samples will occur 90 days after a complete and validated data package is obtained by UXB
Biological Sample Storage (No. of days from sample collection): NA
SAMPLE DISPOSAL
Personnel/Organization: Sample Custodian, TestAmerica Laboratories, Inc
Number of Days from Analysis: Disposal of the samples will occur 90 days after a complete and validated data package is obtained by UXB

QAPP WORKSHEET #27 - SAMPLE CUSTODY REQUIREMENTS

Sample Identification Procedures: Each sample will have a unique identification correlated to the MRS.
Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): Each sample will be individually identified and labeled after collection, then sealed with custody seals and enclosed in a plastic cooler. The sample information will be recorded on chain-of-custody forms, and the samples shipped/couriered to the appropriate laboratory via expedited delivery service.
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal): A sample custodian at the laboratory will accept custody of the samples, and check them for discrepancies, proper preservation, integrity, etc. If noted, issues will be forwarded to the RI Technical Lead to determine if corrective action is necessary. The sample custodian will relinquish custody to the appropriate department for analysis. Disposal of the samples will occur 90 days after a complete and validated data package is obtained by UXB.

QAPP WORKSHEET #28 - QC SAMPLES TABLE

Matrix	Solid, Aqueous
Analytical Group	Munitions Constituents - Metals
Concentration Level	NA
Sampling SOP(s)	See Worksheet #18
Analytical Method/SOP Reference	SW846- 6010B/DV-MT-0019 & DV-MT-0021 SW846- 6020/DV-MT-0018 & DV-MT-0022 SW846- 6860/DV-LC-0024 SW846-8330B/DV-LC-0002
Field Sampling Organization	UXB
Analytical Organization	TestAmerica
No. of Sample Locations	TBD

Table 1. QC Specifications for Analysis of Laboratory Measurements Using Methods SW-6010B/DV-MT-0019 & 0021

QC Check	Minimum Frequency	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	No Target Compounds>1/2RL	If sufficient sample is available, reanalyze samples. Qualify data as needed. Report results if sample results >10x blank result or sample results ND.	Analyst / Section Supervisor	Accuracy/Bias-Contamination	No Target Compounds>1/2RL
Laboratory Control Sample	1/Batch (20 samples)	Within 10% of expected value	If sufficient sample is available, reanalyze samples. Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias	Laboratory % Recovery Control Limits
Matrix Spike/Matrix Spike Duplicate	1/Batch (20 samples)	Within 10% of expected value	Determine root cause; flag MS/MSD data; discuss in narrative.	Analyst / Section Supervisor	Accuracy/Bias/ Precision	Laboratory % Recovery / RPD Control Limits
Dilution test	Each new sample matrix	1:5 dilution must agree within 10% of the original determination	Perform post digestion spike addition	Analyst / Section Supervisor	Accuracy/Bias/ Precision	N/A
Post digestion spike addition	When dilution test fails	Recovery within 25% of expected results	Correct problem then re-analyze post digestion spike addition	Analyst / Section Supervisor	Accuracy/Bias	N/A

*Data presented in this table are not intended to be more stringent than provided in the TestAmerica Quality Assurance Manual for DoD QSM V4.1 compliance, as this tabular version was subject to interpretation by UXB.
NA: Not applicable
RL: Reporting limit

Table 2. QC Specifications for Analysis of Laboratory Measurements Using Methods SW-6020/DV-MT-0018 & 0022

QC Check	Minimum Frequency	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	No Target Compounds>1/2RL	Correct problem then re-prep and analyze method blank and all samples processed with the contaminated blank. Report results if sample results >10x blank result or sample results ND.	Analyst / Section Supervisor	Accuracy/Bias-Contamination	No Target Compounds>1/2RL
Laboratory Control Sample	1/Batch (20 samples)	Within 10% of expected value	If sufficient sample is available, reanalyze samples. Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias	Laboratory % Recovery Control Limits
Matrix Spike/Matrix Spike Duplicate	1/Batch (20 samples)	Within 10% of expected value	Determine root cause; flag MS/MSD data; discuss in narrative.	Analyst / Section Supervisor	Accuracy/Bias/ Precision	Laboratory % Recovery / RPD Control Limits
Dilution test	Each new sample matrix	1:5 dilution must agree within 10% of the original determination	Perform post digestion spike addition	Analyst / Section Supervisor	Accuracy/Bias/ Precision	N/A
Post digestion spike addition	When dilution test fails	Recovery within 25% of expected results	Correct problem then re-analyze post digestion spike addition	Analyst / Section Supervisor	Accuracy/Bias	N/A

*Data presented in this table are not intended to be more stringent than provided in the TestAmerica Quality Assurance Manual for DoD QSM V4.1 compliance, as this tabular version was subject to interpretation by UXB.
NA: Not applicable
RL: Reporting limit

Table 3. QC Specifications for Analysis of Laboratory Measurements Using Methods SW-6860/DV-LC-0024

QC Check	Minimum Frequency	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	No Target Compounds>1/2RL; no common lab contaminants >RL.	If sufficient sample is available, reanalyze samples. Qualify data as needed. Report results if sample results >10x blank result or sample results ND.	Analyst / Section Supervisor	Accuracy/Bias-Contamination	No Target Compounds>1/2RL; no common lab contaminants >RL.
Laboratory Control Sample (Perc: conc level =RLV)	1/Batch (20 samples)	Within 10% of expected value	If sufficient sample is available, reanalyze samples. Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias	Laboratory % Recovery Control Limits
Matrix Spike/Matrix Spike Duplicate	1/Batch (20 samples)	Within 10% of expected value	Determine root cause; flag MS/MSD data; discuss in narrative.	Analyst / Section Supervisor	Accuracy/Bias/ Precision	Laboratory % Recovery / RPD Control Limits

Table 4. QC Specifications for Analysis of Laboratory Measurements Using Methods SW-8330B/DV-LC-0002

QC Check	Minimum Frequency	Method/SOP QC Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	Data Quality Indicator (DQI)	Measurement Performance Criteria
Method Blank	1/Batch (20 samples)	No Target Compounds>1/2RL; no common lab contaminants >RL.	If sufficient sample is available, reanalyze samples. Qualify data as needed. Report results if sample results >10x blank result or sample results ND.	Analyst / Section Supervisor	Accuracy/Bias-Contamination	No Target Compounds>1/2RL; no common lab contaminants >RL.
Laboratory Control Sample	1/Batch (20 samples)	Refer DoD QSM, Tables G-12 and G-13	If sufficient sample is available, reanalyze samples. Qualify data as needed.	Analyst / Section Supervisor	Accuracy/Bias	Laboratory % Recovery Control Limits
Matrix Spike/Matrix Spike Duplicate	1/Batch (20 samples)	Waters: Refer DoD QSM, Tables G-12. Soils (extraction): Refer DoD QSM, Tables G-13. Soils (grinding): Refer to Table 5 for performance evaluation sample acceptance criteria (as applicable)	Determine root cause; flag MS/MSD data; discuss in narrative.	Analyst / Section Supervisor	Accuracy/Bias/ Precision	Laboratory % Recovery / RPD Control Limits
Surrogates	Every sample	LCS percent recovery data are retrieved from the LIMS and statistically analyzed to establish the historical mean (bias) and the 2- and 3-sigma warning and control limits	Check calculations and instrument performance; recalculate, reanalyze.	Analyst / Section Supervisor	Accuracy/Bias	Laboratory % Recovery Control Limits

Table 5. Soil Grinding Acceptance Criteria for Performance Evaluation Samples (Method 8330B)

Analyte Order	Analytes	CAS #	Rec. Low	Rec. High	Units	Limit Type	Activation Date
0	2,4-diamino-6-nitrotoluene	6629-29-4			%	LSRMRC	2010-2-1 2:19 PM
10	2,6-diamino-4-nitrotoluene	59229-75-3			%	LSRMRC	2010-2-1 2:19 PM
20	2-Amino-4,6-dinitrotoluene	35572-78-2	56	108	%	LSRMRC	2010-2-1 2:19 PM
30	4-Amino-2,6-dinitrotoluene	19406-51-0	46	98	%	LSRMRC	2010-2-1 2:19 PM
40	2,4-Dinitrotoluene	121-14-2	69	137	%	LSRMRC	2010-2-1 2:19 PM
50	2,6-Dinitrotoluene	606-20-2	60	121	%	LSRMRC	2010-2-1 2:19 PM
60	Nitroglycerin	55-63-0	60	115	%	LSRMRC	2010-2-1 2:19 PM
70	o-Nitrotoluene	88-72-2	67	117	%	LSRMRC	2010-2-1 2:19 PM
80	m-Nitrotoluene	99-08-1	69	124	%	LSRMRC	2010-2-1 2:19 PM
90	Nitrobenzene	98-95-3	58	119	%	LSRMRC	2010-2-1 2:19 PM
100	p-Nitrotoluene	99-99-0	62	123	%	LSRMRC	2010-2-1 2:19 PM
110	1,3,5-Trinitrobenzene	99-35-4	58	116	%	LSRMRC	2010-2-1 2:19 PM
120	1,3-Dinitrobenzene	99-65-0	69	116	%	LSRMRC	2010-2-1 2:19 PM
130	1,2-Dinitrobenzene	528-29-0			%	LSRMRC	2010-2-1 2:19 PM
140	HMX	2691-41-0	59	131	%	LSRMRC	2010-2-1 2:19 PM
150	RDX	121-82-4	62	123	%	LSRMRC	2010-2-1 2:19 PM
160	Tetryl	479-45-8			%	LSRMRC	2010-2-1 2:19 PM
170	PETN	78-11-5	60	115	%	LSRMRC	2010-2-1 2:19 PM
180	2,4,6-Trinitrotoluene	118-96-7	69	120	%	LSRMRC	2010-2-1 2:19 PM
190	3,5-Dinitroaniline	618-87-1			%	LSRMRC	2010-2-1 2:19 PM
200	2,4,6-Trinitrophenol	88-89-1			%	LSRMRC	2010-2-1 2:19 PM
210	MNX	5755-27-1			%	LSRMRC	2010-2-1 2:19 PM

QAPP WORKSHEET #29 -PROJECT DOCUMENTS AND RECORDS TABLE

Sample Collection Documents and Records	On-site Analysis Documents and Records	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
• Field logbooks • Chain-of-custody forms • Sample labels • Shipping records • Variance Request Forms • Sample Location Coordinates	• Field logbooks • Chain-of-custody forms • Variance Request Forms	• Laboratory sample receipt logs • Chain-of-custody form • Standard traceability logs • Instrument calibration logs • Instrument maintenance logs • Sample preparation worksheets/logs • Sample analysis worksheets/run logs • Chromatograms/raw data/instrument printouts • Sample results/Form Is • QC sample results • Telephone/email logs • Corrective action documentation	• Laboratory data review checklists • Corrective action documentation • Data validation report	• Telephone/email logs • Corrective action documentation

QAPP WORKSHEET #30 - ANALYTICAL SERVICES TABLE

Matrix	Analytical Group	Concentration Level	Analytical SOP	Data Package Turnaround Time	Laboratory/Organization (Name and Address, Contact Person and Telephone Number)	Backup Laboratory/Organization (Name and Address, Contact Person and Telephone Number)
All	All	NA	All	21 days	TestAmerica Laboratories, Inc. 4955 Yarrow Street Arvada, Colorado 80002 Ph.: (303) 736-0134 ATTN: Debra Henderer	NA

QAPP WORKSHEET #31 - PLANNED PROJECT ASSESSMENTS TABLE

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing Corrective Actions	Person(s) Responsible for Monitoring Effectiveness of Corrective Actions
Quality Control Audit	Once	Internal	UXB	RI Technical Lead	MC Sampling Field Manager	MC Sampling Field Manager	RI Technical Lead

QAPP WORKSHEET #32 - ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response	Timeframe for Response
Operational Readiness Review	Checklist or logbook entry	UXB Project Manager, RI Technical Lead and MC Sampling Field Manager	Immediately to within 24 hours of review	Checklist or logbook entry	UXB Project Manager and RI Technical Lead	Immediately to within 24 hours of review
Field Observations/ Deviations from Technical Management Plan	Logbook or Field Change Request	UXB Project Manager, RI Technical Lead and MC Sampling Field Manager	Immediately to within 24 hours of deviation	Logbook or Field Change Request	UXB Project Manager and RI Technical Lead	Immediately to within 24 hours of deviation
Laboratory Technical Systems/ Performance Audits	E-mail followed by deficiency report	UXB Project Manager, RI Technical Lead, and TestAmerica Project Manager	ASAP after identification	Corrective Action Report	UXB Project Manager and RI Technical Lead	Within 14 days of notification to contractor

QAPP WORKSHEET #33 - QA MANAGEMENT REPORTS TABLE

Type of Report	Frequency	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation	Report Recipient(s)
Data validation report	As performed	Up to 15 business days after receipt of data package	UXB	Contents summarized in RI Report
Laboratory Technical Systems/ Performance Audits	As per QSM	Unknown	TestAmerica	UXB Project Manager
Variance Request Form	As required per variance/field change	Prior to field change if feasible	UXB	CENAE and USAESCH Project Managers
Remedial Investigation Final Report	One report	Final – December 2011	UXB	• Lead Agency, CENAE • Technical Support and Contracting Agency – USAESCH • MADEP • US EPA

QAPP WORKSHEET #34 - VERIFICATION (STEP I) PROCESS TABLE

Verification Input	Description	Internal/ External	Responsible for Verification (Name, Organization)
Field logbooks	Field notes will be reviewed periodically to determine completeness, appropriateness, ease of understanding, etc., of information recorded. Upon completion of field work, logbooks will be placed in the project files.	Internal	UXB Project Manager or designee
Chain-of-custody forms	Chain-of-custody forms will be reviewed against the samples packed in the specific cooler prior to shipment. Original chain-of-custody forms will be sent with the samples to the laboratory, while a copy is retained for the project files.	Internal	UXB Project Manager or designee
Sample receipt and log-ins	Sample receipt and log-in summaries will be reviewed to determine potential receipt issues that may impact data quality and for consistency with the chain-of-custody forms.	Internal	UXB or TestAmerica Project Manager (or designee)
Laboratory analytical data package prior to release	Data packages will be reviewed/verified internally by the laboratory performing the work for completeness and technical accuracy prior to submittal.	External	TestAmerica
Laboratory analytical data package	Data packages will be reviewed by UXB. The data will undergo a Level IV validation protocol.	Internal	UXB
Data validation report	Data validation reports will be reviewed by the UXB Project Manager and the RI Technical Lead.	Internal	UXB Project Manager or designee
Electronic data	Electronic laboratory data and field data will be reviewed for consistency with the hardcopy information.	Internal	UXB Project Manager or designee
Data validation report	The validated analytical results will be compiled in a tabulated summary. Entries will be reviewed/verified against hardcopy information.	Internal	UXB Project Manager or designee

QAPP WORKSHEET #35 - VALIDATION (STEPS IIA AND IIB) PROCESS TABLE

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	SOPs	Ensure that the sampling methods/procedures outlined in the QAPP were followed, and that any deviations were noted/approved.	UXB Project Manager or designee
IIb	SOPs	Determine potential impacts from noted/approved deviations, in regard to project requirements.	UXB Project Manager or designee
IIa	Chain-of-custody	Examine chain-of-custody forms against project requirements (analytical methods, sample identification, etc.).	UXB Project Manager or designee
IIb	On-site analytical work	All onsite analytical data will be reviewed against QAPP requirements for completeness and accuracy based on the field QC records. Second method results will be compared with on-site analytical results.	UXB Project Manager or designee
IIb	Laboratory data package	Examine packages against project requirements and chain-of-custody forms (holding times, sample handling, analytical methods, sample identification, data qualifiers, QC samples, etc.).	UXB
IIb	Laboratory data package	Determine potential impacts from noted/approved deviations, in regard to project requirements (e.g., precision/accuracy).	UXB Project Manager or designee
IIb	Field duplicate results	Compare results of field duplicate sample analyses with RPD criteria.	UXB

QAPP WORKSHEET #36 - VALIDATION (STEPS IIA AND IIB) SUMMARY TABLE

Step IIa/IIb	Matrix	Analytical Group	Concentration Level	Validation Criteria	Data Validator (title and organizational affiliation)
IIa/b	All	All	NA	QAPP Worksheets #11, 12, 15, 19, and 28	UXB Project Chemist

QAPP WORKSHEET #37 - USABILITY ASSESSMENT

The quality and usability of data obtained during the project will be determined by examining and inspecting various site/field logbooks, laboratory data packages, and data validation reports; and verifying that the sampling procedures and analytical results were obtained following the applicable protocols and satisfy project requirements, and can be relied upon for performing the determining the attainment of project quality objectives. The data assessment will determine possible effects on the data that result from project requirement failures (i.e., data quality), and their actual adequacy to fulfill the site-specific QA/QC requirements (i.e., data usability).

Project remedial action objectives will be compared to the confirmatory sample results from the field investigation to determine if they were achieved. Efforts to evaluate and verify attainment of project requirements will enable data users to understand any usability limitations associated with project data. Procedures used to assess QA/QC objectives will be in accordance with the appropriate analytical methods, which were originally selected based on ability to meet project goals.

The data quality/usability and reconciliation evaluations will be performed by personnel with the appropriate training and/or experience to perform these reviews/evaluations, as determined by UXB's Project Manager, in concert with Scientific Discipline Leads or their designees.

Evaluations will be performed by personnel with the appropriate training and/or experience to perform these evaluations, as determined by AMEC's Project Manager, in concert with the Scientific Discipline Leads or their designees.

The results of the data quality/usability evaluation and project goal reconciliation will be presented in the RI Report.

Precision – Results of all laboratory duplicates will be presented separately in tabular format for each analysis. For each duplicate pair, the relative percent difference (RPD) will be calculated for each analyte whose original and duplicate values are either greater than or equal to the quantitation limit. The RPDs will be checked against the measurement performance criteria presented on Worksheet #12. The RPDs exceeding criteria will be identified on the tables. Additionally, the RPD of each analyte will be averaged across all duplicate pairs whose original and duplicate values are both greater than or equal to the quantitation limit, and the combined overall average RPD for each analysis will be calculated for the laboratory duplicates. A discussion will follow summarizing the results of the laboratory precision. Any conclusions about the precision of the analyses will be drawn and any limitations on the use of the data will be described.

Accuracy/Bias – Results for all laboratory method blanks and instrument blanks will be presented separately in tabular format for each analysis. The results for each analyte will be checked against the measurement performance criteria presented on Worksheet #12. Results for analytes that exceed criteria will be identified on the tables. A discussion will follow summarizing the results of the laboratory accuracy/bias. Any conclusions about the accuracy/bias of the analyses based on contamination will be drawn and any limitations on the use of the data will be described.

APPENDIX F:
CONTRACTOR FORMS

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UXB International, Inc.

PROJECT MOBILIZATION CHECKOFF LIST

PROJECT NAME:_____ **PROJECT #:**_____

LCPM:_____ **SITE MANAGER:**_____

The following items should be sent to the Site Manager for all project personnel:

ITEM	SENT?	COMMENTS:
Resume / IM Slick		
List of current physical dates		
Copies of EOD Certificates		
Copies of 40-Hour Certificates		
Copies of 8 Hour Refresher Certificates		
Copies of 8 Hour Supervisor's Certificates		
Completed Employment Agreements		
Copies of Driving Records		

The following items should be sent to the Site Manager:

ITEM	SENT?	COMMENTS:
Project Staff Checkout Form		
Project End / Checkout Memo		
Demobilization Policy (For Posting)		
Exit Interview Copy		
New Employment Agreement Procedures Memo		
Blank Employment Agreement Copy		
Employee Hospitalization Memo		
Drug, Alcohol, & Tobacco Policy		
Field Staff Holiday Schedule		
Timesheet Due Dates Memo		
Salaried & Hourly Timesheet Master		

UXB Form 02-02-1
Project Mobilization Checklist
Revision: 1
Effective Date: March 2001

Page 1 of 2

ITEM	SENT?	COMMENTS:
Timesheet Change Form		
Employer's First Report of Accident		
Performance Appraisal Memo		
Performance Appraisal Form		
Compliance Posters		
Expense Report Form - Master Copy		
Standard Operating Procedures – As Applicable		

Daily Report

UXB International, Inc.

Date: _____ Contract Number: _____

Delivery Order Number: _____ Location: _____

Weather Conditions:

I. Work Summary: _____

a. Work Planned: _____

b. Work Accomplished: _____

c. Explanation of Discrepancy: _____

d. Inspection Results: _____

II. Instructions Received from Customer Representative (s)

III. Safety Comments:

IV. UXO Summary

a. UXO Destroyed:

Type	Quantity	U/I	Disposition

UXB Form 02-06-2
Daily Report
Revision: 1
Effective Date: March 2001

b. Demolition Supplies Used:

Type	Quantity	U/I	Disposition

c. Scrap Generation/Disposition:

V. Personnel/Equipment Utilization:

a. Personnel On-site

Description	Number	Man-Hours
Environmental Engineer		
First Aid Specialist		
Heavy Equipment Operator		
Helper		
Magnetometer Operator		
Project Manager		
Quality Control Specialist		
Senior UXO Supervisor		
Site Safety Officer		
Surveyor		
UXO Assistant		

UXO Specialist		
UXO Supervisor		
Unskilled Labor		
Other Personnel (List)		
Sub Contractor Personnel (List by Category)		
b. Equipment Utilization		
Description	Number	Hours
Backhoe, Wheeled		
Backhoe, Tracked		
Car (Sedan)		
Pickup (1/2 ton)		
Pickup (3/4 ton)		
Radio, Handheld		
Sport Utility Vehicle		
EM-61		

Schonstedt		
Forrester		
Other Equipment (List)		
VI. Comments/Concerns:		
VII. Signature(s)/Date Project Manager	Senior UXO Supervisor	

UXB Form 02-06-2
Daily Report
Revision: 1
Effective Date: March 2001

Site Visitors Log

UXB International, Inc.

Contract No. _____ Delivery Order No. _____ Location: _____

Date	Name	Company	Telephone Number	Safety Briefing Received	Time In	Time Out	Escort Required

UXB FORM 02-06-3
Site Visitors Log
Revision: 1
Effective Date: March 2001

UXB International, Inc. Explosives Accountaility Form

1. Project Name: _____ 2. Project Location: _____ 3. Deltek No. _____

4. Explosive Description: _____ 5. Marks and Identification: _____

6. Manufacturer _____ 7. Storage Location: _____

8. Date Received	9. Quantity In	10. Unit of Issue	11. Quantity Out	12. Balance	13. Date Expended	14. Printed Name and Initials

UXB Form 03-00.1-1
Explosive Accountability Form
Revision: 1
Effective Date: May 2001

Explosive Accountability Form -- Instructions

1. Project Name - Name assigned project. (For example: Fort Campbell)
2. Geographical location. (For example: Paris, Texas)
3. Deltek Number - Assigned by UXB/corporate office
4. Explosives Description - Item name (For example: blasting caps, boosters, and detonating cord)
5. Marks and Identification - Identification as specified by the Manufacturer; Lot number for US military explosives
6. Manufacturer - manufacturer of item and country of origin (For example: Atlas Powder, USA; Govt
7. Storage Location - Proper name of storage magazine (For example: Igloo J180; Bldg. #18; COE Bunker #1; Mag 2)
8. Date Received - Date that the transaction occurs.
9. Quantity In - Quantity gained by the transaction; if no quantity is lost, mark column with -0-.
10. Unit of Issue - Unit of measure (For example: each, case, foot)
11. Quantity Out - Quantity lost by the transaction; if no quantity is gained, mark column with -0-.
12. Balance - Running balance of quantity on hand after the transaction.
13. Printed Name and Initials - Name and initials of individual performing the transaction (Print clearly).

Additional Instruction:

1. All data entered on Demolition Material Accountability Form should be entered in ink.
2. Lines not used on Demolition Material Accountability Form should be marked through with a line and marked “not used”.
3. When a mistake is written on Demolition Material Accountability Form, DO NOT ERASE OR WHITE OUT--- mark through data with single line, initial change,

UXB Form 03-00.1-1
Explosive Accountability Form
Revision: 1
Effective Date: May 2001

Safety Meeting Attendance Log

UXB International, Inc.

Date:		Time:		Contract Number:	
Delivery Order Number:		Location:			
Weather Conditions:					

I. Safety Meeting Topic (Briefly describe):	

II. Attendees:	

Name (Print)	Signature	Company

Name (Print)	Signature	Company

III. Verification:

I certify that the personnel listed on this roster received the briefing described above. Site personnel not attending this meeting will be briefed before beginning their assigned duties.

Site Safety Officer _____ Date _____

Daily QCI Report

PROJECT NAME: _____

CONTRACT #: _____

DATE: _____

QC SPECIALIST: _____

TASK INSPECTED[1]	RESULTS[2]	COMMENTS[3]

[1] From QCI Schedule
[2] C - Conforms, N - Nonconformance, MI - Minor, MA - Major, CR - Critical, i.e., N-Minor
[3] Briefly describe Nonconformance(s)

UXB FORM 11-00.1-5
Daily QCI Report
Effective Date: July 2002

Daily Truck Inspection Log

UXB

Month _____

Serial No. _____

Work Site _____

Project No. _____

Signature of Driver	Odometer Begin	Odometer End	Date	Lights/Signals/Reflectors	Brakes	Tires	Seat Belts	Fire Extinguisher	First Aid Kit	Oil Level	Water Level	Horn	Back-up Alarm	Exhaust System	Windshield Wipers/Defrosters	Mirrors	Glass/Windshield, Side	Fuel Tank/Piping	Steering	Power Point	Coupling Device	Gallons Fuel Added	Mileage/Service/site
			1																				
			2																				
			3																				
			4																				
			5																				
			6																				
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			31																				

COMMENTS:

UXB Form 12-00.1-1
Daily Truck Inspection Log
Effective Date: February 2002

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APPENDIX G:
MSD CALCULATION SHEETS

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FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	Practice Round	DODIC:	
Munition:	3 lb AN-Mk 23 Practice Bomb w/ Mk 4 Signal Cart	Date Record Created:	12/2/2005
		Last Date Record Updated:	3/26/2008
Primary Database Category:	Bomb	Individual Last Updated Record:	Crull
Secondary Database Category:	3 lb Practice	Date Record Retired:	
Munition Case Classification:	Non-Roubst		

Munition Information and Fragmentation Characteristics

Explosive Type:	Smokeless Pwdr
Explosive Weight (lb):	0.00660
Diameter (in):	2.2047
Max Fragment Weight (lb):	0.000000
Critical Fragment Velocity (fps):	0

Theoretical Calculated Fragment Range

HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	0
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	0
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	0

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	6
Inhabited Building Distance (09 psi), K50 Distance:	7
Intentional MSD (0065 psi), K328 Distance:	48

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	0.00
Mild Steel:	0.00
Hard Steel:	0.00
Aluminum:	0.00
LEXAN:	0.00
Plexi-glass:	0.00
Bullet Resist Glass:	0.00

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.000000
Critical Fragment Velocity (fps)SB:	0
Kinetic Energy 106 (lb-ft2/s2)SB:	0.0000
Required Wall Roof Sandbag Thickness (in)SB:	NA
Expected Maximum Sandbag Throw Distance (ft)SB:	NA
Minimum Separation Distance (ft)SB:	NA

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.000000
Critical Fragment Velocity (fps)W:	0
Kinetic Energy 106 (lb-ft2/s2)W:	0.0000
Water Containment System:	NA
Minimum Separation Distance (ft)W:	NA

Print This Form

Close Form

Distribution authorized to the Department of Defense and U.S. DoD contractors only for Administrative-Operational Use (17 October 2002). Other requests shall be referred to the Chairman, Department of Defense Explosives Safety Board, Room 856C, Hoffman Building I, 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.

FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	HE Rounds	DODIC:	
Munition:	5" HVAR Mk 1	Date Record Created:	4/21/2008
		Last Date Record Updated:	
Primary Database Category:	Rocket	Individual Last Updated Record:	Crull
Secondary Database Category:	5 in	Date Record Retired:	
Munition Case Classification:	Robust		

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	8.60000
Diameter (in):	5.0000
Max Fragment Weight (lb):	0.382160
Critical Fragment Velocity (fps):	2872

Theoretical Calculated Fragment Range

HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	398
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	1566
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	2100

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	87
Inhabited Building Distance (09 psi), K50 Distance:	109
Intentional MSD (0065 psi), K328 Distance:	714

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	4.75
Mild Steel:	0.89
Hard Steel:	0.73
Aluminum:	1.83
LEXAN:	5.56
Plexi-glass:	3.96
Bullet Resist Glass:	3.32

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.382160
Critical Fragment Velocity (fps)SB:	2872
Kinetic Energy 106 (lb-ft2/s2)SB:	1.5761
Required Wall Roof Sandbag Thickness (in)SB:	36
Expected Maximum Sandbag Throw Distance (ft)SB:	220
Minimum Separation Distance (ft)SB:	220

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.382160
Critical Fragment Velocity (fps)W:	2872
Kinetic Energy 106 (lb-ft2/s2)W:	1.5761
Water Containment System:	1100 gal tank
Minimum Separation Distance (ft)W:	275

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FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	Practice Round	DODIC:	
Munition:	100 lb Practice Bomb Mk 15 Mod 3 w/ Mk 7 Spotting	Date Record Created:	7/30/2004
		Last Date Record Updated:	3/26/2008
Primary Database Category:	bomb	Individual Last Updated Record:	Crull
Secondary Database Category:	100 lb Practice	Date Record Retired:	
Munition Case Classification:	Extremely Heavy C		

Munition Information and Fragmentation Characteristics

Explosive Type:	Black Powder
Explosive Weight (lb):	1.00000
Diameter (in):	8.0000
Max Fragment Weight (lb):	0.000000
Critical Fragment Velocity (fps):	0

Theoretical Calculated Fragment Range

HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	0
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	0
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	0

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	31
Inhabited Building Distance (09 psi), K50 Distance:	39
Intentional MSD (0065 psi), K328 Distance:	257

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	0.00
Mild Steel:	0.00
Hard Steel:	0.00
Aluminum:	0.00
LEXAN:	0.00
Plexi-glass:	0.00
Bullet Resist Glass:	0.00

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.000000
Critical Fragment Velocity (fps)SB:	0
Kinetic Energy 106 (lb-ft2/s2)SB:	0.0000
Required Wall Roof Sandbag Thickness (in)SB:	NA
Expected Maximum Sandbag Throw Distance (ft)SB:	NA
Minimum Separation Distance (ft)SB:	NA

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.000000
Critical Fragment Velocity (fps)W:	0
Kinetic Energy 106 (lb-ft2/s2)W:	0.0000
Water Containment System:	NA
Minimum Separation Distance (ft)W:	NA

Print This Form

Close Form

Distribution authorized to the Department of Defense and U.S. DoD contractors only for Administrative-Operational Use (17 October 2002). Other requests shall be referred to the Chairman, Department of Defense Explosives Safety Board, Room 856C, Hoffman Building I, 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Water	**SELECT ITEM DESCRIPTION**	5-inch HVAR Mk 1
If underwater, ignore soil type	Wet Sandy Clay		OTHER (User Defined)

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.382
ENTER	FRAGMENT VELOCITY (ft/s)	2,872.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	8.60
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	8.60
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.3820
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.3820
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	3,446
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	3,446
	TOTAL TNT WEIGHT USED (lbs)	9.90
	WEIGHT USED IN UNDEX WEIGHT CALCULATIONS (lbs)	13.86
	WEIGHT USED IN UNDEX VELOCITY CALCULATIONS (lbs)	11.88
	ENTER DEPTH OF WATER (ft)	5.00
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	600

UNDERWATER

NO CRATER

FRAGMENT EXIT VELOCITY (ft/s)	269.2	FRAGMENT LAUNCH ANGLE (°)	85.3
MAXIMUM FRAGMENT DISTANCE (ft)	151.0		

*Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)*		169.3
Open Air Withdrawal Distance, K328 (ft) 704.3	Fragment Hazard Distance (ft)		151.0
	Pressure at Fragment Hazard Distance	(psi)	0.0735
		(dB)	148.1
	Pressure at Range Entered	(psi)	0.0186 ***
		(dB)	136.1

***Range entered out of limits--extrapolated

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Water	**SELECT ITEM DESCRIPTION**	5-inch HVAR Mk 1
If underwater, ignore soil type	Wet Sandy Clay		OTHER (User Defined)

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.382
ENTER	FRAGMENT VELOCITY (ft/s)	2,872.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	8.60
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	8.60
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.3820
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.3820
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	3,446
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	3,446
	TOTAL TNT WEIGHT USED (lbs)	9.90
	WEIGHT USED IN UNDEX WEIGHT CALCULATIONS (lbs)	13.86
	WEIGHT USED IN UNDEX VELOCITY CALCULATIONS (lbs)	11.88
	ENTER DEPTH OF WATER (ft)	10.00
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	600

UNDERWATER

NO CRATER

FRAGMENT EXIT VELOCITY (ft/s)	0.5	FRAGMENT LAUNCH ANGLE (°)	89.8
MAXIMUM FRAGMENT DISTANCE (ft)	0.0		

*Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)*		76.8
Open Air Withdrawal Distance, K328 (ft)	704.3	Fragment Hazard Distance (ft) **	0.0
		Pressure at Fragment Hazard Distance (psi)	0.0000
		Pressure at Fragment Hazard Distance (dB)	0
		Pressure at Range Entered (psi)	0.0084 ***
		Pressure at Range Entered (dB)	129.2

***Range entered out of limits--extrapolated

**Water too deep--no fragments expected

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Water	**SELECT ITEM DESCRIPTION**	5-inch HVAR Mk 1
If underwater, ignore soil type	Wet Sandy Clay		OTHER (User Defined)

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.382
ENTER	FRAGMENT VELOCITY (ft/s)	2,872.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	8.60
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	8.60
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.3820
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.3820
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	3,446
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	3,446
	TOTAL TNT WEIGHT USED (lbs)	9.90
	WEIGHT USED IN UNDEX WEIGHT CALCULATIONS (lbs)	13.86
	WEIGHT USED IN UNDEX VELOCITY CALCULATIONS (lbs)	11.88
	ENTER DEPTH OF WATER (ft)	15.00
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	600

UNDERWATER

NO CRATER

FRAGMENT EXIT VELOCITY (ft/s)	0.0	FRAGMENT LAUNCH ANGLE (°)	90.0
MAXIMUM FRAGMENT DISTANCE (ft)	0.0		

*Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)*		48.7
Open Air Withdrawal Distance, K328 (ft) 704.3	Fragment Hazard Distance (ft) **		0.0
	Pressure at Fragment Hazard Distance	(psi)	0.0000
		(dB)	0
	Pressure at Range Entered	(psi)	0.0053 ***
		(dB)	125.3

***Range entered out of limits--extrapolated

**Water too deep--no fragments expected

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Water	**SELECT ITEM DESCRIPTION**	5-inch HVAR Mk 1
If underwater, ignore soil type	Wet Sandy Clay		OTHER (User Defined)

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.382
ENTER	FRAGMENT VELOCITY (ft/s)	2,872.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	8.60
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	8.60
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.3820
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.3820
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	3,446
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	3,446
	TOTAL TNT WEIGHT USED (lbs)	9.90
	WEIGHT USED IN UNDEX WEIGHT CALCULATIONS (lbs)	13.86
	WEIGHT USED IN UNDEX VELOCITY CALCULATIONS (lbs)	11.88
	ENTER DEPTH OF WATER (ft)	20.00
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	600

UNDERWATER

NO CRATER

FRAGMENT EXIT VELOCITY (ft/s)	0.0	FRAGMENT LAUNCH ANGLE (°)	90.0
MAXIMUM FRAGMENT DISTANCE (ft)	0.0		

*Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)*		35.3
Open Air Withdrawal Distance, K328 (ft)	704.3	Fragment Hazard Distance (ft) **	0.0
		Pressure at Fragment Hazard Distance (psi)	0.0000
		Pressure at Fragment Hazard Distance (dB)	0
		Pressure at Range Entered (psi)	0.0039 ***
		Pressure at Range Entered (dB)	122.5

***Range entered out of limits--extrapolated

**Water too deep--no fragments expected

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Water	**SELECT ITEM DESCRIPTION**	5-inch HVAR Mk 1
If underwater, ignore soil type	Wet Sandy Clay		OTHER (User Defined)

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.382
ENTER	FRAGMENT VELOCITY (ft/s)	2,872.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	8.60
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	8.60
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.3820
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.3820
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	3,446
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	3,446
	TOTAL TNT WEIGHT USED (lbs)	9.90
	WEIGHT USED IN UNDEX WEIGHT CALCULATIONS (lbs)	13.86
	WEIGHT USED IN UNDEX VELOCITY CALCULATIONS (lbs)	11.88
	ENTER DEPTH OF WATER (ft)	25.00
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	600

UNDERWATER

NO CRATER

FRAGMENT EXIT VELOCITY (ft/s)	0.0	FRAGMENT LAUNCH ANGLE (°)	90.0
MAXIMUM FRAGMENT DISTANCE (ft)	0.0		

*Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)*		27.4
Open Air Withdrawal Distance, K328 (ft) 704.3	Fragment Hazard Distance (ft) **		0.0
	Pressure at Fragment Hazard Distance	(psi)	0.0000
		(dB)	0
	Pressure at Range Entered	(psi)	0.0030 ***
		(dB)	120.3

***Range entered out of limits--extrapolated

**Water too deep--no fragments expected

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Water	**SELECT ITEM DESCRIPTION**	5-inch HVAR Mk 1
If underwater, ignore soil type	Wet Sandy Clay		OTHER (User Defined)

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.382
ENTER	**FRAGMENT VELOCITY (ft/s)**	2,872.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	8.60
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	8.60
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.3820
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.3820
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	3,446
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	3,446
	TOTAL TNT WEIGHT USED (lbs)	9.90
	WEIGHT USED IN UNDEX WEIGHT CALCULATIONS (lbs)	13.86
	WEIGHT USED IN UNDEX VELOCITY CALCULATIONS (lbs)	11.88
	ENTER DEPTH OF WATER (ft)	30.00
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	600

UNDERWATER

NO CRATER

FRAGMENT EXIT VELOCITY (ft/s)	0.0	**FRAGMENT LAUNCH ANGLE (°)**	90.0

MAXIMUM FRAGMENT DISTANCE (ft)	0.0

***Distance at which pressure is 0.066 psi=**	**Blast Withdrawal Distance (buried/undex) (ft)***		22.4
Open Air Withdrawal Distance, K328 (ft)	704.3	**Fragment Hazard Distance (ft)** **	0.0
		Pressure at Fragment Hazard Distance (psi)	0.0000
		Pressure at Fragment Hazard Distance (dB)	0
		Pressure at Range Entered (psi)	0.0024 ***
		Pressure at Range Entered (dB)	118.5

******Range entered out of limits--extrapolated***

*****Water too deep--no fragments expected***

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APPENDIX H: RESUMES

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Michael Warminsky, PE; UXB International, Inc.	
Education	• B.S., Civil Engineering, 1981 • M.B.A., 1995
Registrations/ Certifications	• HAZWOPER 40 Hour with Current Refresher1989/2008 • Professional Engineer, New Jersey License # GE 42547 1995/2010
Special Qualifications and Training Relevant to the Proposed Project	• 26 years experience/12 years range/munitions specific • Experienced Munitions Response Program Manager • Experience using various detection techniques to support MMR actions • Successful application of innovative technologies • Experience with regulatory/stakeholder interface

Experience Record

Mr. Warminsky has over 26 years of civil construction/environmental remediation experience, with over 12 years' relevant range/munitions specific environmental experience. His experience includes MMR actions at MRA/MRS with small arms, MEC/MC, and CERCLA driven projects. He has demonstrated experience utilizing various detection technologies in support of MMR actions. He has implemented procedures to eliminate conflicts, errors, omissions, and assure accuracy of all deliverables within each project, and prepares periodic progress reports and tracks associated project costs. He has experience preparing technical project plans and managing multi-disciplinary MMRP projects involving both MEC/MC and HTRW elements at DoD facilities. Relevant experience includes:

Program Manager. DOLC Technology Demonstration. Mr. Warminsky managed a DOLC Laboratory/ FY 2006 Technology Demonstration Program. His role included quality, progress, and cost tracking report preparation and served as single POC for DOLC client. Task orders included:

- Fort Ruger, Hawaii - investigation, delineation, and soil remediation of legacy range residue at a FUDS. Field investigation and delineation conducted using a combination of traditional field sampling and XRF analysis. Soil treatment was performed using an innovative hybrid soil washing technology. He supported regulatory/stakeholder public meetings and met performance-based milestones driven by the 2006 Earth Wind and Fire Craterfest Concert. August 2005–July 2006
- Marine Corps Base Hawaii - operational range clearance/upgrades at Range R2. Performed upgrade of small arms range complex, recovering legacy lead and replacing the berm with an innovative granular rubber backstop. Mr. Warminsky developed the technical approach and managed overall program implementation. May 2006–March 2007
- Marine Corps Base Hawaii - operational range clearance of the MK-19 range on MCBH. Work included clearance MEC/MD in support of a target upgrade project. March 2007– June 2007

Project Manager. Fort AP Hill Range 33. Managed operational range clearance and upgrade for Range 33 at Fort AP Hill. Mr. Warminsky prepared technical project plans and was the single point of contact for client. He implemented procedures to eliminate conflicts, errors, omissions, assured accuracy of all deliverables, and maintained close communication with the Base for the project duration. He also prepared monthly/weekly progress and cost reports, as well as final report. November 2003–September 2005

Program Manager. Multi-Array Geophysics in Support of Military Munitions Response, Hurlburt Field **-** Mr. Warminsky provided programmatic technical/operational support to Air Force Special Operations Command (AFSOC) for a Geophysics Technology Demonstration at Hurlburt Field, Florida. The scope of work includes a geophysical survey that included both a surface survey and a high-resolution 3D radar image of the subsurface. Electromagnetic (EM) and Ground Penetrating Imaging Radar (GPIR) were combined in a multi-sensor approach to locate buried metallic and non-metallic anomalies. The technology demonstration was used to focus a limited site characterization of the impacted areas, and reduce the footprint requiring further sampling/investigation. September 2004-November 2005

Program Manager. US Army ARDEC-ETD RangeSafe Program**.** The scope of work for this program included turnkey metals management and recycling services at munitions manufacturing facilities and small arms/ artillery test ranges. Task orders managed by Mr. Warminsky under this program include:

- Fort Dix Range 25 - Performed field sampling and managed treatability studies to support remedial design and soil treatment process development for a design-build SAFR restoration project. Mr. Warminsky's role includes field sampling, management of treatability study and process development/optimization, as well as the design and reconstruction of a "Green" berm. In addition, Mr. Warminsky was involved in regulatory hearings and briefings of the Force Projectorate at the Base, as well as assisting with strategic planning, and work plan development.
- Fort Dix Range 24 - Management of treatability studies and subsequent full-scale activities at the Range 24 project at Fort Dix, New Jersey. Mr. Warminsky's role included negotiation of task order(s), technical consulting, and client liaison. In addition, Mr. Warminsky was involved in regulatory hearings and briefings of the Force Projectorate at the Base, as well as assisting with strategic planning, and work plan development.
- Fort Greeley - Management of treatability studies and subsequent full-scale activities at the Fort Greeley SM1-A Pipeline Rad-soil treatment project. Mr. Warminsky's role included negotiation of task order(s), technical consulting, and client liaison.
- Technology Evaluation/Treatability Studies - Managed technology evaluation/ treatability studies at Griffis Air Force Base, Eglin Air Force Base, Mac Dill Air Force Base, and NAS Adak. Mr. Warminsky's role included work plan development, data review, and conceptual planning of full-scale remedy for feasibility evaluation.

Work completed 1999-2003

Project Manager. MCA/GCC 29 Palms. Managed **s**oil washing operations in support of range maintenance/bullet trap retrofit at MCA/GCC 29 Palms in California. Mr. Warminsky's responsibilities included treatability study data review, plant configuration, and full-scale operations. Daily activities included plant operations, inventory control, and process QA/QC. He was also responsible for plant performance monitoring and implemented several process modifications during field operations to address changes in feed soil, and optimize the process to increase throughput while still meeting treatment goals. 1997-1998

Patrick Fogleson, UXB International, Inc.	
Education	• B.S. (Law Enforcement), West Texas State University, 1977 • A.A. (Criminal Justice and Police Science), Amarillo College, 1973
Years of Experience	• 12 years of commercial experience • 20 years of military experience
Registrations/ Certifications	• Awarded Bronze Star
Special Qualifications and Training Relevant to the Proposed Project	• OSHA Certified • Explosive Ordnance Disposal Officer • OSHA Hazardous Waste Operations and Emergency Response • OSHA Supervisor Safety Course • OSHA Technician Level Emergency Response • HAZWOPER 40-hour with Refresher, 2009

Experience Record

Mr. Fogleson is a seasoned manager with twenty years of UXO experience and twelve years commercial experience. While in the military, Mr. Fogleson served as Chemical and Explosive Ordnance Disposal (EOD) Officer for Operations Desert Shield and Desert Storm and later served as United States Central Command (USCENTCOM) Deputy Director of Joint Operations Center. He has three years managing projects in Afghanistan, including the Central Eradication Poppy Program. While working on the Eradication Program, Patrick planned and coordinated multiple EOD support operations in the region. He also assisted with ammunition destruction on the DoS Weapons Removal and Abatement (WRA) program in Honduras.

Senior UXO Supervisor/UXB Team Leader, Lone Star Army Ammunition Plant Building Characterization of Load Line E, Texarkana, TX. The objective of this subcontract is to identify and remove explosive hazards from 78 Load Line E buildings and structures in accordance with DoD 6055.09-Std, DoDI-4142.62-M, and USACE EP-385-1-97 Explosives Safety and Health Requirements Manual. As the Senior UXO Supervisor (SUXOS)/UXB Team Leader, Mr. Patrick Fogleson oversees day-to-day operations and is the most senior UXO-qualified representative on-site. Mr. Fogleson manages two crews consisting of three UXO technicians each.

SUXOS/Subject Matter Expert, UXB International, Inc., various locations. Serves as Subject Matter Expert and SUXOS on UXO/MEC and Demining Projects. July/2009 to Present.

EOD Technician III, UXB International, Inc., Guantanamo Bay Naval Base, Cuba. Supervised 21 UXO personnel during range clearance operations at Guantanamo Bay Naval Base, Cuba. Duties included supervising UXO and vegetation clearance teams, reacquiring and verification, safety, QA and report preparation. Additional duties included training Peruvian workers to safely perform vegetation clearance operations in a UXO environment and insuring logistical requirements were met. June/2008 to March/2009.

Program Manager, UXB International FZE, Afghanistan. Managed commercial UXO and Demining Programs in Afghanistan. Managed daily program reports, oversaw quality assurance and quality control measures for all programs. Recruited and trained managers on internal practices and procedures. Managed proposal efforts and mainstreams all communications for programs. Assured that technical compliance, permits, licenses, and similar documents were available. January/2008 to April/2008.

EOD Technical Advisor, UXB International FZE, Honduras. Assisted Program Manager as the focal point for DI quick response ammunition destruction efforts in Honduras. Served as liaison with all U.S. Government agencies, GOH officials, and other stakeholders. Responsible for destruction of munitions. Oversaw and trained local nationals. Primarily responsible for weapons demilitarization. April/2007 to July/2007.

Country Manager, UXB International, Inc., Central Poppy Eradication Force, Afghanistan. Managed all Explosive Ordnance Disposal operations for the Central Poppy Eradication Force (U.S. State Department counter narcotics operation). Developed and implemented a training program for Afghan and international police personnel in IED, counter terrorism, mine avoidance/removal, and UXO operations. Trained Afghan and International police personnel on Improvised Explosive Devices (IED), counter terrorism, counter mine and Unexploded Ordnances. Managed scheduling, supplying and controlling of multiple EOD teams throughout Afghanistan. Planned and coordinated multiple EOD support operations throughout Afghanistan. Redesigned and upgraded IED security and response plan. 2004 to 2006.

Director of Operations, Pueblo Diversified Industries Force, Pueblo, Colorado. Managed and directed Pueblo Diversified Industries' Operations Department. Planned, developed, coordinated, implemented, and operated a quality manufacturing plant in compliance with ISO 9001 and CARF Standards. Directed and coordinated all staff personnel, the manufacturing of all products, the receipt and shipment of all raw materials and finished products, and the maintenance of facilities and equipment. Assumed duties of the President when necessary. Reduced operating expense and waste. Coordinated two major renovation projects and one building project. Improved the information systems company wide. Upgraded company safety and security systems. Reduced fleet operating and maintenance costs. 1997 to 2004.

Commander, Pueblo Chemical Depot, Pueblo, Colorado. Managed a U.S. Army Chemical Storage Facility with 200+ employees with an annual budget in excess of $40 million. Directed a staff consisting of five division chiefs and five separate staff sections. Supervised operational and life support functions of a 25,000 acre facility including the storage of 10% of the nation's chemical weapons, International Treaty Compliance, police and fire protection, chemical accident and incident response, environmental compliance, a 29 unit family housing complex, and an industrial area with tenant commercial companies. Created a community-based team for the reuse of the depot that included federal government, local and state government, business, education, and citizen participation. Interacted directly with federal, state, and local regulators. Directed Chemical Accident Incident Response Center. Developed and implemented a plan that has reduced environmental clean-up costs by several million dollars. Accelerated clean-up and better met the end use of the depot. Reduced security costs by $1.2 million a year, while increasing effectiveness of the security force. 1995 to 1997.

Commander, Tooele Chemical Activity, Tooele, Utah. Served as Commander of a U.S. Army Chemical Activity with 500 employees and an annual budget of $15 million. Established a new command responsible for operational and life support functions of a chemical activity that stored 60% of the nation's chemical weapons. Assumed direct responsibility for International Treaty Compliance, Police and fire protection, chemical accident and incident response, and environmental compliance. Supervisory control over four division directors, three staff sections, a major research facility, and a $1 billion chemical weapons disposal plant. Established the command, and developed the budget and personnel manning plan. Established the command, and developed the budget and personnel manning plan. Developed all Standard Operating Procedures, safety and environmental documentation. Developed command relationship plan for tenant organizations. Interfaced directly with Federal, State, and Local regulators. Directed the Chemical Accident Incident Response Center.

1995 to 1995.

System Manager, Chemical Agents and Munitions Disposal System, various locations. Managed daily operations, safety, security, environmental compliance, budgeting, and planning for a chemical disposal research facility with 280 employees and an annual budget of $12 Million. Supervised 4 division chiefs and 2 separate staff sections. Directed chemical accident and incident response operations. Planned and executed all chemical operations, training, and testing. Planned and executed all chemical operations, training, and testing. Performed two live agent tests of major disposal systems on-time and under budget. Reduced the overall operating costs by reducing external support charges. Served as the Area Chemical Accident Incident Control Officer. 1993 to 1995.

Chemical Officer, United States Central Command (USCENTCOM), Washington, D.C. Served as Explosive Ordnance Disposal and Chemical Officer for Operations Desert Shield and Desert Storm. Wrote and coordinated chemical, operational, and training plans for a multi-service headquarters. Provided advice and recommendation on nuclear, biological, and chemical operations and protection to the Commander in Chief USCENTCOM. Served as Deputy Director of Joint Operations Center. Developed all chemical, biological, and nuclear operational and training plans for the command. Conducted Chemical and Biological investigations in Kuwait, Iraq, and Saudi Arabia. Supported Secret Service and provided chemical support and training for President Bush's trip to Saudi Arabia. 1990 to 1993.

Company Commander, United States Army, various locations. Managed munitions response actions. Participated in numerous emergency responses, both military and civilian. Served as command and control of all military personnel assigned to the proving ground. 1986 to 1989.

Deputy S3, 2nd Brigade, 1st Armor Division, United States Army, various locations. Interfaced with national level agencies to coordinate EOD mission requirements. Managed munitions response actions. Planned and executed chemical, nuclear, and biological defense plans. Served as Officer in Charge of the Erlangen Emergency Operations Center. Assumed duties of S3 in his absence. Established the Brigade Chemical School. Responded to numerous explosive and operational emergencies. Planned and executed four brigade training cycles. 1983 to 1985.

Commander, Technical Escort Detachment, United States Army, various locations. Responsible for chemical escort as well as chemical and biological accident\incident response for the western United States and Explosive Ordinance Disposal response for the Denver Area. Managed munitions response actions. Served as On-Scene Commander for the ground movement of Weteye VX bombs. Served as On-Scene Commander for more than 100 accidents\incidents. Provided support to Secret Service Presidential Detail. 1980 to 1983.

Operations Officer, United States Army, various locations. Planned missions and equipped and trained personnel to perform chemical, biological, and nuclear escort and response missions. Performed On-Scene Commander duties for Edgewood Arsenal, including EOD mission requirements and munitions response actions. Planned and executed numerous escort missions. Planned and supervised chemical agent disposal. 1977 to 1980.

Shirley Rieven, PhD; UXB International, Inc.	
Education	• PhD, Geophysics, 1999 (MIT) • BS, Applied Geophysics, 1986 (MTU)
Registrations/ Certifications	• HAZWOPER 40 Hour with Current Refresher
Special Qualifications and Training Relevant to the Proposed Project	• 20 years experience • Experience with various detection technologies for MMR actions • CERCLA experience including regulatory/stakeholder interface

Experience Record

Dr. Rieven is an experienced Senior Geophysicist with more than 20 years experience conducting geophysical and environmental investigations in CONUS and OCONUS locations with over 7 years of experience directly related to the geophysical mapping, detection, and discrimination of buried military munitions. Her practical experience includes electromagnetic induction, magnetometry, and GPiR for UXO detection, discrimination, and mapping, as well as a working knowledge of the CERCLA process. Representative experience includes:

Senior Geophysicist. Fort Wainwright, Fairbanks AK and Former Naval Air Station, Adak Island, AK. Responsibilities included geophysical survey design and data acquisition to locate buried military munitions; interpretation requirements for discrimination, geophysical data quality determinations, and critical path/programmatic decision point assessments. 1/2006-12/2007

Senior Geophysicist Camp Navajo, NM. Senior Geophysicist responsible for interpretation of digital geophysical surveys at a military OB/OD and disposal area. Munitions were disposed of by various methods at this site, resulting in potential UXO/MD vertically throughout the soil column at various depths. A significant component of successfully utilizing geophysics at this site involved discrimination of anomalies to minimize false positives posed by overlapping disposal areas, at different depths 4/2005-10/2005

Senior Geophysicist - Massachusetts Military Reservation (MMR), Multiple Task Orders Program Senior Geophysicist responsible for all aspects of CERCLA and SDWA required Remedial Investigation Geophysical Surveys at the impact area and research and training ranges at MMR. Each of these areas posed unique challenges to completing successful geophysical surveys. March 2002 to December 2006

- GPO Multi-Sensor Demonstration – As a result of legacy training practices, it was thought buried unused propellant bags were acting as a "continuing source" exacerbating an RDX plume in groundwater. Since there were no metallic images anticipated in the burial pits, alternate detection methods were explored. To simulate buried powder bags, tube socks were filled with fertilizer and placed in the GOP. Subsequent surveys using a combination of EM61 and Ground Penetrating Imaging Radar (GPiR) were tested in the GPO. The results indicated that GPiR could detect the non-metallic powder bags, and EM61 could detect all of the metallic anomalies. Singularly, each achieved approximately 80% detection, but in combination, 100% of the items were detected.
- Gun and Mortar Position Surveys – Using information from GPO multi-sensor testing, a full survey of gun and mortar positions was conducted with multi-sensor approach. Each Gun position was surveyed to detect MEC, metallic debris and/or buried powder-bags. The combined use of GPiR and EM61 provided a very high resolution survey of the entire area. The results of the multi-

sensor investigation, supported by the GPO results, were used to ensure to a high degree of certainty that no MEC or powder bags were buried sub-surface at the Gun and Mortar Positions.

- Central Impact Area High Use Target Areas (HUTAs) exhibited a very high density of surface and subsurface MEC and munitions related debris. The areas had been previously surveyed using airborne magnetometry and Electromagnetic Induction (EM). The HUTAs were subsequently excavated in six-inch lifts and rescreened for magnetic anomalies using magnetometers. Dr. Rieven performed an extensive evaluation of the lateral and vertical accuracy of the EM and magnetometry data as compared to the results of the intrusive investigation. The electromagnetic results were found to provide considerably better resolution than aeromagnetics, but the uncertainty in lateral and vertical position of the EM anomaly versus the excavated items was found to be strongly influenced by the geospatial accuracy of the surveying methods, principally during the ground-truthing/excavations. This level of evaluation highlights the importance of accuracy and precision during all aspects of geophysical surveying and validation. It also highlighted the challenge of distinguishing the geophysical signatures of vertically stacked MEC and metallic debris. Dr. Rieven's theoretical experience in cluster-analysis was used in the density evaluation to assess the overall quality of the data and its usability for various geophysical investigative objectives.
- J Range Complex (Ranges J1, J2, J3 and L) - The research nature of the activities historically conducted at the J Ranges included the use of "one-off" military tests; including but not limited to the burial of glass flares, the use of visual obscurement smokes, explosive shroud tests for the Giant Patriot Missile, OB/OD, Melt/Pour munition manufacturing facilities, extremely sensitive UXO (40 mm grenades).

Donna Sharp

Proposed Job Title: AMEC NTCRA/MRSPP/RI Specialist

Experience Highlights	
15	Relatable
13	Regulatory/Stakeholder Involvement
8	Active DoD military installations

Education

BS/1994/Geology
Certificate in Project Management, 2009
USACE Omaha Military Munitions Design Center AF MMRP Training, 2009

Active Registrations

- Professional Geologist – TN

Experience on Subfactor 1 Projects

- Project#5- Camp Dawson

Special Qualifications

- Ms. Sharp has over 15 years of professional experience providing technical oversight of RCRA and CERCLA investigations and remedial actions involving MPPEH, soil, and groundwater at federal facilities nationwide, including DoD and DOE.
- Ms. Sharp has developed a strong technical background and practical working knowledge of range and munitions related issues including munitions constituent fate and transport and MEC investigation strategies. Ms. Sharp provides technical support and project management for munitions response projects managed by AMEC including completed project, Camp Dawson, as well as a current Omaha District project at Edwards Air Force Base with our team member, UXB.
- Ms. Sharp has a successful history of providing technical support for DoD Agencies including the USACE, Air Force, Navy, and Air National Guard, as well as DOE. This includes performance based munitions response projects involving range investigation, remedial actions, and munitions detection.

Directly Relatable Project Experience and Qualifications

MMRP EE/CA and Surface Clearance, Edwards Air Force Base, Technical Resources Manager. 2009- Present. Tasks include coordinating cultural and natural resources support, GIS support, and preparing an NFA ESS for MRAs on and off-site. She is working closely with team member UXB, Omaha District, and EAFB to remove MEC and munitions debris while ensuring protection of the cultural and natural resources at 3 MRSs.

MMRP CSE Phase I/II, NTCRA, Toledo Air National Guard Base, Technical Manager. 2009- Present. CSE Phase I/II Investigation and removal action for a small arms firing range. Tasks include documentation of the CSE process including personnel interviews and sitewide visual survey to complete the CSE Phase I, pre and post investigation fact sheets, work plans, EE/CA, Action Memorandum, public participation activities, and remediation of lead impacted soils from the range. Project includes characterization of soil from the range floors and berm areas as well as groundwater. Responsible for writing work plans, reports, developing technical approach for remediation of range soils, and developing the MRSPP.

MMRP CSE Phase II NTCRA Nashville Air National Guard Base, Technical Support. 2009 to Present. Tasks include documentation of the CSE process including pre and post investigation fact sheets, work plans, Engineering Evaluation/Cost Analysis (EE/CA), Action Memorandum, public participation activities, and remediation of lead impacted soils from the ranges. Project included XRF characterization of soil from the range floors and berm areas and groundwater, surface water and sediment sampling from drains within the ranges, pilot treatability study of range soil to

determine the applicability of lead stabilization using phosphate amendments. Responsible for providing technical support for pilot study development and removal strategies for the project.

MMRP RI/FS Former Camp Wheeler, Macon, Georgia, MRSPP/RI/FS Manager. 2008-2009. Developed the Environmental Sampling and Analysis Plan for a MMRP RI/FS at the 14,160 acre World War I and II training area under contract with the USACE Savannah District with USAESCH providing technical oversight. Tasks included conducting the discussion on MEC investigation and environmental sampling of munitions constituents with the GA EPD and other stakeholders at TPP meetings, and developing the initial MRSPP worksheets for 7 MRSs, using the MRSPP on-line tool.

MMRP RI/FS Former Conway Bombing and Gunnery Range, Conway, South Carolina, MRSPP/RI/FS Manager. 2008-2009. Developed the strategy for determining geophysical transects and environmental sampling at this former World War II training area, and presented the environmental sampling strategy to SC DHEC at project planning meetings. Tasks also included evaluating the explosive, chemical and human health hazards by using the MRSPP on-line tool for each MRS.

Former Five Points Outlying Field, Arlington, Texas, RI/FS Technical Manager. 2008-2009. Prepared a desktop RI/FS report under CERCLA guidance for a 162 acre World War II bombing range in Arlington, TX under the FUDS MMRP. MEC removal activities led by geophysical investigations were performed on 100% of the properties where Rights of Entries (ROE) were obtained. Data from previous investigations and removal activities were used in preparing the RI/FS report. MRSPP evaluations were prepared for this site to evaluate the explosive, chemical, and human health hazards.

Relatable Project Experience and Qualifications

Moody Air Force Base, Valdosta, Georgia, Senior Project Scientist. 2005-2007. Lead technical and project manager on three Air Force IRP sites to treat lead impacted soil and groundwater impacted by chlorinated solvents and petroleum related constituents. She successfully conducted a soil removal action and soil and groundwater investigation on a surface disposal site with lead impacted soil using the Triad approach. The nature and extent of soil contamination was performed in 1 field mobilization using XRF and lab analysis with a constantly evolving CSM to determine the data gaps during the field effort. Effective communication with regulators and the base EM was key in the rapid completion of the investigation. Groundwater contamination was delineated using MIP and monitoring well data. Remedial actions at additional sites included injecting emulsified oil with bioaugmentation in "walls" perpendicular to groundwater flow at a former landfill.

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APPENDIX I:
TECHNICAL PROJECT PLANNING (TPP) WORK SHEETS

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DATA QUALITY OBJECTIVE WORKSHEET

Project: Former Cape Poge Little Neck Bomb Target Site MRS

DQO STATEMENT NUMBER: **1 OF 2**

DQO Element Number	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate Nature and Extent of MEC
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	MEC, Munitions Debris
4	Media of Interest	N/A
5	Required Sampling Locations or Areas and Depths	Ocean, Inland Water, Beach, and Land MEC - surface and subsurface
6	Number of Samples Required	N/A
7	Reference Concentration of Interest or Other Performance Criteria	Based on the indications of type, degree, and quantity of MEC/MD, a recommendation will be made regarding subsequent actions at the site.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	MEC - Analog and DGM transects, Grids, and Anomaly Investigation
9	Analytical Methods	N/A

[a] Refer to EM 200-1-2, Paragraph 4.2.1

DATA QUALITY OBJECTIVE WORKSHEET

Project: Former Cape Poge Little Neck Bomb Target Site MRS

DQO STATEMENT NUMBER: **2 OF 2**

DQO Element Number	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate Nature and Extent of MC.
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	Explosives and metals based on munitions present.
4	Media of Interest	Soil, Sediment, and Surface Water, Groundwater
5	Required Sampling Locations or Areas and Depths	Determined by the results of the geophysical and intrusive anomaly investigations.
6	Number of Samples Required	Number of samples for the media of interest will be determined after the geophysical and intrusive investigations. Samples will be biased toward areas of high anomaly densities.
7	Reference Concentration of Interest or Other Performance Criteria	The maximum detected concentration of each metal analyte will be compared to site specific background samples evaluated using CERCLA background guidance. Each analyte will also be evaluated to verify that it is a potential MC for the site (IE., in the munitions known or suspected for the site). Comparison against EPA Regional Screening Values (EPA Master Table, Dec 2009) or Massachusetts screening values will be used to determine if nature and extent has been delineated. Only the analytes detected above background concentrations and are potential MC will be retained for consideration in the Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (SLERA). The maximum detected concentration of explosive analytes will be retained in the SLRA.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	MC - Hand Auger, Direct Push Technology, Vibracore, Grab sample, MIS tool
9	Analytical Methods	EPA SW 846 methods: 6010C, 6020A, 8330A, 8330B, 6860

[a] Refer to EM 200-1-2, Paragraph 4.2.1

DATA QUALITY OBJECTIVE WORKSHEET

PROJECT: Former Moving Target Machine Gun Range at South Beach MRS

DQO STATEMENT NUMBER: **1 OF 2**

DQO Element Number	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate Nature and Extent of MEC
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	MEC, Munitions Debris
4	Media of Interest	N/A
5	Required Sampling Locations or Areas and Depths	Ocean, Inland Water, Beach, and Land MEC - surface and subsurface
6	Number of Samples Required	N/A
7	Reference Concentration of Interest or Other Performance Criteria	Based on the indications of type, degree, and quantity of MEC/MD, a recommendation will be made regarding subsequent actions at the site.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	MEC - Analog and DGM transects, Grids, and Anomaly Investigation
9	Analytical Methods	N/A

[a] Refer to EM 200-1-2, Paragraph 4.2.1

DATA QUALITY OBJECTIVE WORKSHEET

PROJECT: Former Moving Target Machine Gun Range at South Beach MRS

DQO STATEMENT NUMBER: **2 OF 2**

DQO Element Number	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate Nature and Extent of MC.
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	Explosives and metals based on munitions present.
4	Media of Interest	Soil, Sediment, and Surface Water, Groundwater
5	Required Sampling Locations or Areas and Depths	Determined by the results of the geophysical and intrusive anomaly investigations.
6	Number of Samples Required	Number of samples for the media of interest will be determined after the geophysical and intrusive investigations. Samples will be biased toward areas of high anomaly densities.
7	Reference Concentration of Interest or Other Performance Criteria	The maximum detected concentration of each metal analyte will be compared to site specific background samples evaluated using CERCLA background guidance. Each analyte will also be evaluated to verify that it is a potential MC for the site (IE., in the munitions known or suspected for the site). Comparison against EPA Regional Screening Values (EPA Master Table, Dec 2009) or Massachusetts screening values will be used to determine if nature and extent has been delineated. Only the analytes detected above background concentrations and are potential MC will be retained for consideration in the Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (SLERA). The maximum detected concentration of explosive analytes will be retained in the SLERA.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	MC - Hand Auger, Direct Push Technology, Vibracore, Grab sample, MIS tool
9	Analytical Methods	EPA SW 846 methods: 6010C, 6020A, 8330A, 8330B, 6860

[a] Refer to EM 200-1-2, Paragraph 4.2.1

DATA QUALITY OBJECTIVE WORKSHEET

Project: Tisbury Great Pond MRS

DQO STATEMENT NUMBER: **1 OF 2**

DQO Element Number	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate Nature and Extent of MEC
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	MEC, Munitions Debris
4	Media of Interest	N/A
5	Required Sampling Locations or Areas and Depths	Ocean, Inland Water, Beach, and Land MEC - surface and subsurface
6	Number of Samples Required	N/A
7	Reference Concentration of Interest or Other Performance Criteria	Based on the indications of type, degree, and quantity of MEC/MD, a recommendation will be made regarding subsequent actions at the site.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	MEC - Analog and DGM transects, Grids, and Anomaly Investigation
9	Analytical Methods	N/A

[a] Refer to EM 200-1-2, Paragraph 4.2.1

DATA QUALITY OBJECTIVE WORKSHEET

Project: Tisbury Great Pond MRS

DQO STATEMENT NUMBER: **2 OF 2**

DQO Element Number	DQO Element Description[a]	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate Nature and Extent of MC.
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	Explosives and metals based on munitions present.
4	Media of Interest	Soil, Sediment, and Surface Water, Groundwater
5	Required Sampling Locations or Areas and Depths	Determined by the results of the geophysical and intrusive anomaly investigations.
6	Number of Samples Required	Number of samples for the media of interest will be determined after the geophysical and intrusive investigations. Samples will be biased toward areas of high anomaly densities.
7	Reference Concentration of Interest or Other Performance Criteria	The maximum detected concentration of each metal analyte will be compared to site specific background samples evaluated using CERCLA background guidance. Each analyte will also be evaluated to verify that it is a potential MC for the site (IE., in the munitions known or suspected for the site). Comparison against EPA Regional Screening Values (EPA Master Table, Dec 2009) or Massachusetts screening values will be used to determine if nature and extent has been delineated. Only the analytes detected above background concentrations and are potential MC will be retained for consideration in the Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (SLERA). The maximum detected concentration of explosive analytes will be retained in the SLRA.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	MC - Hand Auger, Direct Push Technology, Vibracore, Grab sample, MIS tool
9	Analytical Methods	EPA SW 846 methods: 6010C, 6020A, 8330A, 8330B, 6860

[a] Refer to EM 200-1-2, Paragraph 4.2.1

TPP Team	EM 200-1-2, Paragraph 1.1.1	
Decision Makers		
Customer	USACE - New England District (CENAE) & U.S. Army Engineering and Support Center, Huntsville (USAESCH)	
Project Manager	Carol Ann Charette, CENAE	
Regulators	Massachusetts Department of Environmental Protection (MA DEP) and the Environmental Protection Agency (EPA)	
Primary Stakeholders	Trustees of Reservations (TTOR), Department of Conservation and Recreation (DCR), Town of Edgartown, Town of West Tisbury, Town of Chilmark, Wampanoag Tribe of Gay Head (Aquinnah), Dukes County, Riparian Association	
Data Types	**Data Users**	**Data Gatherer**
Demographics/Land Use	Risk, Responsibility, and Remedy Perspectives	UXB Team
Site Conditions	Remedy Perspective	UXB RI Field Team
Munitions and explosives of concern (MEC)	Risk and Remedy Perspectives	UXB RI Field Team
Munitions constituents (MC)	Risk and Remedy Perspectives	UXB RI Field Team
Archaeology	Compliance and Remedy Perspectives	CENAE, UXB
Endangered Species (State and Federal)	Risk and Compliance Perspectives	CENAE, UXB

CUSTOMER'S GOALS	EM 200-1-2, Paragraph 1.1.2		
Munitions Response Site	**Contaminant Issues**	**Future Land Use**	**Site-specific Closeout Goal (if applicable)**
Former Cape Poge Little Neck Bomb Target Site	MEC/MC	Residential, Recreational, Commercial, Wildlife Refuge, Public Beach	TBD
Former Moving Target Machine Gun Range at South Beach	MEC/MC	Residential, Recreation, Public Beach	TBD
Tisbury Great Pond	MEC/MC	Residential, Recreation, Commercial, Public Beach	TBD
Site Closeout Statement			
To manage the MEC and MC risk through investigation, removal, long-term monitoring, 5 year reviews, administrative controls, and public education; thereby rendering the site as safe as reasonably possible to humans and the environment and conducive to future land use.			
Customer's Schedule Requirements			
Remedial Investigation, Feasibility Study, Proposed Plan, and Decision Documents completed by 12/30/2012			
Customer's Site Budget			
Remedial Investigation, Feasibility Study, Proposed Plan, and Decision Documents.			

IDENTIFY SITE APPROACH		
EXISTING SITE INFORMATION & DATA	**EM 200-1-2, Paragraph 1.1.3 and 1.2.1**	
Attachment(s) to Phase I TPP Memorandum	**Located at Repository**	**Preliminary Conceptual Site Model**
Inventory Project Reports (INPR) (per MRS)	No	No
Preliminary Assessment (PA) Cape Poge Little Neck Bomb	N/A - document is not Final	No
TCRA Site Specific Report Cape Poge Little Neck Bomb Target	N/A - document is not Final	No
Archives Search Report (ASR) for the former Tisbury Great Pond	No	No
ASR Supplement for the Former Tisbury Great Pond	No	No
Tisbury Great Pond Site Inspection Report	No	Yes
POTENTIAL POINTS OF COMPLIANCE	**EM 200-1-2, Paragraph 1.2.1.3**	
Determination of Nature and Extent of MEC/MC		
Avoidance of sensitive conditions; wetlands, endangered species, archaeological sites (if applicable)		
MEDIA OF POTENTIAL CONCERN	**EM 200-1-2, Paragraph 1.2.1.4**	
MEC and MC (Soil, Surface Water, Sediment, and Groundwater)		
SITE OBJECTIVES	**EM 200-1-2, Paragraph 1.2.2**	
Collection of sufficient MEC and MC data to adequately characterize nature and extent in order to determine future response actions.		
REGULATOR AND STAKEHOLDER PERSPECTIVES	**EM 200-1-2, Paragraph 1.2.3**	
Regulators	**Community Interests**	**Others**
MA DEP - Protect Public Health, Safety, and Environment	TTOR - Public Safety, restore confidence and access	TBD
EPA - Protect Public Health, Safety and the Environment		
PROBABLE REMEDIES	**EM 200-1-2, Paragraph 1.2.4**	
Remedial Design (RD)/Remedial Action (RA), Long-Term Monitoring, and 5 Year Reviews		
EXECUTABLE STAGES TO SITE CLOSEOUT	**EM 200-1-2, Paragraph 1.2.5**	
Remedial Investigation/Feasibility Study		
Proposed Plan		
Decision Document		
Remedial Design		
Remedial Action (as necessary)		
Long-Term Monitoring		
5-Year Reviews		

IDENTIFY CURRENT PROJECT		
SITE CONSTRAINTS AND DEPENDENCIES	**EM 200-1-2, Paragraph 1.3.1**	
Administrative Constraints and Dependencies		
Rights of Entry (ROE)		
Funding for additional RI (if needed)		
Concurrent planning programs		
Scheduling - Tourism (Heavy Public Beach use from June through Labor Day)		
Technical Constraints and Dependencies		
Hunting		
Commercial Fishing		
Cultural Resources		
Topography/vegetation		
Site conditions (Sea State)		
Environmentally sensitive areas		
Legal and Regulatory Milestones and Requirements		
Consistent with CERCLA and NCP		
Public, stakeholder and regulatory involvement and review of key documents (see schedule)		
Funding for additional RI (if needed) and beyond		
Massachussets Endangered Species Act		
District of Critical Planning Concerns (DCPC) - Coastal, Cape Poge, West Tisbury, and Chilmark		
CURRENT EXECUTABLE STAGE	**EM 200-1-2, Paragraph 1.3.3**	
Remedial Investigation and Feasibility Study		
(For Current Projects)	(For Future Projects)	(Objectives that do not lead to site closeout)
Site reconnaissance		
Analog instrument investigation		
Digital geophysical mapping		
Intrusive anomaly investigation		
Soil, sediment, surface water, groundwater sampling		

Acronyms

CENAE - U.S. Corps of Engineers, New England District
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
DCPC - District of Critical Planning Concerns
DCR - Department of Conservation and Recreation
EPA - U.S. Environmental Protection Agency
FUDS - Formerly Used Defense Sites
MA DEP - Massachusetts Department of Environmental Protection
MC - munitions constituents
MEC - munitions and explosives of concern
MRS - munitions response site
MRSPP - Munitions Response Site Prioritatizion Protocol
NCP - National Contingency Plan
NTCRA - Non Time Critical Removal Action
RI/FS - Remedial Investigation and Feasiblity Study
ROE - Rights of Entry
SI - Site Inspection
TBD - To be determined
TCRA - Time Critical Removal Action
TPP - Technical Project Planning

Martha's Vineyard TPP Meeting # 1
Edgartown Town Hall
March 24, 2010

Attendees:

Carol Ann Charette– USACE NAE Project Manager
Ralph Campbell– USAESCH HNC Project Manager
Kim Meacham – USAESCH HNC Technical Engineer
Mike Warminsky - UXB Project Manager, Prime Contractor
Tracy Bergquist - UXB Senior Environmental Scientist
John Kierepka – UXB MEC Operations Manager
Shirley Rieven - UXB Senior Geophysicist
Donna Sharp – AMEC (UXB Subcontractor)
Tom Rancich– VRHabilis (UXB Subcontractor)
Elliott Adler– VRHabilis (UXB Subcontractor)
Mark Padover– Aqua Survey (UXB Subcontractor)
Jennifer Rand – West Tisbury
Joanne Deardon – MADEP Regulator
Anne Malewicz – MADEP Regulator
Mike Moran - MADEP Regulator
Desiree Moyer– EPA Regulator
Chris Kennedy– Regional Director, The Trustees of Reservations (TTOR)
Steve Nicolle– Superintendent, TTOR
Dave Babson – TTOR
Chris Egan - TTOR
Marilyn Wortman – Town of Edgartown
John Varkonda – DCR
Mary Jane Pease – TGP President

The meeting started at 0830. Following are the minutes from the meeting, including action items.

0830 – Introductions

New England District Project Manager, Carol Ann Charette introduced the USACE participants; and asked all attendees to introduce themselves and provide their organization and role in the projects. A sign-in sheet was maintained for persons attending, and is provided as Attachment A.

This project covers 3 FUDs sites: Former Cape Poge Little Neck Bomb Target Site Munitions Response Site (MRS), Former Moving Target Machine Gun Range at South Beach MRS (includes Wasque Point), and Tisbury Great Pond MRS – following CERCLA process – UXB team responsibility is the RI/FS, PP and DD; emphasis on 3 separate projects conducted concurrently.

0835 – Project Team/Approach

UXB Project Manager, Mike Warminsky presented the UXB Project team Organization Chart and reviewed roles and responsibilities:

- UXB – Prime Contractor, overall project management, land based analog transects/UXO; Geophysics Management. Mike Warminsky - Project Manager; John Kierepka - MEC Operations Manager; Shirley Rieven – Sr. Geophysicist; Donna Sharp – Technical Manager (AMEC)
- AMEC – Sub Contractor - Technical Management and Environmental Sampling,
- VR Habilis – Sub Contractor - Underwater analog transects/grids UXO Support
- Aqua Survey - Sub Contractor - Underwater digital geophysics, and sediment sampling, and
- NAEVA – Sub Contractor, – Land based digital geophysics

Org Chart provided as Attachment B to these minutes.

Mike Warminsky provided an overview of the FUDs Program and CERCLA Process – focused on where current projects are in overall process; stressed purpose of RI/FS was to adequately determine the nature and extent of Munitions and Explosives of Concern (MEC) and Munitions Debris (MD) at the MRS to develop future response actions without additional investigation.

The presentation consisted of 4 parts:

- Part 1 - Martha's Vineyard RI/FS Overview
- Part 2 - Former Cape Poge Little Neck Bomb Target Site MRS
- Part 3 - Former Moving Target Machine Gun (MTMG) Range at South Beach MRS
- Part 4 - Tisbury Great Pond MRS

0845 - TPP Presentation Part 1 Martha's Vineyard RI/FS Overview
Project overview provided with descriptions and pictures of proposed equipment/techniques (see presentation slides).

Mike Warminsky provided an overview of the investigation areas at each site:

- Land
  - Analog transects (magnetometer/all-metals detector), DGM grids
  - Anomaly Investigation
  - MC Sampling (soil)
- Beach
  - DGM transects (EM61 Towed array) and DGM grids
  - Anomaly investigation
- Inland Water (Intertidal Areas and Inland Ponds
  - DGM transects (underwater EM61) and DGM grids
  - Underwater Anomaly Investigation
  - MC Sampling (Sediment and Surface Water)
- Ocean
  - Analog transects (magnetometer) and analog grids
  - Underwater anomaly investigation

Mike Warminsky expanded the discussion on the MEC Approach:

Geophysical investigation (determines extent of MEC) – transects (analog and digital) to provide wide area assessment and data for subsequent grid selection; additional focused grids (analog and digital) to support intrusive investigation.

Intrusive Investigation (determines nature of MEC) – percentage of anomalies will be intrusively investigated.

MEC Transport Study – Study areas at Tisbury Great Pond MRS and South Beach.
ESTCP data – demonstration of new technology – Tetra Tech is doing the work but UXB will investigate selected anomalies. ESTCP project is a wide area assessment – to include large areas of transects, followed by a more detailed grid survey in smaller areas. Data collected by UXB for the ESTCP project will be used to support the RI/FS. Tetra Tech will develop the ESTCP Report.

Analog and digital geophysical mapping transects will be used first to obtain anomaly densities. Transects will be laid out to determine the extent of metallic anomalies.

Analog transects will be performed on land and in the ocean; analog grids will be used in the ocean.

DGM transects will be collected on beaches (towed array) where there is less brush, trees, etc. and in inland water (walking diver). DGM grids on land and inland water - underwater EM sled for deeper water.

MEC transport study will include monitoring previously cleared grids (TCRA) to see if additional items migrated in, and also placing objects consistent with MEC in predetermined grids to determine migration patterns.

0915 - TPP Presentation Part 1 (continued)

Donna Sharp – presented MC approach – biased sampling based on highest density of MEC. MA DEP and EPA would like groundwater to be sampled regardless of soil, sediment, or surface water results. A well inventory will be performed and provided to TPP team.

Chris Kennedy - Existing wells are sampled regularly at South Beach but this is not used for drinking water. Well is brackish.

Desiree Moyer– why are we using 8330A instead of 8330B?

Donna Sharp – 8330A is the right method for analyzing discrete samples. We will use 8330B for prepping and analyzing IS samples. IS samples will be collected at the Moving Target Machine Gun Range firing lines and target areas, where potential for MC from explosive residues may exist. This area is the only place a definitive number of samples can be planned. The approach for the other samples is to review the geophysical and intrusive data before identifying sample locations and numbers.

Action Item 1: UXB will provide the team with the MC sampling decision logic for review (Donna Sharp).

Also, the team will be allowed access to the geophysical and intrusive investigation data as the project progresses. Review needs to be timely so as not to impact field operations. Regular conference calls with the TPP team will be conducted during field activities.

Carol Ann Charette – Why aren't we using IS for all soil samples?

Donna Sharp - We plan to collect IS for surface soils biased on high density areas; however, subsurface soils will be discrete. MM CX does not have standards or guidance on collecting subsurface soil samples by IS methods.

Samples were collected at Tisbury in the past. EPA asked why not full suite. Kim Meacham answered only MC consistent with past usage.

Carol Ann Charette stated the IS versus discrete sampling, and all sampling for each media, locations, analytes and methods used should be decided by the Risk Assessors and chemists for UXB and the Corps.

Action Item 2: UXB and Corps: Engage risk assessors and chemists in overall sampling approach and methodology.

0945 - TPP Presentation Part 2– Former Cape Poge Little Neck Bomb Target Site MRS

Site History and Technical Approach discussed. (See presentation slides).

Action Item 3: Preliminary Assessment on Cape Poge will be made available once NAE completes its internal review of the Draft Document. NAE to provide Cape Poge PA once review is complete. Maps of the area are available in the interim. UXB to provide maps to MADEP.

EPA asked questions regarding the analog data recording. Kim Meacham explained that the counts would be recorded as long as there is GPS availability. For areas where GPS is not available, anomaly counts will be recorded at specified distances along the transect line.

At Cape Poge, previous investigations have discovered both ferrous and non-ferrous materials.

Shirley Rieven – explained that the ferrous locating equipment should be sufficient for land-based (analog) transects due to probability of ferrous being collocated. Later, the DGM will be used for land-based grids which will detect non-ferrous as well. Some clearing will have to be done to be able to use the analog equipment. But the advantage to using the analog is that it can minimize clearing.
The time of year for land-based investigation – off season, land-based and inland water starting in fall 2010. Not the best for weather but also advantageous for people and wildlife. Beach is at widest point in fall.

Mike Warminsky – UXB approach is to minimize clearing to max extent possible for transects; grids to be clear cut to6 inches above the ground.

Shellfish exposure – MADEP concerned about risk. Sediment sampling within the shellfish harvest areas will be conducted. If MC concentrations are above screening criteria, benthic sampling may be performed.

At Cape Poge, MADEP would like to focus more on the expected target area and move transects closer together at the higher risk areas around the point at Little Neck. MW – explained the total areas of transects/grids were provided by USACE – UXB developed spacing and layout based on site data and previous work. Approach will be described in work plan, which will be reviewed by USACE

Action Item 4: UXB to take under consideration revising transect plan.

Chris Kennedy – TTOR's objective is to open up the Little Neck area to the public again.

1015 - TPP Presentation Part 3– Moving Target Machine Gun Range at South Beach MRS

Site History and Technical Approach presented (See PowerPoint presentation slides).

Two (2) Aerial bombing targets where they fired 2.5" to 5" rockets and the Moving Target Machine Gun Range. The aerial bombing targets were on either side of the moving target. A removal action in 1989 was performed in the vicinity of the bombing targets. They removed the dunes and rebuilt them.

Kim Meacham and Marilyn Wortham confirmed the dunes in the area of the target were not cleared.

Investigation methods are the same as with Former Cape Poge, however, there is historical and visual evidence of the firing lines and berm at the Moving Target Machine Gun Range. Kim Meacham also indicated that the dunes out there now are not the dunes that were present at the time the **Moving Target Machine Gun Range was in existence. Thus the need for investigation is minimal on the dunes.**

Carol Ann Charette – questions whether the former track is completely under water and also whether the aerial targets are being investigated based on proposed transects and grids.

Note: After reviewing the historic plans and current land features, it appears as though half of the track is now under water and half would have been located where the beach is now.

Donna Sharp and Mike Warminsky – discussed combination of analog transects by UXB and ESTCP survey both cover this area; grid placement for intrusive investigation based on these transects will provide additional coverage.

Action Item 5: UXB: plot ESTCP survey area on project transect maps; Bob Selfridge to obtain native (shape) files from Tetra Tech and provide to UXB.

1045 - TPP Presentation Part 4 – Tisbury Great Pond MRS

Site History and Technical Approach presented (See PowerPoint presentation slides).

Tisbury Great Pond – a trench is cut into the barrier beach several times a year. The trench was recently cut. Cutting the trench causes scouring of the trench bottom and sides and results in the washing out of ordnance. No ordnance has been discovered exposed as a result of the most recent cut.

Action Item 6: Mike Moran will provide information to UXB on property owner who noted all the metallic debris on his property after it was returned to them by the Navy.

EPA had concerns about distance between transects. Additional discussion by Kim Meacham, Shirley Rieven, and Mike Warminsky on transect spacing. Desiree Moyer suggested more transects, digging on the anomalies identified by the not doing grids.

Action Item 7: UXB will provide electronic copies of transect maps with the meeting minutes.

Schedule – awaiting firm schedule from TetraTech so that UXB can finalize their work schedule.

Tentative project schedule – ESTCP support – summer 2010; land and beach geophysics/intrusive investigation fall/winter 2010; inland water start fall 2010, work up until Christmas, then 6 weeks off. Complete inland water, and ocean areas spring/summer 2011; Project field work should be completed by end of 2011; overall project projected to be completed by end of 2012.

1145 – Lunch Break

1300 – Meeting reconvened

Donna Sharp led the discussions on DQO worksheets – 1 for each site. 1st page is for MEC, 2nd page is for munitions constituents.
Discussion of collecting IS for the BIP actions. IS may be collected in those areas of previous BIP and any future BIP activities.

Kim Meacham AM – they use IS for screening and then return to sample higher concentration areas. But she is under the impression that MADEP wanted discrete sampling so the project was scoped that way.

DECISION 1: IS as opposed to discrete surface sampling will be conducted. Subsurface samples will be biased discrete. Carol Ann Charette also recommended that this issue be run past the risk assessors and chemists for UXB and the Corps.

Subsurface – What is considered subsurface – Donna Sharp says subsurface sampling is at 12"-18", however it depends on the depth of penetration of the MEC items.

DECISION 2: Need more information about whether IS could be applied for subsurface. There is no guidance or standard on collecting subsurface IS samples, therefore subsurface sampling will be in biased discrete locations.

MADEP is concerned that the proposed sampling is very limited and more consistent with an SI than an RI.

Kim Meacham – stated that if we are biasing the sampling based on the areas of highest concentration of MEC areas, there is no need for more extensive sampling.

Donna Sharp stated that due to biasing, we can limit the areas. MA DEP questions that this is valid. We cannot make such broad assumptions for such large areas and so few samples. MADEP used the example at the dunes where no samples were collected during the SI because no geophysical data warranted and they later found 100 pound bombs.

Carol Ann Charette – Stated that IS sampling is better as it requires taking more grabs of the media over a larger areas and combining them in fewer composite samples. Results in an overall greater probability of getting more representative samples that increase the likelihood of finding MC if it is present.

Kim Meacham – We first find the anomaly, dig it out, and sample if MEC is found. These samples would be discrete.
Donna Sharp - We cannot provide sample numbers until we have our geophysical data.

Carol Ann Charette – We are determining nature and extent so sufficient samples will be collected to accomplish that. It won't be 100% but will meet the needs of CERCLA for an RI/FS.

DECISION 3: MADEP and EPA asked to present the analog data prior to proceeding to DGM.

Carol Ann Charette– Wants everyone to have the opportunity to look over the data for the proposed transects, proposed grids and proposed dig list. This is consistent with what was done for the TCRA. Data was provided continuously throughout the project and decisions were made with all informed of the rationale before the work was done. She also wants to know the transect spacing on the pond. 2.75 miles of 3 foot wide transects in 1 acre with spacing between them 300 feet.
Anne Malewicz – had 2 questions…. First Question - If you have your equipment on the transect, how deep can you see into the sediment?
Shirley Rieven – stated 11 times the diameter of the item, however, maybe deeper if it is wetter.
2nd question – What is the depth of penetration of MEC in the water?
Shirley Rieven replied: The MEC will lose some of its energy in the water which will influence typical depth measurements.

Continued discussion/concerns by MADEP and EPA regarding transect location/coverage.

Shirley Rieven – Graphically demonstrated the effectiveness of the 300-foot analog transect spacing based on a comparison of the expected width of the bombing range impact area and the inter-transect spacing. She showed that the team anticipates that there will be enough transects to ensure detection of a bombing target but concedes that the spacing would be inadequate to detect individual MEC items between the transects. She emphasized that the transects; followed by the DGM grids-placed strategically-is appropriate to ensure characterization of the nature (grids) and extent (transects) of MEC for the RI/FS.

Questions on how the areas were determined were raised – Bob Selfridge performed VSP model, but was not in attendance.

Action 8: Provide basis of transect/grid determinations (Bob Selfridge); UXB to add a chart showing total area of transects and grids for each MRS (from PWS basis of estimate) to each of the site maps (Donna Sharp).

Donna Sharp - Draft-finals and Finals will be provided to the public in accordance with EP 1110-3-18, and ER 200-3-1. Donna Sharp couldn't locate any previous documents at the library. Marilyn Wortham – stated the other libraries have reciprocal agreements so we only need to provide one unless site specific, i.e. Tisbury library should have their own RI.

Cape Poge and South Beach will use the Edgartown Library for their repository and Tisbury Library should have the Tisbury Great Pond documents.

Ann Malewicz expressed concern that since this is not a removal action, dangerous items will not be removed.

Ralph Campbell – stated that the USACE will not leave anything on site that presents an imminent safety hazard.

Ann Malewicz expressed much concern that USACE would not be present for all field work.
Ralph Campbell explained that the Corps would be there for critical tasks throughout the project execution; however, the contractor would otherwise be able to operate independently.

1630 Meeting Adjourns (will resume with additional technical approach discussions tomorrow at 0830 AM)

Martha's Vineyard TPP Meeting # 1
Edgartown Town Hall
March 25, 2010

Attendees:

Carol Ann Charette– USACE NAE Project Manager
Ralph Campbell– USAESCH HNC Project Manager
Kim Meacham – USAESCH HNC Technical Engineer
Mike Warminsky - UXB Project Manager, Prime Contractor
Shirley Rieven - UXB Senior Geophysicist
Donna Sharp – AMEC (UXB Subcontractor)
Tom Rancich– VRHabilis (UXB Subcontractor)
Elliott Adler– VRHabilis (UXB Subcontractor)
Joanne Deardon – MADEP Regulator
Anne Malewicz – MADEP Regulator
Mike Moran - MADEP Regulator
Desiree Moyer– EPA Regulator
Dave Babson – TTOR
Marilyn Wortman – Town of Edgartown

0845 TPP Team resumed discussions from previous day.

Continued review of the MC DQO sheet for Former Cape Poge Little Neck Bomb Target Site MRS. Media of interest for MC consists of Soil, sediment, surface water, and groundwater. A well inventory will be conducted at each MRS to determine if a groundwater pathway exists. Concerns by the EPA and MA DEP on the number of munitions constituents samples proposed was raised. Donna Sharp will provide decision logic for MC sample collection.

Reference Concentration of Interest or Other Performance Criteria – Use CERCLA background guidance for collection of background samples, background data sets will be per site, not combined. Comparison of samples against action levels for delineation will be made against the EPA Regional Screening Values (Master Table, December 2009) or MA delineation criteria, whichever is more stringent.

A revised Memorandum for Record was provided for the team members for their review. (Attachment C to these minutes).

Technical Approach Discussion applicable to all MRSs.

Desiree Moyer– Is concerned with the transect coverage at each site. She would like more information on statistical approach for the current acres of transects proposed. Also, she would prefer to dig on a percentage of anomalies along the transects as opposed to dropping in grids for additional geophysics and intrusive investigation.

Desiree Moyer and Ann Malewicz will provide written comments after the meeting addressing their concerns with the project.

Kim Meacham reiterated the objective of the RI is to determine Nature and Extent. It is not possible to determine the location of every item during this investigation. Adequate information is needed to be able to determine future response actions.
Joanne Deardon – Wants to know the confidence level of the transects. Her concern is that the investigation will be based on a low (70% confidence level). She would like to see the assumptions that were made when the transect coverage and spacing were determined.

Shirley Rieven – Reiterated her discussion from yesterday that a bombing target impact area is anticipated to cover a broad area and thus, analog transects run at "reconnaissance" spacing will prove not only effective at delineating the impact area but will be an efficient use of financial resources. She emphasized that transects define extent by intersecting the impact area boundary at various places so the footprint can be discerned for later use in the RD/RA stages of work. She stated that DGM grids would be used to characterize the nature of metallic debris and MEC as required by the objectives of an RI/FS.

Review of existing grid maps
Carol Ann Charette – wants to see TCRA grids on maps with grids numbered – grid areas in red

Action Item 9: UXB to update maps with TCRA Grids (Donna Sharp).

MEC Transport Study – group discussion on proposed methods, and whether this would provide sufficient data – and ability to recover the "seed items"

Elliot Adler – can add acoustic pingers to seed items to aid recovery
Desiree Moyer – wants to look at real time GPS tracking
Mike Warminsky – we are not able to change the scope without Contracting Officer direction

Action Item 10 UXB to evaluate alternate tracking approach from technical/cost basis (Mike Warminsky, Elliot Adler).

1245 Meeting Adjourns

Summary Action Items/Decisions

Action Item 1: UXB will provide the team with the MC sampling decision logic for review (Donna Sharp)
Action Item 2: UXB and Corps: Engage risk assessors and chemists in overall sampling approach and methodology.
Action Item 3: Preliminary Assessment on Cape Poge will be made available once NAE completes its internal review of the Draft Document. NAE to provide Cape Poge PA once review is complete. Maps of the area are available in the interim. UXB to provide maps to MADEP.
Action Item 4: UXB to take under consideration revising transect plan.
Action Item 5: UXB: plot ESTCP survey area on project transect maps; Bob Selfridge to obtain native (shape) files from Tetra Tech and provide to UXB.
Action Item 6: Mike Moran will provide information to UXB on property owner who noted all the metallic debris on his property (Bigelow?) after it was returned to them by the Navy.
Action Item 7: UXB will provide electronic copies of transect maps with the meeting minutes.

Action 8: Provide basis of transect/grid determinations (Bob Selfridge); UXB to add a chart showing total area of transects and grids for each MRS (from PWS basis of estimate) to each of the site maps (Donna Sharp).

Action Item 9: UXB to update maps with TCRA Grids (Donna Sharp).
Action Item 10 UXB to evaluate alternate tracking approach from technical/cost basis (Mike Warminsky, Elliot Adler).

DECISION 1: IS as opposed to discrete surface sampling will be conducted. Kim will have to check with the CX for subsurface sampling using IS. Carol Ann Charette also recommended that this issue be run past the risk assessors and chemists for UXB and the Corps.
DECISION 2: Need more information about whether IS could be applied for subsurface. If they are discrete samples, not enough sampling to be representative (4).
DECISION 3: MADEP and EPA asked to present the analog data prior to proceeding to DGM.

Summary Action Items, with updated TPP worksheets – 4-9-10
Revised Drawings based on discussion – 4-9-10

Attachments

Attachment A – Sign - In Sheet
Attachment B – Org Chart Presented
Attachment C - Revised Memorandum for Record