M67001.AR.003413
MCB CAMP LEJUENE
5090.3a

FINAL ACTION MEMORANDUM FOR SITE 6 STORAGE LOTS 201 AND 203 FOR THE TIME CRITICAL REMOVAL ACTION MCB CAMP LEJEUNE NC

04/01/2011

CH2M HILL

Final

Action Memorandum
Site 6 Storage Lots 201 and 203
Time-Critical Removal Action

Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

Contract Task Order 0129

April 2011

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Mid-Atlantic

Under the

NAVFAC CLEAN 1000 Program
Contract N62470-08-D-1000

Prepared by

CH2MHILL®

Virginia Beach, Virginia

Final

Action Memorandum
Site 6 Storage Lots 201 and 203
Time-Critical Removal Action

Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

April 2011

Prepared for

NAVFAC
Naval Facilities Engineering Command

Prepared by

CH2MHILL

NORTH CAROLINA PROFESSIONAL SEAL 022327 ENGINEER CHRISTOPHER F. BOZZINI

4/13/11

Contents

Tables

Figures

Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
DoN	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
ESS	Explosives Safety Submission
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft	feet
IAS	Initial Assessment Study
IRP	Installation Restoration Program
LDR	land disposal restriction
LTM	long-term monitoring
LUC	land use control
MCB CamLej	Marine Corps Base Camp Lejeune
MD	munitions debris
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
NAVFAC	Naval Facilities Engineering Command
NCDENR	North Carolina Department of Environment and Natural Resources
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OU	Operable Unit
OVA	organic vapor analyzer
PA/SI	Preliminary Assessment/Site Inspection
PCB	polychlorinated biphenyl
PRAP	Proposed Remedial Action Plan
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RSL	regional screening level
SARA	Superfund Amendments and Reauthorization Act
SVOC	semivolatile organic compound

TBC	to-be-considered
TCRA	Time-Critical Removal Action
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance
VOC	volatile organic compound

Action Memorandum – Site 6 Storage Lots 201 and 203

1. Purpose

This Action Memorandum documents the Time-Critical Removal Action (TCRA) for Site 6, Storage Lots 201 and 203, Marine Corps Base Camp Lejeune (MCB CamLej), Onslow County, North Carolina. This Action Memorandum serves as the decision document to conduct the TCRA.

This Action Memorandum was prepared in accordance with the remedial program requirements defined by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, the Superfund Amendments and Reauthorization Act of 1986 (SARA), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the United States Environmental Protection Agency's (USEPA) Superfund Removal Guidance For Preparing Action Memoranda (USEPA, 2009).

The Department of the Navy (DoN) has broad authority under CERCLA Section 104 and Executive Order 12580 to carry out remedial actions when the release is on, or when the sole source release is from, a DoN installation. The Navy/Marine Corps Installation Restoration Program (IRP) was initiated to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at Navy and Marine Corps activities. This Action Memorandum follows the guidelines published in the *Environmental Restoration Program Manual* (DoN, 2006) and the USEPA *Superfund Removal Guidance For Preparing Action Memoranda* (USEPA, 2009).

This Action Memorandum addresses a TCRA to address buried drums and chlorobenzene-impacted soil discovered at Site 6 during recent test-pitting activities. The buried drums and soil are a continuing source of contamination to groundwater and potentially to the distal Wallace Creek and pose a potential risk to human health and the environment.

The cleanup goal for this TCRA is to remove the grossly contaminated chlorobenzene soil/waste equaling 42 cubic yards of material. Samples will be collected from the excavation prior to backfilling. The analytical results will be evaluated after the TCRA has been completed as part of the ongoing supplemental groundwater investigation. The overall remedy for Site 6 will be revisited to ensure continued protection of human health and the environment.

2. Site Conditions and Background

This section describes MCB CamLej and Site 6, documented releases, and current National Priorities List (NPL) status. This section also reviews any previous and current investigations and actions conducted by the Navy at Site 6.

2.1 Site Description

MCB CamLej is a training facility for the United States Marine Corps located on the coastal plain in Onslow County, North Carolina and covers approximately 236 square miles, including 14 miles of coastline (**Figure 1**). The New River flows southeast, bisecting the Base, and forms a large estuary before entering the Atlantic Ocean. The Base is bounded on the southeast by the Atlantic Ocean, on the west by U.S. Route 17, and on the northeast by State Highway 24. The City of Jacksonville, North Carolina is located north of the Base.

Site 6 is a part of Operable Unit (OU) 2 located along Piney Green Road on the Mainside of the Base (**Figure 2**). OU 2 covers approximately 210 acres and consists of three sites (Sites 6, 9, and 82) that have been grouped together because of their proximity to one another. Site 6 originally consisted of Storage Lots 201 and 203 and large wooded areas that surrounded both lots. A large portion of this formerly wooded area has since been cleared and is currently used for storage. Currently, Lot 201 is used to store shipping containers and Lot 203 is temporarily being used by the Defense Reutilization and Marketing Office (DRMO) for metal staging operations.

As a result of the discovery of material potentially presenting an explosive hazard (MPPEH) during investigation activities at OU 2, the area has been included in the Military Munitions Response Program (MMRP) and designated as Site Unexploded Ordnance (UXO)-22. Site 6 is located within the boundaries of UXO-22 (**Figure 2**). A Preliminary Assessment/Site Inspection (PA/SI) is planned at UXO-22 in 2011-2012.

2.2 Site History and Previous Investigations

From the 1940s to the late 1980s, Site 6 was used for disposal and storage of wastes and supplies, including pesticides, transformers containing polychlorinated biphenyls (PCBs), solvents, electrolytes, used batteries, waste oils, and munitions debris (MD). Pesticides were reportedly stored in the northeast and southeast portions of Lot 201. Transformers containing PCBs were reportedly stored in the southwest portion of Lot 201. Pesticides were reported to have been stored in a trailer on Lot 203 as well as in the southeast portion of the lot. Open Storage Lot 203 previously served as a waste disposal and storage area and there is little indication as to the types and quantities of material disposed. Previous investigations, findings, and actions are listed in **Table 1** below.

TABLE 1
Site 6 Previous Investigations and Actions

Previous Investigation/Action	Date	Activities and Findings
Initial Assessment Study (IAS) (WAR, 1983)	1983	The IAS was conducted to identify potential hazardous sites at MCB CamLej. Wastes present reportedly originated from dumping and storage activities and the IAS recommended that a Confirmation Study be conducted to verify the presence of contamination.
Confirmation Study (1987)	1984 - 1987	Field activities including soil, groundwater, surface water, and sediment sampling, were conducted to verify the presence or absence of contamination. Soil samples were analyzed for pesticides, and all other media were analyzed for volatile organic compounds (VOCs) and pesticides. Low levels of pesticides were detected in soil samples. Groundwater samples collected from shallow monitoring wells revealed low levels of VOCs and benzene.

TABLE 1
Site 6 Previous Investigations and Actions

Previous Investigation/Action	Date	Activities and Findings
Soil Gas Survey (1989)	1989	A soil gas survey was conducted to identify the presence of VOCs that may potentially affect personnel working within Lot 203. No imminent hazards were identified with the results of the survey.
Remedial Investigation/Feasibility Study (RI/FS) (Baker,1993)	1992 - 1993	Field activities consisted of a preliminary site survey, a geophysical survey, a soil investigation including drilling and sampling, a groundwater investigation including monitoring well installation and sampling, drum waste sampling, test pit investigation, a surface water and sediment investigation, and an aquatic and ecological survey. Pesticides/PCBs, VOCs, semi-volatile organic compounds (SVOCs), and metals were identified in soil, groundwater, surface water, and sediment across the OU. Potential human health risks were identified due to exposure to soil and groundwater. Potential adverse ecological impacts were identified for Wallace Creek and Bear Head Creek. The FS developed and screened remedial alternatives for addressing groundwater and soil contamination.
Proposed Remedial Action Plan (PRAP) and Record of Decision (ROD) (Baker, 1993)	1993	A PRAP was to solicit public input on the preferred alternative (soil removal, groundwater extraction and treatment, long-term monitoring [LTM], and land use controls [LUCs]) and a public meeting was held. The Final ROD was issued and signed in September 1993.
Remedy-in-Place	1993 - present	The selected remedy identified in the ROD was conducted as TCRAs from 1993 to 1997, during which drums (some containing DDT), batteries, and communications wire were removed and contaminated soil was excavated. Groundwater extraction and treatment and LTM for VOCs were implemented in 1996 and are ongoing. LUCs were implemented in 2001 and updated in 2002. Elevated, fluctuating levels of chlorobenzene have been detected during groundwater LTM resulting in additional field investigations to determine the potential source.
Basewide Vapor Intrusion Evaluation (CH2M HILL, AGVIQ, 2009)	2007 - 2010	A Basewide Vapor Intrusion Study was conducted from 2007 through 2009 to determine if complete or significant exposure pathways exist for vapor intrusion into buildings. At OU 2, no buildings were identified within 100 feet (ft) of monitoring wells containing VOC concentrations above screening values. If buildings are planned for construction in the vicinity of the VOC groundwater plume, the potential for a vapor intrusion pathway will be evaluated and mitigated if needed.
Chlorobenzene Summary Report (CH2M HILL, 2010)	2008 - 2010	To identify the potential source of chlorobenzene contamination and delineate the extent in groundwater, a Supplemental Site Investigation was conducted. During vegetation clearing activities, MD was discovered and an explosives safety submission (ESS) was submitted to remove and dispose of the MD. The geophysical survey results indicated the presence of several linear features, potentially representing trenches containing metallic debris. Chlorobenzene concentrations in groundwater continue to fluctuate, the dissolved chlorobenzene is migrating downgradient, and the chlorobenzene plume has not been fully delineated vertically and horizontally. The potential source of the chlorobenzene is likely disposal trenches and test pitting and additional groundwater delineation was recommended.
Chlorobenzene Source Area Investigation	2010-present	As a follow-up to the recommendations of the Chlorobenzene Summary Report, test pit activities to investigate the large geophysical anomalies were conducted. 12 test pit excavations (approximately 5' x 5' x 5') were completed and cultural debris, MD, drums, buckets, communication batteries, communication wires, and scrap metal were uncovered. At Test Pit 10, two drums were uncovered resulting in elevated breathing zone measurements. No munitions-related items were encountered during the initial Test Pit 10 excavation. Soil samples were collected from the test pits. The results from Test Pit 10 indicated chlorobenzene concentrations in soil at 70,000,000 µg/kg. No explosives compounds were detected and no metals were detected at concentrations exceeding background and regulatory screening levels. Based on the results of the test pitting and soil sampling, groundwater monitoring wells were installed to further delineate the groundwater plume and sampling is ongoing.

2.3 Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant

During the chlorobenzene source area investigation at Site 6 in January 2011, two buried drums and chlorobenzene-contaminated soil were identified within Test Pit 10 (**Figure 3**). As a result of the chlorobenzene concentration of 70,000,000 µg/kg detected in soil at Test Pit 10, the buried drums and the associated soil were determined to pose an immediate unacceptable risk to human health and the environment and to provide a continuing source to surrounding environmental media, including groundwater and the distal Wallace Creek.

2.4 National Priority List Status

MCB CamLej (USEPA ID: NC6170022580) was placed on the CERCLA NPL effective November 4, 1989 (54 Federal Register 41015, October 4, 1989). Subsequent to this listing, the USEPA, NCDENR, DoN, and the Marine Corps entered into a Federal Facilities Agreement (FFA) for MCB CamLej to address environmental concerns present at the Base (MCB CamLej, 1991). The IRP is responsible for addressing these concerns and managing responses as appropriate to CERCLA and the Resource Conservation and Recovery Act (RCRA).

2.5 Maps, Pictures, and Other Graphical Representations

Figure 1 presents a general location map of MCB CamLej and **Figure 2** presents a location map of Site 6. **Figure 3** depicts the proposed TCRA area.

2.6 Other Actions to Date

A ROD is in-place for OU 2 that includes Site 6. The remedial action components listed below were completed pursuant to the ROD (Baker, 1993).

- Extraction and treatment of chlorinated VOCs in groundwater
- LTM for groundwater and surface water
- LUCs for Non-Industrial Use and Intrusive Activities Control - Soil
- LUCs for Intrusive Activities Control - Groundwater
- LUCs for Aquifer Use Control

All actions, including the remedial actions, that have been conducted at Site 6 are presented above in **Table 1**.

2.7 State and Local Authorities' Role

The USEPA and NCDENR have been involved in planning and reviewing site investigation reports and this Action Memorandum. Comments on this Action Memorandum were solicited from the USEPA, NCDENR, and MCB CamLej. Involvement by all parties in the planning process will continue throughout the TCRA activities through meetings and correspondence.

At the local level, the general public is involved through quarterly meetings of the Restoration Advisory Board (RAB). This TCRA will be presented at a public meeting and a public notice will be placed in *The Jacksonville Daily News* within 60 days of the TCRA.

3. Threats to Public Health, Welfare, or the Environment, and Statutory and Regulatory Authorities

Section 300.415 of the NCP lists the factors to be considered in determining the appropriateness of a TCRA. Paragraph (b)(2) of Section 300.415 applies to the conditions at Site 6 as follows:

Section 300.415(b)(2)(i):	*"Actual or potential exposures to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants"*
Section 300.415(b)(2)(ii):	*"Actual or potential contamination of drinking water supplies or sensitive ecosystems"*
Section 300.415(b)(2)(iv):	*"High levels of hazardous substances or pollutants or contaminants in soils largely near the surface, that may migrate"*

The buried drums and chlorobenzene-contaminated soil (70,000,000 µg/kg) at Site 6 present an immediate risk to public health, welfare, and/or the environment. By removing the buried drums and soil, the continuing source of contamination to soil, groundwater, and potentially Wallace Creek will be removed, effectively eliminating the threat to public health, welfare, or the environment.

4. Endangerment Determination

Actual or threatened releases of hazardous substances (buried drums and chlorobenzene-contaminated soil) from Site 6 may present an imminent and substantial endangerment to public health, or welfare, or the environment.

5. Proposed Actions and Estimated Cost

5.1 Proposed Action

5.1.1 Proposed Action Description

The proposed removal action is the excavation of the buried drums and chlorobenzene-contaminated soil from Test Pit 10. This removal action was selected to provide an immediate action to prevent further migration of contamination to soil, groundwater, and potentially Wallace Creek resulting in risks to human health and the environment.

The proposed removal action area (**Figure 3**) is based on the location of Test Pit 10 where two drums and contaminated soils were uncovered within a 5 ft x 5 ft x 5 ft area. During the

January 2011 excavation of Test Pit 10, elevated breathing zone measurements of VOCs were encountered and the test pit was backfilled immediately following soil sample collection due to health and safety concerns. Therefore, the contents of the drums were not investigated and the excavation was not extended laterally to confirm whether additional drums were present. During the proposed removal action, if additional drums are uncovered immediately adjacent to the original two drums, they and the surrounding soil will be removed. To account for this uncertainty, a 10-ft buffer was added surrounding the original test pit, resulting in a removal area of 15 ft x 15 ft laterally. The vertical extent of the removal action is based on the depth to groundwater, encountered at approximately 5 ft below ground surface that is known to be impacted by chlorobenzene based on LTM groundwater data. Therefore, 42 cubic yards of soil is estimated for removal.

Sidewall and floor soil samples will be collected from the excavation prior to backfilling to provide information on whether chlorobenzene concentrations remain in-place. The analytical results will be evaluated after the TCRA has been completed as part of the ongoing supplemental groundwater investigation. The overall remedy for Site 6 will be revisited to ensure continued protection of human health and the environment. Because the TCRA area is located within Site UXO-22, munitions and explosives of concern (MEC) support will be provided during the excavation activities in accordance with the Explosive Safety Submission (ESS) and Amendments (CH2M HILL, 2009 and 2010). No munitions-related items were found during the initial test pit excavation at Test Pit 10; therefore, no MPPEH or MEC is expected to be encountered.

Based on the concentration (70,000,000 µg/kg) of chlorobenzene detected in a soil sample collected from the test pit, it is assumed that the excavated soil will be considered a RCRA hazardous waste for toxicity characteristic and carry the Code (D021). Drums contaminated with D021 residuals will be managed as RCRA hazardous debris. In addition, the concentrations of chlorobenzene may trigger land disposal restrictions (LDRs). In order to minimize the volume of hazardous waste to be disposed and treated if LDRs apply, highly contaminated soil will be segregated from less contaminated soil, along with segregation of other debris. Segregation will be based on field conditions and organic vapor analyzer (OVA) readings. Once the excavation is complete, waste characterization samples will be collected to determine the proper disposal. Hazardous waste will be disposed in a RCRA, Subtitle C Hazardous Waste Landfill. If the soil/waste does not meet the LDRs, it will be treated via incineration with the post-incinerated material being disposed of at a Subtitle C facility. Following the removal action, clean borrow material will be used as backfill and the area will be restored to grade.

The removal action is easily implementable and cost-effective, using conventional equipment and standard construction methods. Implementation of the removal action will provide a permanent method of removing an identified source area to eliminate migration of contamination and risks to human health and the environment.

5.1.2 Contribution to Remedial Performance

A ROD is in-place for OU 2 that includes Site 6. The remedy components comprise the following:

- Extraction and treatment of chlorinated VOCs in groundwater

- LTM for groundwater and surface water
- LUCs for Non-Industrial Use and Intrusive Activities Control - Soil
- LUCs for Intrusive Activities Control - Groundwater
- LUCs for Aquifer Use Control

During LTM groundwater sampling, fluctuating chlorobenzene concentrations at Site 6 were identified in monitoring well IR06-MW16 and the source area has now been identified. By removing the drums and chlorobenzene-contaminated soil, the source of the groundwater chlorobenzene contamination will be addressed. Following the TCRA and ongoing supplemental groundwater investigation, the remedy for Site 6 will be revisited to ensure continued protection of human health and the environment.

5.1.3 Applicable or Relevant and Appropriate Requirements

In accordance with 40 Code of Federal Regulations (CFR) § 300.415(j) of the NCP on-site removal actions conducted under CERCLA of 1980, as amended, are required to attain 'applicable' or 'relevant and appropriate' requirements (ARARs) to the extent practicable, considering the exigencies of the situation. In determining whether compliance with ARARs is practicable, the lead agency may consider appropriate factors, including: 1) the urgency of the situation; and 2) the scope of the removal action. The Navy has determined that compliance with all of the identified ARARs is practicable.

ARARs are divided into three categories: Chemical-, Location- and Action-Specific. Chemical-specific ARARs apply to individual contaminants. Location- specific ARARs depend upon the location of the contamination and potential restrictions on activities conducted in these areas (i.e., wetlands, flood plains, etc.). Action-specific ARARs govern the removal action and are usually technology– or activity-based directions or limitations that control actions taken at CERCLA sites. In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance "to-be-considered" (TBC) that may be useful in developing CERCLA remedies.

Table 2 presents the ARARs for the TCRA. There are no Chemical-Specific ARARs that are applicable or relevant and appropriate to the action.

5.1.4 Project Schedule

	Dates (MM-DD-YY)	
Activities	**Anticipated Date of Initiation**	**Anticipated Date of Completion**
Action Memorandum	03-03-11	04-30-11
Implementation Plan	03-09-11	04-30-11
Field Work	05-09-11	06-09-11
Report	05-15-11	06-15-11
Public Notice	06-15-11	06-15-11
Public Comment Period	06-15-11	07-15-11

Factors that may affect the TCRA schedule primarily relate to review periods and inclement weather.

5.2 Estimated Cost

The NCP 40 CFR Part 300.415 dictates statutory limits of $2 million and 12 months for USEPA fund-financed removal actions, with statutory exemption for emergencies and actions consistent with the removal action to be taken. The removal action described in this Action Memorandum will not be USEPA funded/financed. The Navy/Marine Corps does not limit the cost or duration of the removal action; however, cost effectiveness is a recommended criterion for evaluation of the removal action alternatives.

The Navy will contract with environmental remediation contractors to perform the required work associated with the Site 6 TCRA at MCB CamLej. The -30%/+50% cost estimate range is $271,250 to $581,250. The estimated costs are itemized in **Table 3**.

6. Expected Change in the Situation Should Action be Delayed or Not Taken

If no action is taken or the action is delayed, the buried drums and chlorobenzene-contaminated soil at Site 6 will remain as a continuing source of contamination to soil, groundwater, and potentially Wallace Creek; posing a threat to human health and the environment.

7. Outstanding Policy Issues

As noted herein, both Federal (USEPA) and State (NCDENR) agencies are currently involved in environmental planning for the Site 6 TCRA. The general public will also be involved via the RAB and public notice, following the TCRA. All the agency comments received prior to finalization of this Action Memorandum will be taken into consideration prior to the start of the TCRA.

8. Enforcement

The DoN can and will perform the proposed response action promptly and properly.

9. Recommendation

This decision document represents the TCRA for the buried drums and chlorobenzene-contaminated soil at Site 6 at MCB CamLej, developed in accordance with CERCLA as amended, and is consistent with the NCP.

Conditions at the site meet the NCP Section 300.415(b)(2) criteria for a removal action and NAVFAC, in consultation with USEPA and NCDENR, recommend the removal action. Response actions should commence as soon as practical due to the potential threat to human health and the environment.

10. References

Baker, 1993. *Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9 and 82)*, Marine Corps Base Camp Lejeune, North Carolina. August.

Baker, 1993. *Final Record of Decision for Operable Unit No.2 (Sites 6, 9, & 82)*, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina.

Baker, 1993. *Time Critical Removal Action, Site 6, Operable Unit No. ,* Marine Corps Base Camp Lejeune, North Carolina. October.

CH2M HILL, 2009. *Explosives Safety Submission for Munitions Response Activities, Site 6 (Operable Unit 2),* Marine Corps Base Camp Lejeune, North Carolina. Approved June 2009.

CH2M HILL, 2009. *Amendment No. 1, Explosives Safety Submission for Munitions Response Activities, Site 6 (Operable Unit 2),* Marine Corps Base Camp Lejeune, Jacksonville, North Carolina. Approved August 2009.

CH2M HILL, 2009. *Final Basewide Vapor Intrusion Evaluation Report,* Marine Corps Base Camp Lejeune, North Carolina. November.

CH2M HILL, 2010. *Final Site 6 Chlorobenzene Investigation Summary Report*, Marine Corps Base Camp Lejeune, North Carolina. July.

CH2M HILL, 2010. *Amendment No. 2, Explosives Safety Submission for Munitions Response Activities, Site 6 and Site 82 (Operable Unit 2),* Marine Corps Base Camp Lejeune, Jacksonville, North Carolina. Approved September 2010.

CH2M HILL, 2010. *Amendment No. 3, Explosives Safety Submission for Munitions Response Activities, Site 6 and Site 82 (Operable Unit 2),* Marine Corps Base Camp Lejeune, Jacksonville, North Carolina. November 2010.

DoN, 2006. *Department of the Navy Environmental Restoration Program Manual.* Department of the Navy. August 2006.

MCB CamLej, 1991. *Federal Facilities Agreement (FFA) Between United States Environmental Protection Agency, Region 4, Department of the Navy, the Marine Corps, and the North Carolina Department of Environment, Health and Natural Resources,* Marine Corps Base Camp Lejeune. 1991.

OHM Remediation Services Corporation (OHM), 1997. *Contractor's Closeout Report for Sites 6 and 82 Source Removal,* Marine Corps Base Camp Lejeune, North Carolina.

USEPA, 2009. *Superfund Removal Guidance For Preparing Action Memoranda*. September.

USEPA, 1993. *Guidance On Conducting Non-Time-Critical Removal Actions Under CERCLA*. August.

Water and Air Research Inc. (WAR), 1983. *Initial Assessment Study for MCB Camp Lejeune, North Carolina.*

Tables

TABLE 2
Federal Location-Specific ARARs
Site 6 TCRA
MCB CamLej

Location	Requirement	Prerequisite	Citation	ARAR Determination
Migratory Bird Treaty Act				
Migratory bird area	Protects almost all species of native birds in the United States from unregulated "taking".	Presence of migratory birds.	*Migratory Bird Treaty Act* , 16 USC 703	Applicable

TABLE 2
Federal and State Action-Specific ARARs
Site 6 TCRA
MCB CamLej

Action	Requirement	Prerequisite	Citation	ARAR Determination
General Construction Standards — All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)				
Managing storm water runoff from land-disturbing activities	Shall install erosion and sedimentation control devices and practices sufficient to retain the sediment generated by the land-disturbing activity within the boundaries of the tract during construction.	Land-disturbing activity (as defined in N.C.G.S Ch.113A: 51-66, Article 4) of more than 1 acre of land	*N.C.G.S. Ch.113A-157(3)*	Applicable
	Shall plant or otherwise provide permanent ground cover sufficient to restrain erosion after completion of construction.			
	Shall take all reasonable measures to protect all public and private property from damage caused by such activities.	Land-disturbing activity (as defined in N.C.G.S. Ch. 113A-52) of more than 1 acre of land	*15A NCAC 4B.0105*	
	Erosion and sedimentation control plan must address the following basic control objectives: (1) Identify areas subject to severe erosion, and off-site areas especially vulnerable to damage from erosion and sedimentation. (2) Limit the size of the area exposed at any one time. (3) Limit exposure to the shortest feasible time. (4) Control surface water run-off originating upgrade of exposed areas. (5) Plan and conduct land-disturbing activity so as to prevent of site sedimentation damage. (6) Include measures to control velocity of storm water runoff to the point of discharge.		*15A NCAC 4B.0106*	
	Erosion and sedimentation control measures, structures, and devices shall be planned, designed, and constructed to provide protection from the run-off of 10 year storm.	Land-disturbing activity (as defined in N.C.G.S. Ch. 113A-52) of more than 1 acre of land	*15A NCAC 4B.0108*	
	Shall conduct activity so that the post-construction velocity of the ten year storm run-off in the receiving watercourse to the discharge point does not exceed the parameters provided in thi Rule.		*15A NCAC 4B.0109*	
Managing fugitive dust emissions	Shall not cause or allow fugitive dust emissions to cause or contribute to substantive complaints, or visible emissions in excess of that allowed under paragraph (e) of this rule.	Activities at Site 6 that will generate fugitive dust emissions.	*15A NCAC 02D .0540(c)*	Relevant and Appropriate
	Implement methods (e.g., wetting dry soils) to control dust emissions that could travel beyond the facility boundary.		*15A NCAC 02D .0540(g)*	

TABLE 2
Federal and State Action-Specific ARARs
Site 6 TCRA
MCB CamLej

Action	Requirement	Prerequisite	Citation	ARAR Determination
Managing toxic air pollutant emissions	A facility shall not emit toxic air pollutants in such quantities that can cause or contribute beyond the premises (adjacent property boundary) to any significant ambient air concentration that may adversely affect human health.	Activities at Site 6 that will generate toxic air pollutants that will generate toxic air pollutant (Chlorobenzene CAS#108-00-7) emissions.	*15A NCAC 02D .1104* *15A NCAC 2D .0100-.1100* *15A NCAC 02Q .0700*	Relevant and Appropriate
Waste Characterization and Storage — Primary Wastes (i.e., excavated contaminated soils and drums)				
Characterization of solid waste (e.g., contaminated soil)	Must determine if solid waste is hazardous waste or if waste is excluded under 40 Code of Federal Regulations (CFR) 261.4(b); and	Generation of solid waste as defined in 40 CFR 261.2 and which is not excluded under 40 CFR 261.4(a).	*40 CFR 262.11(a)* *15A NCAC 13A .0107*	Applicable
	Must determine if waste is listed under 40 CFR Part 261; or		*40 CFR 262.11(b)* *15A NCAC 13A .0107*	
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261by either: (1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or (2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.	Generation of solid waste which is not excluded under 40 CFR 261.4(a)	*40 CFR 262.11(c)* *15A NCAC 13A .0107*	
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste that is determined to be hazardous.	*40 CFR 262.11(d)* *15A NCAC 13A .0107*	
Storage of solid waste (e.g., contaminated soil)	All solid waste shall be stored in such a manner as to prevent the creation of a nuisance, insanitary conditions, or a potential public health hazard.	Generation of solid waste that is determined not to be hazardous.	*15A NCAC 13B .0104(f)*	Relevant and Appropriate
	Containers for the storage of solid waste shall be maintained in such a manner as to prevent the creation of a nuisance or insanitary conditions. Containers that are broken or that otherwise fail to meet this rule shall be replaced with acceptable containers.		*15A NCAC 13B .0104(e)*	
Characterization of hazardous waste	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR 264 and 268.	Generation of RCRA-hazardous waste for storage, treatment or disposal.	*40 CFR 264.13(a)(1)* *15A NCAC 13A .0109*	Applicable

TABLE 2
Federal and State Action-Specific ARARs
Site 6 TCRA
MCB CamLej

Action	Requirement	Prerequisite	Citation	ARAR Determination
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 et seq.. *Note:* This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment or disposal.	*40 CFR 268.9(a)* *15A NCAC 13A .0112*	Applicable
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non-wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal.	*40 CFR 268.9(a)* *15A NCAC 13A .0112*	
	Must determine if the hazardous waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste. *Note:* This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.	Generation of hazardous waste for storage, treatment or disposal.	*40 CFR 268.7(a)* *15A NCAC 13A .0112*	
Temporary storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that:	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10.	*40 CFR 262.34(a)* *40 CFR 262.34(a)(1)(i)* *15A NCAC 13A .0107*	Applicable
	• waste is placed in containers that comply with 40 CFR 265.171-173; and			
	• the date upon which accumulation begins is clearly marked and visible for inspection on each container		*40 CFR 262.34(a)(2)* *15A NCAC 13A .0107*	
	• container is marked with the words “hazardous waste;” or		*40 CFR 262.34(a)(3)* *15A NCAC 13A .0107*	
	• container may be marked with other words that identify the contents.	Accumulation of 55 gal. or less of RCRA hazardous waste or one quart of acutely hazardous waste listed in 261.33(e) at o near any point of generation.	*40 CFR 262.34(c)(1)* *15A NCAC 13A .0107*	
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 CFR 264.175(b)	Storage of RCRA hazardous waste in containers with free liquids.	*40 CFR 264.175(a)* *15A NCAC 13A .0109*	Applicable
	Area must be sloped or otherwise designed and operated to drain liquid resulting from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA-hazardous waste in containers that do not contain free liquids (other than F020, F021, F022, F023,F026 and F027)	*40 CFR 264.175(c)(1) and (2)* *15A NCAC 13A .0109*	

TABLE 2
Federal and State Action-Specific ARARs
Site 6 TCRA
MCB CamLej

Action	Requirement	Prerequisite	Citation	ARAR Determination
Closure performance standard for RCRA container storage unit	Must close the facility (e.g., container storage unit) in a manner that: -Minimizes the need for further maintenance; -Controls minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or the atmosphere; and -Complies with the closure requirements of subpart, but not limited to, the requirements of 40 CFR 264.178 for containers.	Storage of RCRA hazardous waste in containers.	*40 CFR 264.111* *15A NCAC 13A .0109*	Applicable
Waste treatment and disposal—primary wastes (excavated contaminated soils and drums)				
Disposal of solid waste (e.g., contaminated soil not considered RCRA hazardous waste)	Shall ensure that waste is disposed of at a site or facility which is permitted to receive the waste.	Generation of solid waste intended for off-site disposal.	*15A NCAC 13B .0106(b)*	Relevant and Appropriate
Disposal of RCRA-hazardous waste in a land-based unit (i.e., landfill)	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA waste.	*40 CFR 268.40(a)* *15A NCAC 13A .0112*	Applicable
	All underlying hazardous constituents [as defined in 40 CFR 268.2(i)] must meet the Universal Treatment Standards, found in 40 CFR 268.48 Table UTS prior to land disposal.	Land disposal of restricted RCRA characteristic wastes (D001-D043) that are not managed in a wastewater treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well.	*40 CFR 268.40(e)* *15A NCAC 13A .0112*	
Disposal of RCRA-*hazardous waste soil* in a land-based unit (i.e., landfill)	Must be treated according to the alternative treatment standards of 40 CFR 268.49(c)or Must be treated according to the UTSs [specified in 40 CFR 268.48 Table UTS] applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA hazardous soils.	*40 CFR 268.49(b)* *15A NCAC 13A .0112*	Applicable

TABLE 2
Federal and State Action-Specific ARARs
Site 6 TCRA
MCB CamLej

Action	Requirement	Prerequisite	Citation	ARAR Determination
Disposal of RCRA-*hazardous waste debris* in a land-based unit (i.e., landfill)	Must be treated prior to land disposal as provided in 40 CFR 268.45(a)(1)-(5) unless EPA determines under 40 CFR 261.3(f)(2) that the debris no longer contaminated with hazardous waste<u>or</u> the debris is treated to the waste-specific treatment standard provided in 40 CFR 268.40 for the waste contaminating the debris.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA-hazardous debris.	*40 CFR 268.45(a)* *15A NCAC 13A .0112*	Applicable
Disposal of *treated hazardous debris*	Debris treated by one of the specified extraction or destruction technologies on Table 1 of 40 CFR 268.45 and which no longer exhibits a characteristic is not a hazardous waste and need not be managed in RCRA Subtitle C facility. Hazardous debris contaminated with listed waste that is treated by immobilization technology must be managed in a RCRA Subtitle C facility.	Treated debris contaminated with RCRA-listed or characteristic waste.	*40 CFR 268.45(c)* *15A NCAC 13A .0112*	Applicable
Disposal of *hazardous debris treatment residues*	Except as provided in 268.45(d)(2) and (d)(4), must be separated from debris by simple physical or mechanical means and such residues are subject to the waste-specific treatment standards for the waste contaminating the debris.	Residue from treatment of hazardous debris.	*40 CFR 268.45(d)(1)* *15A NCAC 13A .0112*	Applicable
Transportation of Wastes				
Transportation of hazardous waste *on-site*	The generator manifesting requirements of 40 CFR 262.20−262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right-of-way.	Transportation of hazardous wastes on a public or private right-of-way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right-of-way.	*40 CFR 262.20(f)* *15A NCAC 13A .0107*	Applicable
Transportation of hazardous waste *off-site*	Must comply with the generator standards of Part 262 including 40 CFR 262.20−23 for manifesting, Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding.	Preparation and initiation of shipment of hazardous waste off-site.	*40 CFR 262.10(h)* *15A NCAC 13A .0107*	Applicable
Transportation of *hazardous materials*	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 CFR 171-180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in commerce," or causes to be transported or shipped, a hazardous material.	*49 CFR 171.1(c)*	Applicable

TABLE 2
Federal and State Action-Specific ARARs
Site 6 TCRA
MCB CamLej

Action	Requirement	Prerequisite	Citation	ARAR Determination
Transportation of samples (i.e. contaminated soils)	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: -the sample is being transported to a laboratory for the purpose of testing; or -the sample is being transported back to the sample collector after testing. -the sample is being stored by sample collector before transport to a lab for testing.	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition.	*40 CFR 261.4(d)(1)(i)-(iii)* *15A NCAC 13A .0106*	Applicable
	In order to qualify for the exemption in paragraphs (d)(1)(i) and (ii), a sample collector shipping samples to a laboratory must: -Comply with U.S. DOT, U.S. Postal Service, or any other applicable shipping requirements. -Assure that the information provided in (1) thru (5) of this section accompanies the sample. -Package the sample so that it does not leak, spill, or vaporize from its packaging.		*40 CFR 261.4(d)(2)(i)(A) and (B)* *15A NCAC 13A .0106*	

ARAR = applicable or relevant and appropriate requirement
CFR = *Code of Federal Regulations*
CWA = Clean Water Act of 1972
DEACT = deactivation
DOT = U.S. Department of Transportation
EPA = U.S. Environmental Protection Agency
HMR = Hazardous Materials Regulations
HMTA = Hazardous Materials Transportation Act
LDR = Land Disposal Restrictions
NPDES = National Pollutant Discharge Elimination System
POTW = Publicly Owned Treatment Works
RCRA = Resource Conservation and Recovery Act of 1976
TCLP = Toxicity Characteristic Leaching Procedure
UTS = Universal Treatment Standard

TABLE 3
Cost Estimate
Site 6 TCRA
MCB CamLej

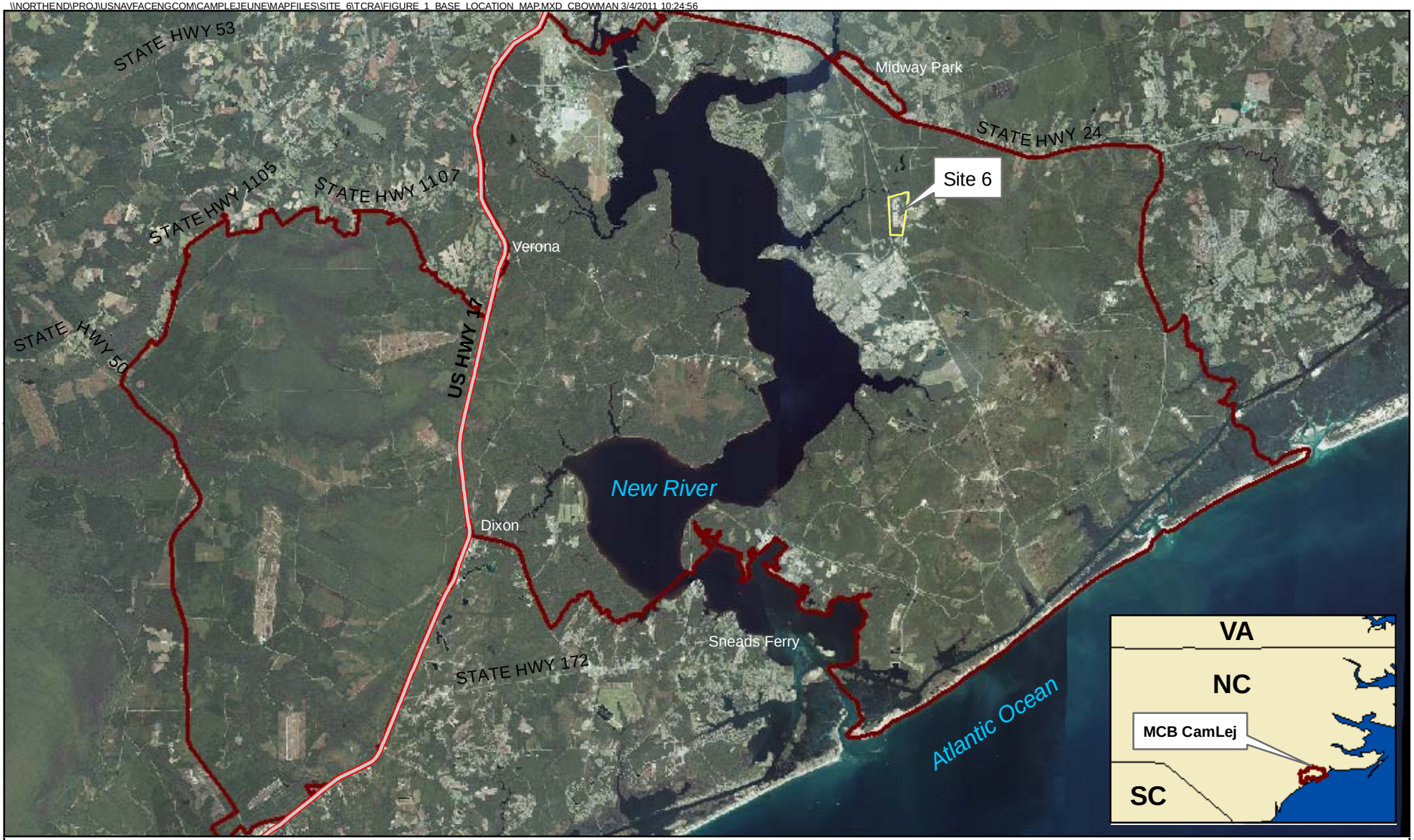
Alternative:	**Excavation and Offsite Disposal**		**PRELIMINARY COST ESTIMATE SUMMARY**			
Site:	Site 6	**Description:** Impacted soil would be excavated in the vicinity of Test Pit 10. It is assumed that an area of approximately 15 feet by 15 feet would be removed to a depth of 5 feet. The excavation volume is estimated to be 42 cubic yards. Soil samples would be collected from the excavation for chlorobenzene analysis. Because the site is located within UXO-22 it is assumed that munitions response support would be needed for excavation activities. Due to high concentrations of chlorobenzene, it is assumed that the soil will be considered RCRA hazardous waste for toxicity characteristic and carry the Code (D021) and land disposal restrictions (LDRs) may apply. To minimize the volume of hazardous waste to be disposed and treated if LDRs apply, highly contaminated soil will be segregated from less contaminated soil, along with segregation of other debris. Hazardous waste will be disposed in a Subtitle C Hazardous Waste Landfill. If the soil/debris does not meet the LDRs, it will be treated via incineration with the post-incinerated material being disposed of at a Subtitle C facility. Incineration was assumed for costing purposes.				
Location:	MCB CamLej					
Phase:	TCRA					
Base Year:	2011					
Date:	26-Apr-11					

CAPITAL COSTS

	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
	Mobilization/Demobilization and Site Preparation	1	LS	$5,000	$5,000	
	Erosion Controls	1	LS	$500	$500	Pricing includes silt fence and hay bales.
	Excavation by Munitions Response Subcontractor	1	LS	$139,718	$139,718	Pricing includes mobilization and assumes hand excavation of 42 cy will be completed by UXO techs in 12 days in Level B/C and that no MR-related items are encountered.
	Site Restoration (backfill)	57	cy	$18	$1,021	Assume 42 cy x 1.35 for compaction factor = 56.70 cy x $18/cy (supply, place, and compact).
	Backfill compaction testing w/ nuclear gauge	1	day	$1,250	$1,250	Assumes 1 day to complete backfill according to specs identified in implementation plan.
	Site Restoration (gravel)	1	LS	$500	$500	
	Transportation and Disposal of Hazardous Soil	63	ton	$1,719	$108,280	Assumes hazardous soil, drum, decon water, and PPE requiring incineration.
	Laboratory Analytical	6	ea	$72	$432	4 sidewalls, 1 floor, 1 trip blank. Analyze for chlorobenzene (VOCs 8260).
	SUBTOTAL				**$256,701**	
	Project Management	1	LS	5%	$12,835	
	Action Memo, Work Plan, and Report	1	LS	15%	$38,505	
	Construction Oversight	1	LS	5%	$12,835	
	SUBTOTAL				**$64,175**	
	SUBTOTAL				**$320,876**	
	Profit and G&A	15%			$48,131	
	Contingency	5%			$18,450	
	TOTAL CAPITAL COST				**$387,500**	

Figures

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\SITE_6\TCRA\FIGURE_1_BASE_LOCATION_MAP.MXD CBOWMAN 3/4/2011 10:24:56



Legend

- Highways
- Operable Unit 2, Site 6
- Installation Boundary

N

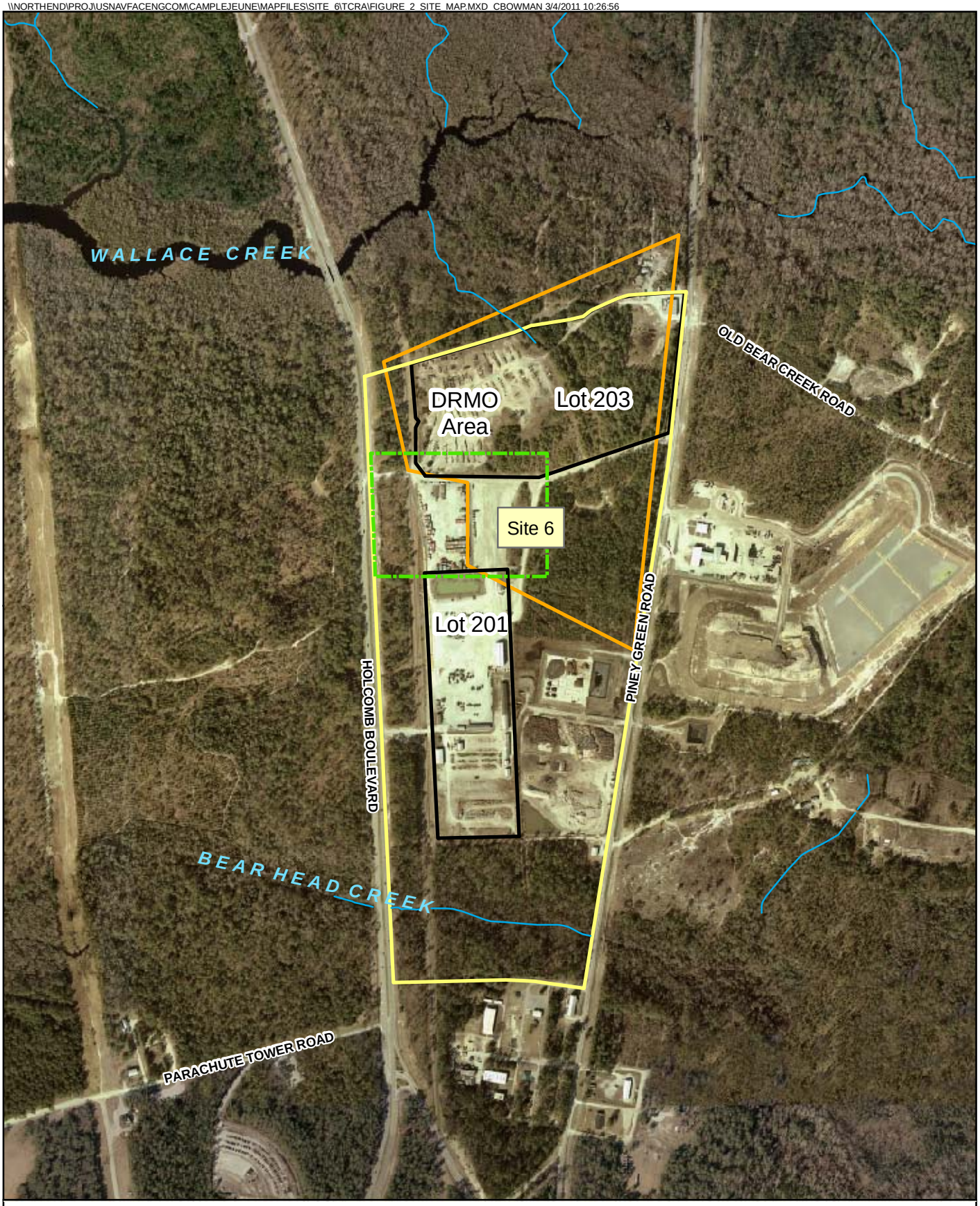
0 7,500 15,000 30,000 Feet

1 inch = 15,000 feet

Figure 1
Base Location Map
Site 6 TCRA
MCB CamLej
North Carolina

CH2MHILL

\\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\SITE_6\TCRA\FIGURE_2_SITE_MAP.MXD CBOWMAN 3/4/2011 10:26:56



Legend
- Surface Water Centerline
- Site 6 Boundary
- Chlorobenzene Investigation Area
- Lots 201 and 203
- UXO-22 Boundary

N

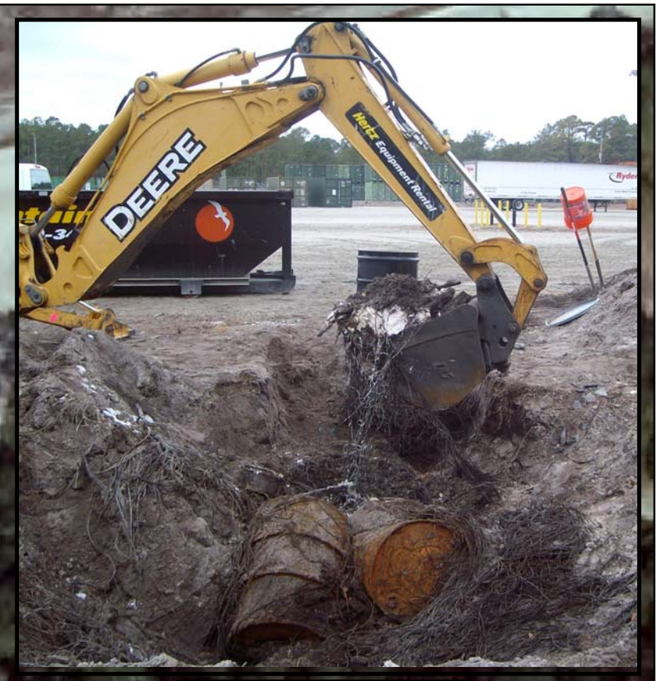
0 450 900 1,800 Feet

1 inch = 900 feet

Figure 2
Site Map
Site 6 TCRA
MCB CamLej
North Carolina

CH2MHILL

Test Pit 10-Drums Uncovered

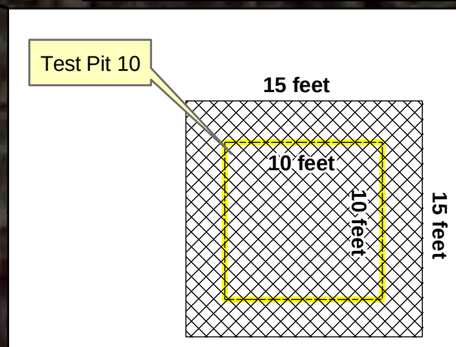


Test Pit 10-Excavation

IR06-MW57
IR06-MW57IW
IR06-GW46
IR06-MW55
IR06-MW56
IR06-MW56IW
IR06-MW54IW
IR06-MW54
IR06-MW58IW
IR06-GW44
IR06-MW58
IR06-GW16
IR06-GW47
IR06-MW53R
IR06-GW16IW
IR06-GW04

Test Pit 10-Backfilled and Secured

Estimated Test Pit 10-Removal Area



Legend

- Surficial Aquifer Monitoring Well
- Upper Castle Hayne Aquifer Monitoring Well
- Estimated Removal Area
- Fence

N

0 40 80 160 Feet

1 inch = 80 feet

Figure 3
Excavation Layout
Site 6 TCRA
MCB CamLej
North Carolina

CH2MHILL