SECTION 7

Descriptions of RD and RA Sites

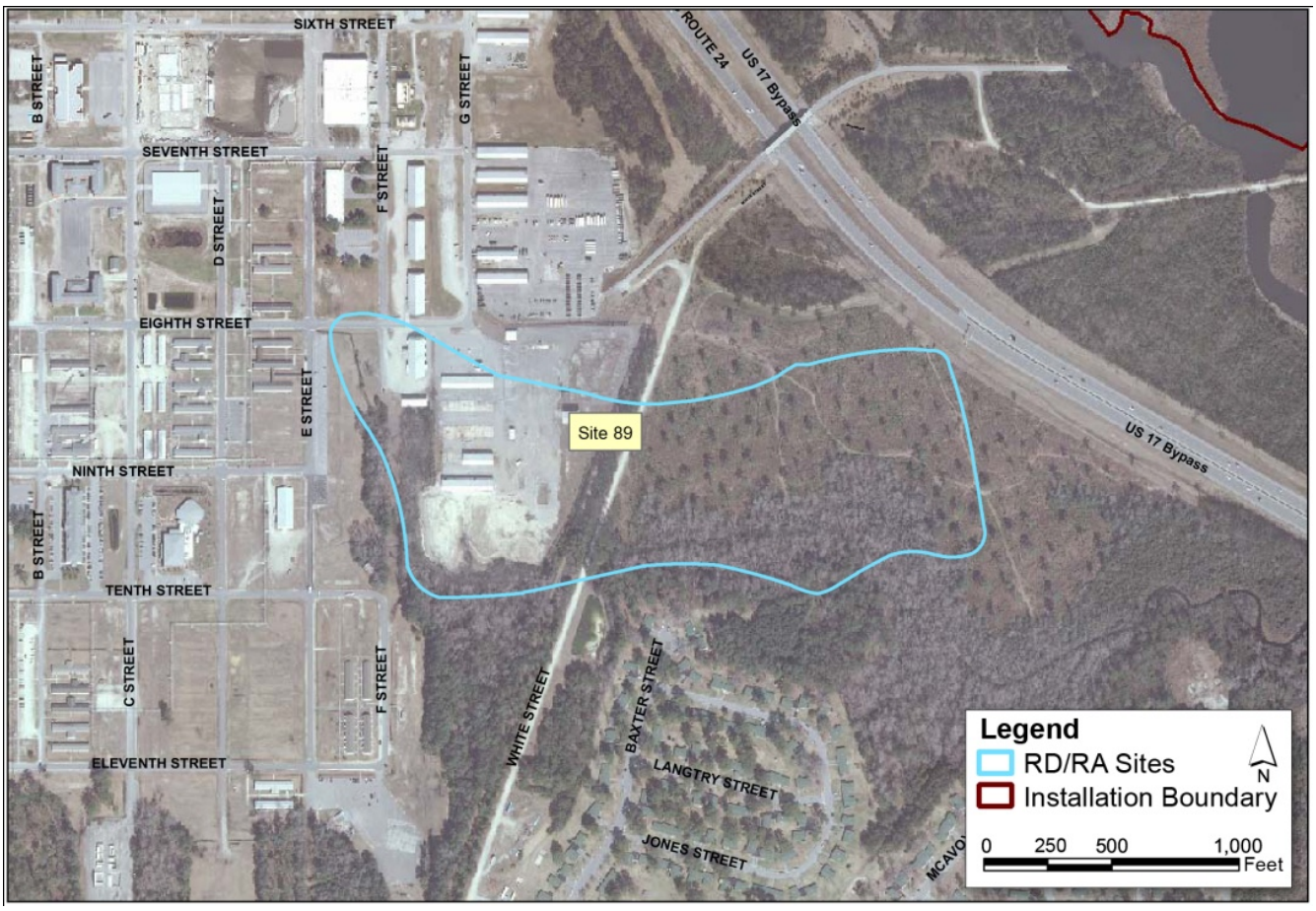
The following sections discuss the site history, summary of previous investigations, and future activities of the one IRP site that is in the RD/RA phase of the CERCLA process. There are currently no MMRP sites in the RD/RA phase of the CERCLA process.

7.1 IRP RD/ RA Sites

7.1.1 Site 89 (OU 16)—Former DRMO

Site 89, the former Defense Reutilization and Marketing Office (DRMO), covers approximately 50 acres within OU 16, which is located within Camp Geiger in the extreme northwest corner of the Base (**Figure 7-1**). OU 16 includes Sites 89 and 93**.** Historical records for Site 89 indicate that the Base Motor Pool operated onsite until approximately 1988, when it was relocated. The Base Motor Pool reportedly used solvents (acetone, TCE, and methyl ethyl ketone [MEK]) for parts cleaning while located within Site 89. From 1988 to 2000, the site was used as the DRMO by the Defense Logistics Agency. The facility was used as a storage yard for items such as scrap and surplus metal, electronic equipment, vehicles, and rubber tires. In the early 1990s, fuel bladders were placed onsite. The bladders ranged in size from 600 to 20,000 gallons and were used in training exercises for helicopter refueling. Base personnel reported that the bladders were emptied on the ground, cleaned with solvents, re-emptied on the ground, and capped prior to storage at the DRMO. The bladders were stored for 3 to 4 years in a pile approximately 75-feet in diameter by 25-feet high. A shredder was then brought onsite and located immediately north of the bladder pile. The bladders were shredded into small cubes and placed into roll-off boxes. During shredding operations, liquids were observed escaping from the bladders. These liquids were not contained or removed. The site has not been used since the DRMO relocated in 2000. Access to most of Site 89 is restricted. Several vacant buildings are located within the restricted area. The unrestricted area is currently in use by the Marine Infantry School. All buildings onsite are planned for demolition. Investigations at Site 89 have historically been focused on a small area within the DRMO that formerly contained a 550-gallon steel UST used to store waste oil. The UST was reportedly installed in 1983 and removed in 1993. The initial UST investigation detected chlorinated VOCs in the groundwater, which led to the inclusion of the site into the MCIEAST-MCB CAMLEJ IRP.

FIGURE 7-1
IRP Site 89, Operable Unit 16



Previous investigations are listed in **Table 7-1.**

TABLE 7-1
Previous Investigations Summary, IRP Site 89

Previous Investigation/Action	Date	Activities
UST STC-868 Investigation (R.E. Wright, 1994)	1994	A limited soil and groundwater investigation was conducted at UST STC-868 located within the Site 89 area. Oil and grease (O&G) was detected in soil and chlorinated solvents were detected in groundwater. The results were used to develop recommendations for additional assessment of Site 89 under the IRP.
Focused RI (Baker, 1998)	1996 - 1998	A Focused RI was conducted to characterize the nature and extent of soil and groundwater contamination. Field activities included the collection of soil, groundwater, surface water, and sediment samples. Samples were analyzed for VOCs, SVOCs, pesticides/PCBs, and metals. Results identified chlorinated solvent contamination in soil and groundwater. Potential human health and environmental risks were identified for future receptors due to exposure to chlorinated VOCs in groundwater and sediment.
LTM	1999 - 2003	Based on the results of the RI, LTM was implemented in order to assess plume stability. LTM was discontinued in 2003 due to the ongoing SI.

TABLE 7-1
Previous Investigations Summary, IRP Site 89

Previous Investigation/Action	Date	Activities
Post-RI (Baker, 1999)	1999	A post RI was completed to further assess the VOC plume. Investigation activities included soil, groundwater, surface water, and sediment sampling. Samples were analyzed for VOCs. Results verified the extensive chlorinated VOCs contamination to the immediate and surrounding areas of the site. Soil sample results indicated that extremely high levels of chlorinated VOCs were affecting an extensive area within the southern portion of the site.
Low Temperature Thermal Desorption TCRA (2000)	2000	A TCRA was completed for the removal and treatment of vadose zone contaminants in the southern portion of the site. Low temperature thermal desorption units were used to treat the contaminated soil and roughly 32,000 tons were treated. In addition, an aeration system was installed in Edwards Creek to assist in the remediation of VOCs. The aeration system remains in place and is operational.
SSI (Baker, 2001)	2001	An SSI was conducted in an area south of the DRMO. Soil and groundwater samples were collected for VOCs analysis. Two separate DNAPL plumes were identified.
Electrical Resistive Heating Pilot Study (Shaw, 2005)	2003 - 2005	The electrical resistance heating pilot study was conducted to treat one of the DNAPL plumes identified during the SSI. An estimated 48,000 pounds of VOCs were removed from the subsurface.
Treatability Study (CH2M HILL, 2008)	2006 - 2008	A treatability study was implemented to evaluate the performance and effectiveness of four remedial alternatives, including air sparging using a horizontal directionally drilled (HDD) well; PRB, using mulch/compost as backfill; chemical reduction via ZVI injection through pneumatic fractures; and ERD using a combination of sodium lactate and emulsified vegetable oil (EVO), with direct push emplacement. While air sparging and ERD reduced contaminant mass for a similar cost per volume treated, air sparging was the most practical technology for full scale implementation. The results of the studies will be used to develop a better exit strategy for the site, and to provide options for future treatment train approaches.
Comprehensive RI (CH2M HILL, 2008)	2006 - 2008	A Comprehensive RI was completed to address previous data gaps. Field activities included a MIP investigation; monitoring well installation; slug testing; groundwater, soil, vapor, sediment, surface water, and pore water sampling; and a benthic community survey. TCE and 1,1,2,2-tetrachloroethane (PCA) and their respective degradation products were detected at elevated concentrations in soil, groundwater, and adjacent surface water and sediment from Edwards Creek. The HHRA identified potential human health risks based on hypothetical potable use of the groundwater and future residential exposure to subsurface soil, primarily from exposure to VOCs. The Ecological Risk Assessment (ERA) identified potential ecological risks to benthic-dwelling organisms and amphibians from exposure to PAHs and pesticides in sediment in an adjacent wetland area. The RI recommended an FS be completed to evaluate remedial alternatives.
NTCRA (CH2M HILL, AGVIQ, 2010)	2007 - 2010	In 2007, an EE/CA was prepared to evaluate removal action alternatives to reduce risks to human health and environment in the DNAPL source area. Five alternatives were evaluated and soil mixing with ZVI-clay addition was the selected NTCRA. A Bench-Scale Study was conducted to optimize the amount of ZVI and clay for treatment. The area treated was 32,000 square feet (ft^2) at a depth of 25 feet resulting in a total treated volume of 30,000 yd^3. Follow-up monitoring has indicated significant reduction in VOC concentrations in the soil, groundwater, and adjacent creek.

TABLE 7-1
Previous Investigations Summary, IRP Site 89

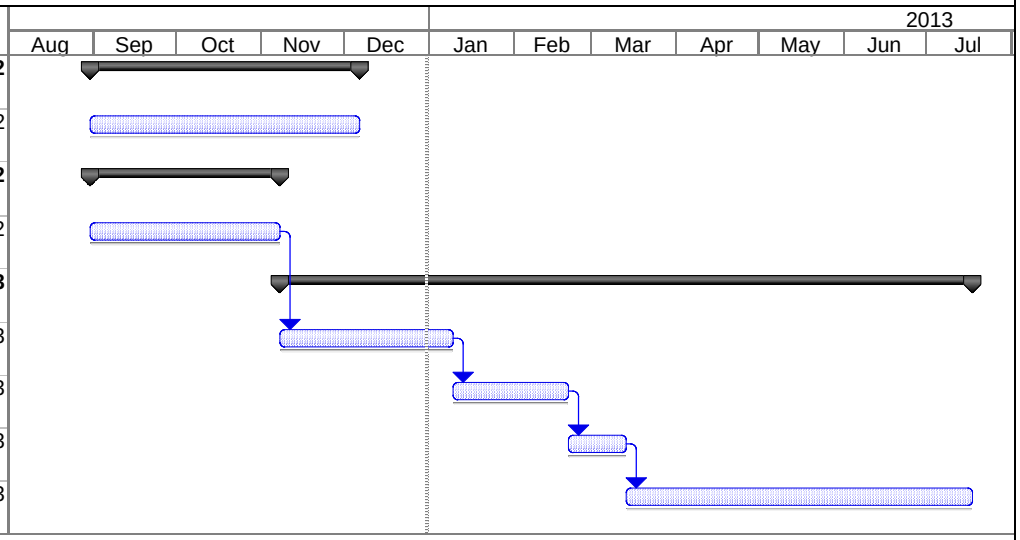
Previous Investigation/Action	Date	Activities
Baseline ERA Addendum (CH2M HILL, 2008)	2008	Based on the results of the RI, additional sediment and surface soil samples were collected for PAHs and pesticides (dichlorodiphenyldichloroethane [DDD], dichlorodiphenyldichloroethylene [DDE], and dichlorodiphenyltrichloroethane [DDT]) analysis. Results confirmed an isolated area of elevated sediment contaminant concentrations posing potential ecological risks. The Final BERA Addendum was completed to document the results and the identified isolated risk.
NTCRA (CH2M HILL and Osage, 2010)	2009 - 2010	An EE/CA to address potential ecological risks in the adjacent western wetland area was submitted identifying three alternatives for evaluation; no action, soil capping and LUCs, and excavation and offsite disposal. An AM was submitted documenting excavation and offsite disposal as the preferred NTCRA. The NTCRA was completed in 2009 to address the potential ecological risks in the western wetland area. After excavation, confirmation sampling was conducted and the results were below cleanup levels. Excavated soil was disposed of offsite.
Basewide Vapor Intrusion Evaluation (CH2M HILL, AGVIQ, 2009, CH2M HILL, 2011)	2007 – 2011	Site 89 was included in the phased Basewide vapor intrusion evaluation to determine if complete or significant exposure pathways exist for vapor intrusion into buildings. No unacceptable risks were identified from indoor air related to vapor intrusion; therefore, it was concluded that vapor intrusion is not a current significant pathway of concern for any of the buildings located in the vicinity of Site 89. The report recommended subslab soil gas and indoor air monitoring at 1 building with previous exceedances of Base-specific soil gas screening levels every 5 years until 3 rounds indicate no unacceptable risks. If new 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. .
FS (CH2M HILL, 2012)	2011 - 2012	RAOs were developed to address VOC-impacted groundwater in the source and downgradient areas and surface water. The remedial alternatives evaluated for the source area include no action, ERD, ISCO, and air sparging. Downgradient groundwater alternatives include no action, MNA, and PRB with MNA. Surface water alternatives include no action, PRB, and aerators.
PRAP and ROD (CH2M HILL, 2012)	2012	A PRAP was issued to solicit public input on the preferred alternative (including horizontal air sparging for source area groundwater, PRB for downgradient groundwater, and aerators for surface water). The PRAP was submitted for public review and comment. General comments for informational purposes were addressed during the public meeting and no written comments were received. The ROD was signed in December 2012.

7.1.1.1 Future Activities

The ROD was signed and the RD was finalized in FY 2013 followed by the RA (**Schedule 7-1**). 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. Base Master Planning maintains current groundwater plume data in GIS, and all construction projects on-Base go through environmental review.

Schedule 7-1
IRP Site 89
FY 2013 Site Management Plan
MCIEAST-MCB CAMLEJ

ID	Task Name	Duration	Start	Finish
1	**ROD**	**70 days**	**Fri 8/31/12**	**Thu 12/6/12**
2	Final ROD	70 days	Fri 8/31/12	Thu 12/6/12
3	**RD**	**49 days**	**Fri 8/31/12**	**Wed 11/7/12**
4	Final RD	49 days	Fri 8/31/12	Wed 11/7/12
5	**RA**	**180 days**	**Thu 11/8/12**	**Wed 7/17/13**
6	Draft AS Work Plan	45 days	Thu 11/8/12	Wed 1/9/13
7	Review Period	30 days	Thu 1/10/13	Wed 2/20/13
8	Final AS Work Plan	15 days	Thu 2/21/13	Wed 3/13/13
9	AS RA	90 days	Thu 3/14/13	Wed 7/17/13



Project: CT0-81
Date: Mon 12/31/12

Task
Progress
Milestone
Tentative Schedule
Summary

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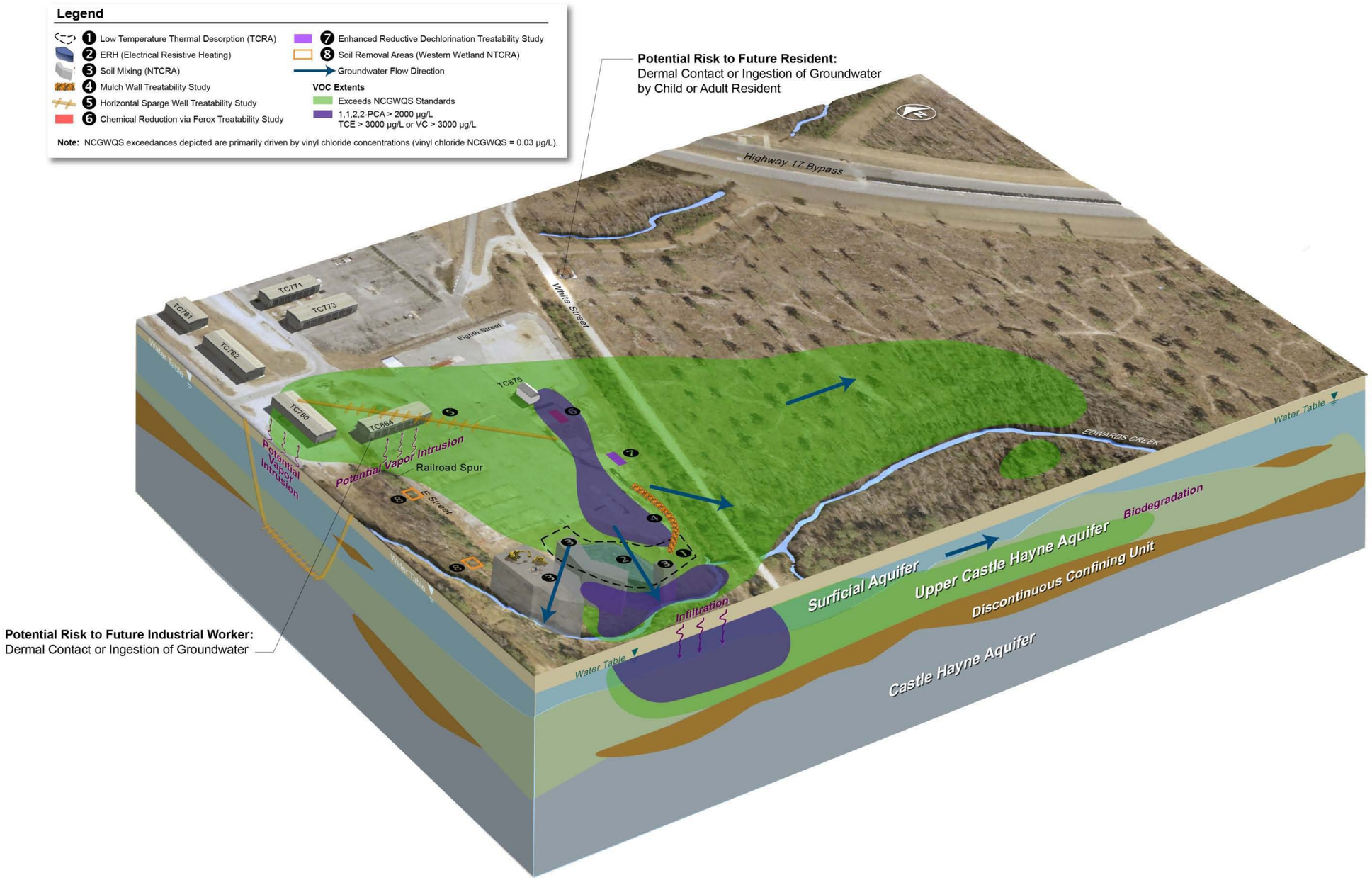
FIGURE 7-2
Site 89 Conceptual Site Model
FY 2013 Site Management Plan
MCIEAST-MCB CAMLEJ
North Carolina



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