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MCRD PARRIS ISLAND
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FIVE YEAR REVIEW REPORT MCRD PARRIS ISLAND SC (PUBLIC DOCUMENT)
09/01/2010
NAVFAC SOUTHERN DIVISION

Five Year Review Report

Marine Corps Recruit Depot

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name ***(from WasteLAN)*****:** Parris Island Marine Corps Reserve Depot		
EPA ID ***(from WasteLAN)*****:** IN4170023499		
Region: 4	**State:** SC	**City/County:** Parris Island/Beaufort

SITE STATUS	
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☒ Under Construction ☒ Operating ☒ Complete	
Multiple OUs?* ☒ YES ☐ NO	**Construction completion date:** TBD
Has site been put into reuse? ☒ YES ☐ NO	

REVIEW STATUS	
Lead agency: ☐ EPA ☐ State ☐ Tribe ☒ Other Federal Agency DOD/Navy	
Author name: NAVFAC EFD SOUTH	
Author title:	**Author affiliation:** Lead Agency
Review period:** 03/02/2010 to 09/26/2010	
Date(s) of site inspection: 06/16/2010	
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL-State/Tribe-lead ☐ Regional Discretion	
Review number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify)	
Triggering action: ☐ Actual RA Onsite Construction at OU # _____ ☐ Construction Completion ☐ Other (specify)	☐ Actual RA Start at OU # _ ☒ Previous Five-Year Review Report
Triggering action date ***(from WasteLAN)*****:** 09/26/2005	
Due Date ***(five years after triggering action date)*****:** 09/26/2010	

*["OU" refers to operable unit.]
**[Review period should correspond to the actual start and end states of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

ISSUE	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
None to be addressed currently		

Recommendations and Follow-up Actions:

Since no issue was noted, none was recommended currently.

Protectiveness Statement(s):

"The remedy at OUs 1, 3, and 5 are expected to be or is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled."

Other Comments:

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1.0 INTRODUCTION

The United States Navy, Southern Division, NAVFACENGCOM, and United States Marine Corps have conducted a Five-Year Review of the remedial actions implemented at Site 1, Site/SWMU 3 and Site 12 on the Parris Island Marine Corps Recruit Depot (MCRD) in Beaufort County, South Carolina. This report documents the results of the review and is prepared in accordance with the U.S. Environmental Protection Agency (EPA) Comprehensive Five- Year Review Guidance, - OSWER No. 9355.7-03B-P, JUNE 2001

The Five- Year Review typically determines whether the remedy selected in a Record of Decision (ROD) is protective of human health and the environment. At MCRD, RODs for Site/SWMU 1/41 and Site/SWMU 12/10, and an Interim Record of Decision (IROD) for Site/SWMU 3 have been approved by US EPA and the South Carolina Department of Health and Environmental Control (SCDHEC). The methods, findings, and conclusions of reviews are documented in Five Year Review Reports. In addition, Five- Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Navy (Lead Agency) is preparing this Five - Year Review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA Sec.121 states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The US EPA interpreted this requirement further in the NCP; 40 CFR Sec. 300.430(f)(4)(ii) states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead

agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This Five-Year Review is the second Five-Year Review for MCRD. -Subsequent review is triggered by the date of EPA's and SCDEHC's signature date on the preceding Five- Year Report. This Five Year Review is due to the hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure. This Five Year Review addresses all sites that have remedies in place at MCRD.

This Five- Year Review was prepared consistent with EPA's Comprehensive Five -Year Review Guidance (EPA-540-R-01-007007/OSWER Directive 9355.7-03B-P), June 2001 and the Chief of Naval Operation's Policy for Conducting Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Statutory Five-Year Reviews, November 2001...

There are fifty-five identified sites at MCRD. US EPA and SCDHEC have agreed that approximately half of these warrant No Further Action. Several of the remaining sites have been transferred to the State UST program and most other sites are under review. Specific details for several sites are provided in this document. The Federal Facilities Agreement (January 2005) (FFA) contains a listing of all the sites at Parris Island

The Navy feels that no single analytical fraction of contaminants is clearly the most widespread contaminant at MCRD either in soils, sediment or groundwater.

2.0 SITE CHRONOLOGY

The National Superfund Database (CERCLIS) identification number for this facility is SC6170022762. MCRD Parris Island was proposed for inclusion on the National Priorities List on July 23, 1994 and was listed on December 16, 1994. The appropriate Federal Register Notice appeared on January 17, 1995.

The following chronology lists actions taken with respect to all OUs at the site.

1883	Federal government began purchasing land on Parris Island to establish a Naval Base as a coaling and supply depot.
1891	Navy started construction of a wooden drydock.
1893	Significant hurricane damage delays construction of drydock – completed 1895.
1903	Navy yard reverts to coaling station.
1909	Nearly all Navy activities cease; officer training school remains.
1910	For brief period, recruit depot established.
1911	School and recruit depot moved; base used as disciplinary barracks.
1915	Marines relocate Recruit Training Depot from Norfolk to Parris Island. At the time of US entrance into WWI, the Marine Corps numbered only 13,000 men and Parris Island supported only 835 recruits. By war's end, Depot was training more than 13,000 recruits at one time. More than 500 temporary buildings were erected, providing space for over 10,000 men while another 2,000 lived in tents.
1920's	Dirigible mooring mast erected on the island (airships Los Angeles and Akron).
1933	Civilian Works Authority cleared large portion of the island for new landing field.
1930's	Much of Parris Island closed down, with only 180 recruits on hand at one point. Due to hostilities in Europe, Parris Island experiencing new revival by 1940.
1941	At time of attack on Pearl Harbor, there were 2,869 recruits in four training battalions and 3,553 permanent personnel on Parris Island. Within two months, numbers had grown to nearly 15,000 recruits in 13 battalions and over 5,000 supporting personnel.
1940's	From December 7, 1941 to August 14, 1945, over 200,000 recruits passed through Parris Island. The peak load was 18,000 recruits in December, 1945. Demobilization came quickly. By the end of 1946, all but three recruit battalions had been deactivated.
1952	At the outbreak of the Korean War, the base received a large influx of recruits and reservists. Before the year was out, eight recruit battalions were formed, and in March 1952 a new peak of recruits was reached with over 24,000 men undergoing training at one time. In all, some 138,000 Marines graduated from Parris Island for service in the Korean War.
1960	During the 1960s, the Depot continued to grow. During the Vietnam War, over 200,000 recruits graduated from Parris Island.
Present	The Depot continues to operate as a recruit training facility. Training levels have generally remained steady, with a combined number of male and female

	recruits at a given time ranging between 9,000 and 11,000.
September 1986	Initial Assessment Study (IAS) was completed. Sixteen sites were assessed and six (Sites 1, 2, 3, 4, 6, and 16) were recommended for further study.
May 1990	Remedial Investigation Verification Step was completed. The six IAS sites plus three new sites (Sites 17, 18, and 19) were investigated. Three sites (Sites 1, 2, and 16) were recommended for Remedial Investigation (RI), with one site (site 3) recommended for Extended Site Investigation (SI). Four sites (sites 6, 17, 18, and 19) were transferred to the Underground Storage Tank (UST) Program. Site 4 was recommended for No Further Action (NFA).
May 1992	Hazard Ranking System (HRS II) scoring was completed, yielding a score of 71.59. The installation was re-scored by EPA in August 1994 yielding a score of 50.00. As a result of EPA's scoring, the Depot was proposed for the National Priorities List (NPL) in August 1994 and was listed January 17, 1995.
March 1994	Accidental release of Tetrachloroethene (PCE) from PCE storage tanks containment basin at Site 45. Impacted soils removed and disposed in hazardous waste landfill.
July 1995	Partnering Team meetings commence. MCRD, Navy, US EPA, and SCDHEC agree on initial list of 45 sites and their current determinations (RI, NFI, State UST, Site Investigation (SI),and Preliminary Assessment (PA)).
November 1999	Remedial Investigation/RCRA Facility Investigation (RI/RFI) for Site/SWMU 3 complete.
June 2000	Feasibility Study -/ -Corrective Measures Study (FS/CMS) for Site/SWMU 3 approved.
August 2000	RI/RFI for Site/SWMU 2 and Site/SWMU 15 complete.
September 2000	Site / SWMU 3IROD concurred by EPA
September 2000	Interim Remedial Action (construction) at Site /SWMU 3 starts.
June 2001	RI/RFI for Site/SWMU 1 and SWMU 41 complete.
July 2001	Field completion for SWMU 3.
October 2001	RFI/RI for Site 12/SWMU 10 complete.
January 2002	FS/CMS for Site/SWMU 1 and SWMU 41 approved.
June 2003	Remedial Design (RD) for Site/SWMU 1 and SWMU 41 complete. Remedial Action (construction) for Site/SWMU 1 and SWMU 41 started.
December 2003	Field Completion for Site/SWMU 1 and SWMU 41.
May 2004	FS/CMS for Site 12/SWMU 10 approved.
November 2004	RI/RFI for Site/SWMU 45 conditionally complete. RI Addendum started.
January 2005	FFA signed between Navy, US EPA, and SCDHEC.
September 2005	First Five Year Review approved
October 2005	Site 12/SWMU10 remedial action started
September 2006	ROD for Site 1 /SWMU 1 signed
September 2006	ROD for Site 12 / SWMU 10signed
September 2007	Site 12 / SWMU10 Remedial Action Completion

January 2008	Land Use Control Remedial Design (LUC RD) for Sites 1 and 12 complete
July 2008	Land Use Control Remedial Action Complete for Sites 1 and 12
2007 – 2010	RI Work started for Sites 5, 9, 14, 16, 27, 45 (for VI), 55 SI work ongoing for 8 MMRP Sites, and for Sites 4, 7, 13C, and 35 Post-Construction Risk Assessment Tech Memo started in support of Final PP and ROD for Site 3/SWMU 3
Ongoing	LTM work ongoing for Sites 1, 3, and 12.

In addition to the Navy Installation Restoration Process described above, a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was completed in April 1990. The RFA was conducted because MCRD submitted a Part A RCRA permit application for the Hazardous Waste Storage Building; an RFA is required for facilities seeking a RCRA permit. The Part A permit application was withdrawn prior to issue of the RFA Report, but the Depot remains as Interim Status to date. This resulted in MCRD sites and documents containing both CERCLA and RCRA attributes, for example RI/RFI for Site/SWMU 3. Since this Five Year Review is solely a CERCLA requirement, and since the January 2005 FFA stated that CERCLA documents are accepted by the State as equivalent RCRA documents, except when referring to existing document titles, the remainder of this document will attempt to adhere to the CERCLA naming conventions only.

3.0 BACKGROUND

Marine Corps Recruit Depot (MCRD), Parris Island, is located along the southeastern coast of South Carolina, roughly one mile south of the city of Port Royal and 30 miles northeast of Savannah, Georgia (see Figure 1). MCRD has been operated as a recruit training facility for the U.S. Marine Corps since 1915 and consists mainly of administrative office buildings, training facilities, recruit and family housing, building and vehicle maintenance shops, and community facilities. The projected land use is essentially the same as historic land use.

MCRD Parris Island lies within a system of islands, marshes and interconnecting man-made causeways that form a peninsula and consist of roughly 2,894 acres of dry land at the depot and approximately 3,816 acres of salt marshes, tidal ponds and streams. Commercial and recreational fishing activities are conducted in the vicinity of MCRD and the surrounding area also serves as habitat for migratory threatened

and endangered species of wildlife (including the southern bald eagle, the wood stork, the Eskimo curlew and the short-nosed sturgeon), as well as their food sources. See Figure 1 for a site location map.

The islands comprising MCRD Parris Island consist primarily of barrier-island sand, silt and clay deposits that contain a surficial aquifer. This shallow unconfined aquifer, existing throughout Parris Island, is estimated to be 30 feet thick and is typically found at a depth of 3 feet. Although the surficial aquifer is not used at Parris Island, the State Water Classifications and Standards "GB" classify the aquifer, effective June 28, 1985, as a potential underground source of drinking water. Beneath the surficial aquifer lies the Floridian Aquifer. It is a relatively large aquifer, extending from South Carolina to Florida that serves as a viable drinking water source. The surface of the aquifer lies 40 to 90 feet below the surface of the land with more than 20 feet of the low permeability Hawthorn formation and a layer of clay under the marshes separating the two aquifers. This low permeability formation has been discovered to be thinned or missing in localized areas in and around Parris Island. The presence of the confining unit and any potential impact to the Floridian Aquifer from contamination that may be present in the surficial aquifer will be assessed during field investigation activities. Water from the Floridian Aquifer on base is not used due to high salt content..

The marsh areas and tidal creeks that border MCRD drain into the Beaufort River and Broad River to form the Port Royal Sound. Surface runoff from most of MCRD flows into the surrounding surface water bodies or storm drains that discharge into the marshes. Because MCRD Parris Island has past disposal sites adjacent to, or in direct contact with, salt water marshes, and because previous studies have documented contaminant releases from some of these sites, the potential exists for contamination to impact those fish and shellfish populations that inhabit the surrounding marshes and tidal waters. Since surface waters in the area are used for both commercial and recreational fishing and shellfish harvesting, any impacts to these marine species from contamination migrating from the facility could result in potentially adverse ecological and human health impacts.

The Navy has been conducting various Installation Restoration Program (IRP) activities at MCRD Parris Island since 1986. The first phase of such activities was the completion of an Initial Assessment Study (IAS). Performed by the Navy in 1986, the IAS revealed sixteen (16) contaminated sites onboard MCRD Parris Island. The majority of these sites are former active landfills and spills where groundwater and

sediment have been found to be contaminated from the prior release or disposal of paint wastes, construction debris, incinerator ash, solvents and petroleum products. After completion of the IAS, three Underground Storage Tank (UST) sites were added to the list of total sites identified based upon further facility-wide site investigations (SI) conducted by the Navy. 15of these sites were recommended for no further investigation following completion of SI. In 1990, EPA conducted a RCRA Facility Assessment (RFA) of MCRD. The RFA identified Solid Waste Management Units (SWMUs) and four Areas of Concern (AOCs). All of the sites previously identified by the Navy were included as a SWMU or AOC. TheUS EPA later recommended 20 of these SWMUs and one AOC for no further evaluation. An additional site (Site 45) was identified in 1995. Additional sites (Sites 45,53, 54, and site 55) were identified in1995, 2001, 2002, and 2003, respectively.

Since MCRD Parris Island was placed on the NPL in early 1995, the Navy, Marines, US EPA and SCDHEC have considered the need for future investigative activities at each site identified in the IAS and RFA and have determined that 22 sites require further investigation and possible remediation. Current operations at MCRD Parris Island include pollution prevention technologies to prevent further contamination. In June 1995, following placement of MCRD on the NPL, the Agency for Toxic Substances and Disease Registry (ATSDR) initiated a public health assessment. The results of that assessment were issued in September 1996. Of 59 areas examined, ATSDR concluded that the causeway landfill and facility rifle range posed no apparent public health hazard but recommended that follow-on monitoring be conducted. In connection with the remaining 57 areas assessed, ATSDR concluded that they posed no public health hazard.

SITE SPECIFIC BACKGROUND INFORMATION:

In 1998 a Master Work Plan developed by Na The Partnering Team held quarterly meetings to review and discuss work plans, investigations, reports, and remediation. The first sites investigated were the primary drivers in the NPL listing: Site 1/41, the Incinerator Landfill Area; Site 2/15, the Borrow Pit Landfill and associated dirt roads;and Site 3, the Causeway Landfill. The next site remediated was Site 12, Jericho Island, an island purchased by the Navy to meet their active range arc safety requirements.

NO ACTION SITES -

OU2 = SITES 2 and 15 / Solid Waste Management Unit (SWMU) 2 (ROD): Site 2, the Borrow Pit Landfill, is a reported landfill located in the central portion of Horse Island in the northern section of the Marine Corps Recruit Depot (MCRD), Parris Island. Site/SWMU 2 (Site 2) occupies approximately 1.9 acres; its southwestern border is approximately 100 feet from a marsh area. From approximately 1966 to 1968, the site was reportedly used as a disposal site for domestic trash, construction debris, solid paint wastes, cleaning rags, solvent sludge, perchloroethylene still bottoms, metal shavings, polychlorinated-biphenyl (PCB)-contaminated oil, mercury amalgam, and beryllium waste from MCRD. Currently, the site is covered by mature pine trees.

In addition to Site 2, Site/SWMU 15 (Site 15) is included in this Record of Decision (ROD). Site 15 consists of approximately 0.5 mile of dirt roads surrounding Site 2 and approximately 1.5 miles of dirt roads accessing Elliot's Beach. From about 1918 to 1966, the dirt roads of Parris Island were sprayed with a mixture of waste lubricating oil, cutting oil, petroleum-based solvents, hydraulic fluids, and water-based coolants. The majority of the roads were paved in the 1940s, but the roads leading to the Borrow Pit Landfill and Elliot's Beach remained unpaved and continued to be sprayed until 1966. At present, the majority of the roads leading to Elliot's Beach have been paved; approximately 0.25 mile remains unpaved.

The ROD documents a no action/no further action decision for Sites 2 and 15. This decision was made based on the results from previous investigations at these sites, including an Initial Assessment Study (IAS) in 1986, a Verification Step (VS) in 1988, an Interim Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA), and a combined Remedial Investigation (RI)/RCRA Facilities Investigation (RFI) in 1998 and 1999.

During the RI/RFI, risk to construction/maintenance workers, adolescent and adult recreational users, and child and adult future on-site residents was evaluated. It was determined that, at both sites, contaminant concentrations in all media were within the US EPA's acceptable risk range. Additionally, the associated

hazard indices (HIs) did not exceed unity, indicating that non-carcinogenic toxic effects would not be anticipated. There was no contamination to warrant a remedial action to prevent unacceptable risk to ecological receptors, including fish, aquatic birds, terrestrial birds, and terrestrial mammals. A determination was made that no remedial action is required to ensure protection of human health and the environment at Sites 2 and 15. The measured level of risk to human health or environmental receptors allows for unrestricted use and/or unlimited exposure. A No Action recommendation was made in the ROD.

SITES WITH REMEDIES COMPLETED LEAVING WASTE IN PLACE AT LEVELS ABOVE UNLIMITED USE AND UNRESTRICTED EXPOSURE BEING REVIEWED FOR THE FIVE YEAR REVIEW REPORT (Sites 1, 3, and 12) -

OU1 = Site 1 and 41 (ROD):

Site /SWMU1(Site 1), the Incinerator Landfill, and SWMU 41, Former Incinerator, are located on the northeastern tip of Horse Island in the northern section of the MCRD Parris Island, as shown on Figure 2-1. SWMU 41, , consisted of a coal-fired brick chamber and, from 1921 to 1959 and Site 1 served as the disposal Site/SWMU 1 served as the disposal site for combustion residues from the incinerator. Although SWMU 41 ceased operation in 1959, Site/SWMU 1 continued to be used for disposal of combustible trash and noncombustible waste until 1965. Incinerated wastes at Site 1 were initially piled on the land or placed in trenches into an adjacent marsh, extending the edge of the landfill into the marsh. Fill dirt was used to build up the land at the edge of the marsh. The landfill progressively extended farther into the marsh as wastes were dumped on the edge of the fill. Site 1 currently extends approximately 670 feet toward Archers Creek and is approximately 400 feet in width. Site/SWMU 1 is approximately seven acres in size and was until recently covered with mature pine trees. In 2001, timber in the center of the site was harvested.

A remedial investigation (RI)/Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) was conducted at Site 1. The RI/RFI was conducted in two phases:from May to September 1998 and in April 1999 [Tetra Tech, NUS, Inc. (TtNUS), 2001]. A human health risk assessment (HHRA) was conducted as part of the RI/RFI; it examined current risks associated with maintenance and construction workers possibly exposed to contaminated media. The HHRA also examined potential future risks to hypothetical on-site residents and adolescent and adult recreational users. An ecological risk assessment (ERA) completed for Site 1 and SWMU 41 considered potential impacts for benthic receptors, soil

invertebrates, terrestrial and aquatic plants, terrestrial receptors, and aquatic receptors. Based upon findings made in the Remedial Investigation/RCRA Facilities Investigation for Site/SWMU 1 – Incinerator Landfill and SWMU 41 – Former Incinerator human health risk assessment and ecological risk assessment, the response action selected in the ROD was necessary to protect the public health or welfare and the environment from actual or threatened releases of pollutants or contaminants from the site that may present an imminent and substantial endangerment to public health or welfare.

For Site 1, the RI/RFI and FS recommended sediment excavation with placement onsite under a low permeability landfill cap due to sediment and surface soil COCs (Table 1). The Remedial Design for Site 1 was initiated in 2002 And the Remedial Action was started in 2003. A Record of Decision, though delayed, has now been completed at this site and the partnering team is in agreement with all work accomplished to date. Land Use Controls have been designed and implemented. Long-term monitoring of sediments, groundwater, and revegetation is ongoing.

OU3 = Site 3 (IROD):

Site 3 was remediated first. Site 3 is a former landfill located in the northwestern portion of MCRD Parris Island which now serves as a causeway connecting Horse Island to Parris Island. From the 1960s until 1972, the causeway was gradually constructed using layers of solid waste, fill dirt, and other debris. Site 3 functioned as the major disposal area during that period for all solid wastes discarded via dumpsters located throughout MCRD. Wastes disposed at the site reportedly included municipal trash with small amounts of empty pesticide containers, oily rags, spent absorbent petroleum and chlorinated solvent sludge, perchloroethylene still bottoms, mercury amalgam and beryllium waste, polychlorinated biphenyl (PCB)-contaminated oil, and metal shavings. Waste disposal practices at the site resulted in residual contamination being found in soils and surrounding sediments at varying concentrations.

The interim remedial action was the first action taken at Site 3 and specifically addressed buried wastes and contaminated soil at the site. Some of the contaminated sediments at Site 3 were also addressed as part of the bank stabilization portion of this interim remedy. A final ROD for the site will specifically address those actions intended to address all remaining contaminated sediments at the site. The principal threat

wastes existing at Site 3 are those now capped municipal solid wastes some of which contained or were contaminated by smaller amounts of oils or other liquids, sludges, pesticide residues, chlorinated solvents, mercury, beryllium, and polychlorinated biphenyls (PCBs). Because the landfill was constructed over many years, the actual volume of wastes deposited [ratio of fill dirt to wastes] is unknown and cannot be reasonably estimated.

Based on the sediment and surface soil Contaminants Of Concern (COCs) (Table 2), the Site 3 Proposed Plan (PP) and Interim Record of Decision (IROD) recommended a landfill cap and this work began in June 2000. The Causeway banks were stabilized, contaminated sediment was covered and a two-foot soil cover placed over the length of the causeway landfill. After this was completed, a roadway was placed on the landfill cap. The work was completed in September 2001. Land Use Controls have been designed and implemented. A Post Construction Risk Assessment is being finalized in support of a final Proposed Plan and ROD for Site 3. Long-term monitoring of groundwater is ongoing.

OU5 = Site 12 (ROD):

Site 12/SWMU 10, Jericho Island Disposal Area, is located northwest of Horse Island, as shown on Figure 1-1. The site was reportedly used by local residents from 1955 to 1968 as a solid waste disposal area; however, no organized landfill operations were reported to have occurred at the site. Jericho Island is approximately 25 acres in size and was acquired by the Navy in 1968 to satisfy limited distance arc requirements for MCRDParris Island's rifle range. Disposed waste consisted of routine domestic refuse including small metal cans, beer and soda bottles, hubcaps, tires, buckets, cinderblocks, rusted metal 5-gallon cans, sheet metal, paper, plastic, and wood. The site had an irregular, undulating surface due to the random scattering of surface debris piles that ranged up to approximately 30 feet in diameter and 5 feet in height. After MCRD Parris Island acquired Site 12, the area was no longer used for waste disposal purposes. Three surface debris piles were present on Jericho Island when the land was acquired. Two of the surface debris piles were located in the upland portion of the island (one in the west-central and one in the southern portion of the island). The third surface debris pile was located at the southern edge of the island and extended into the adjacent sediment. A causeway (a raised way across wet ground or water)

was constructed by unknown persons from the mainland to the northern end of Jericho Island for access purposes prior to Navy acquisition of the property.

This causeway was constructed with soil commingled with waste material. The date of construction of the causeway is unknown.

An RI / FS was completed and regulatory approval obtained. A human health risk assessment (HHRA) was conducted as part of the RI/RFI. It examined risks associated with exposure to the waste debris itself and to contaminated media by construction workers, adolescent trespassers, adolescent and adult recreational users, and risks to hypothetical on-site residents. These situations represented the most conservative of potential human receptor exposure scenarios and associated risk assumptions for this site. An ecological risk assessment (ERA) completed for Site 12 considered potential impacts for benthic receptors, soil invertebrates, terrestrial and aquatic plants, terrestrial receptors, and aquatic receptors. In addition to the risks posed to human health and the environment from the presence of exposed waste debris, the migration of contamination from those materials to surrounding surface and subsurface soils, shallow groundwater, sediments and surface waters also posed unacceptable risks at the site. As a result, the response action selected in the ROD was necessary to protect the public health or welfare and the environment from actual or threatened releases of pollutants or contaminants from the site that could present an imminent and substantial endangerment to public health or welfare.

The Proposed Plan and ROD for Site 12 were completed in FY05. RD and RA start were also scheduled and completed at Site 12 in FY06. Site 12 Contaminantes of Concern (COCs) are n Table 1-1. The remedial action at Site 12 included soil and sediment removal totaling 6,214.85 tons according to the Remedial Action Completion Report (RACR). These tons represented approximately 2,870 cubic yards of soil and sediment which were excavated and disposed of offsite. Of that 2,870 cubic yards, 1,700 cy were PAH contaminated upland soil, 370 cy of sediments (metals contaminated), and finally, the Jericho Island causeway was removed (800 cy of soil and sediment with debris). Soils and sediments were removed to meet the RGOs of the respective COCs. Land Use Controls have been designed and implemented. Long-term monitoring of re-vegetation is ongoing.

SITES WITH PRE-REMEDIAL INVESTIGATIONS IN PROGESS (5, 14, 27 (with 9, 16, and 55), and 45) -

OU4 = Site 45: At Site 45, The Dry Cleaner, an accidental spill in 1994 resulted in a PCE/TCE groundwater plume. A Pump and Treat system was installed in 1998 as a Removal action to slow any flow of groundwater contamination, but due to high concentrations of iron in the environment continually fouling the system, the decision was made by the partnering team to discontinue operations in 2000. The RI/RFI was completed in 2001 and the RI/RFI Report was submitted to the EPA and SCDHEC in 2002, and conditionally approved in early 2005. Due to the elapsed period of time since the RI field work, additional field work has been completed that included identification of a second plume and the need for a vapor intrusion evaluation. A 2008 USGS study addressed these concerns and also determined concentrations of chlorinated solvent above their MCLs were going into the storm sewer. These contaminants include the following : 1,2 DCE(410 ppb) c DCE (410 ppb) PCE (30 ppb) . The before mentioned concentrations are above respective MCLs, therefore, migration of the plume off site needs to be addressed. Additionally the identification of vapor intrusion potential was clarified. These study results were included in the RI addendum submitted in FY 2010. In the forthcoming FS several technologies will be considered for cleaning / removal of the groundwater contamination. While a final remedy is not in place, pilot studies by research organizations have indicated potential success for vegetable oil augmentation for natural attenuation of chlorinated solvents. Immediate solutions for preventing the contaminants from entering the sewer include slip lining the sewer.

OUs 7, 8, 9, and 10 = Sites 9, 16, 27, and 55; Marine Parade Deck 2007-2009: A plume of chlorobenzene, benzene and DDT was discovered. A floating layer (LNPL) of petroleum and pesticide product was also discovered at Site 55, adjacent to Site 27. Sites 9 and 16, due to their close proximity and similar COCs, are being investigated at the same time (however, these sites may or may not be placed in a separate path forward at some time after the RI.) Approximately 40 wells were installed in 2008 to determine the nature and extent of contamination (26 Temporary and 17 Permanent). The Team has reviewed a conceptual site model for the sites and had two field sampling events. The sites are located in an industrial area and the closest water body is the 3rd Battalion Pond.

OU12 = Site 14 Storm Water Outfalls 2009-2010: A Data Quality Objective document was submitted for the storm water outfalls. The storm water outfalls will be sampled to determine any impacts from past

activities on sediments and storm water. There are approximately 30 outfalls that are associated with inland process area sites.

OU6 = Site 5 Former Paint Shop; 2009-2010: An RI Work Plan was submitted. Investigations have indicated that fill material was used to build up the site. This site is an industrial area ladjacent to the Broad River. Past activities included dumping of paint and thinner. The area is an industrial area.

Eleven other sites are currently in the process of preliminary investigation. A CS/SI report was submitted for team review in January 2010. Table 3 lists current status of all identified sites at MCRD , . (Table 3 is taken from the most recent Site Management Plan (SMP)).

4.0 REMEDIAL ACTIONS

Site 1

Based on the results of the RI, the following RAOs were developed for protection of human health and the environment at Site 1 and SWMU 41. The RAOs are provided in the May- 2002 ROD.

- Eliminate contact with landfill contents and impacted surface soils by human and ecological receptors.
- Eliminate the migration of COCs from the source material (impacted soil, waste, and fill) to down-gradient media (i.e., sediment, surface water, and groundwater).
- Eliminate human exposure (i.e., direct exposure to maintenance worker, future construction worker, future recreational users, and hypothetical future resident) to COCs in sediment at concentrations in excess of RGOs.
- Eliminate exposure of ecological receptors to COCs in sediment at concentrations greater than RGOs.
- Comply with chemical-specific, location-specific, and action-specific federal and state ARARs (see Table 4 and Table 5).

Although the ROD had not been signed, the Navy and MCRD proceeded with remedial activity from June 2003 through December 2003 based on the community and regulatory acceptance of the Proposed Plan. The components of the remedial action consist of the following items. A ROD was signed in 2006.

Sediment and Waste Excavation: Contaminated sediment was excavated and consolidated within the limits of a proposed landfill cap system. As expected, actual areas excavated varied moderately based on verification sampling during construction. This sediment contains concentrations of inorganic chemicals (copper, mercury, and lead), PAHs, and pesticides above the cleanup goals, or RGOs, for protection of ecological receptors. Additional testing was performed and successfully determined that PAH-contaminated sediment concentrations have attenuated to levels below RGOs. If the testing had determined that PAH concentrations remained above RGOs, PAH contaminated sediment would also have been excavated and consolidated under the proposed cap system.

Sediment excavated did not include the arsenic concentrations in sediment north of the waste materials that were detected above RGOs. Under current and future land-use scenarios that exclude residential development in the saltwater marsh, the arsenic concentrations are within acceptable risk ranges. Likewise, the arsenic concentrations were not determined to pose a significant threat to ecological receptors. Waste material (e.g., glass, ash) located outside the limits of the proposed cap system was also excavated and consolidated within the limits of the cap.

Low-Permeability Cap System Installation: A low-permeability cap system meeting or exceeding requirements of the federal and state solid waste and hazardous waste landfill closure requirements was placed over approximately 6.3 acres of consolidated and graded waste and contaminated sediment materials. All excavated waste was consolidated above the mean high tide elevation.

Slope Stabilization and Erosion Control: Slope stabilization and erosion control measures (rip-rap placement and liner edge anchoring) were implemented along the toe and side slopes of the landfill cap system to minimize the potential for failure of the side slopes and to reduce the erosion rate of the cover due to surface water runoff, waves, and/or wind.

Salt Marsh Restoration and Monitoring: Excavated areas were restored by filling in the excavation area with sand and RE-vegetating the area with local common vegetation (e.g., cordgrass). The area is being monitored over time to ensure re-establishment of vegetation.

Land-Use Controls and Long-Term Monitoring: Prohibitions on unauthorized intrusive or construction activity have been implemented. Through the Depot's LUCs and the site's LUCIP, residential development of the site and the use of the site's groundwater as potable water are prohibited. (The prohibition of the specific actions identified in the LUCIP is enforced. The reporting requirements for these LUC's have been implemented. In addition, the LUCIP relies in part on the BMP, and the GIS. The LUCs at the sites include the following : Site 1 prohibition on digging or construction of any type , no groundwater withdrawal/use , no residential development, and a requirement to maintain the cap intact. (See Attachment 1 for LUC Inspection Checklist.)

The Long Term Monitoring Program has been in place since work plan approval in 2005. This long term monitoring consists of both sediment and ground water monitoring. See Figure 2 for site location and details of the proposed long-term monitoring program.

These changes to the design occurred during remedial construction: (1) Test pitting of the earthen berm at the south end of the site, parallel to Wake Boulevard, was requested by US EPA and confirmed that waste materials were not buried inside. (2) Sediment concentrations exceeding RGOs were identified at the south-western most testing location, and multiple step-out and re-sampling iterations did not resolve the issue. Metals concentrations remained low, and did not noticeably trend either higher or lower;. therefore, EPA and SCDHEC agreed to terminate the sediment excavation provided long-term sediment monitoring for this single location just outside the limits of excavation was incorporated into the final remedy.

The erosion/settlement issue from the last Five- Year Review no longer appears to be an issue. Inspections, as described in the SWMU 1 Long- Term Monitoring Plan, were implemented. The construction contractor fulfilled contractual requirements to re-vegetate the area.

At present, it is not apparent revegetation has been completely successful. The Navy and MCRD continue to work with US EPA ,SCDHEC and Partnering Team Trustees to resolve this issue, which could result in additional O&M costs.

Site 3

Based on the results of the RI, the following RAOs were developed for protection of human health and the environment at Site 3. The RAOs are provided in the September- 2000 IROD (signed by USMC; with written concurrence from US EPA; SCDHEC approved the IROD as an Interim Measure under the RCRA program):

- Control human exposure (the existing maintenance worker, the future construction worker, and the recreational user) to chemicals of concern (COCs) in surface soil at concentrations in excess of remedial goal options (RGOs).

- Control exposure of ecological receptors to COCs in surface soil at concentrations greater than RGOs.

- Eliminate the migration of COCs from the fill material to sediment, surface water, and groundwater.

- Comply with chemical-specific, location-specific, and action-specific federal and state ARARs (see Table 4).

The components of the interim remedial action consisted of the following items.

Slope Stabilization and Erosion Control. The sides of the entire causeway were stabilized with re-grading, compacted fill, vegetation, riprap, and/or gabions. These actions minimize the potential for further erosion of causeway wastes due to the actions of rain runoff, waves, and/or wind to the pond and marsh. Limited sediment excavation and covering of the sediments along the base of the causeway also occurred. The sediment areas addressed by slope stabilization include the most contaminated sediments found at Site 3. Addressing these sediments eliminated most of the site risks identified to human and ecological receptors by sediment exposure.

Soil Cover.: Additional compacted soil cover was placed over approximately two-thirds of the causeway to minimize the potential for human and ecological contact with waste and impacted soil. A minimum of 2 feet of compacted soil cover was placed over waste materials. The interim remedy also included an additional 1 foot of soil cover over existing soil that posed moderate to high risks to terrestrial wildlife.

Roadway Construction/Sediment Testing. A paved road was constructed to reduce precipitation infiltration into the waste and reduce erosion of cover material. Also, sediment has been re-characterized. (These sediments were subsequently subject to sampling by US EPA and the results are under review by the Navy, MCRD, US EPA, and SCDHEC for consideration of long -term monitoring for groundwater only with no further action for sediments.)

Land-Use Controls and Long-Term Monitoring. Interim LUCs have been implemented to control or eliminate pathways of exposure to COCs at the site, and to assure the effectiveness and integrity of the interim remedy in place at Site 3. Signage was placed at the site that read, 'No subsistence fishing'. Additionally, annual LUC checklists are to be submitted to the regulatory agencies. These annual reporting requirements have been implemented in accordance with the requirements set forth in the LUCIP. The Navy performs annual groundwater sampling for this site. Additionally, current site restrictions regarding prohibitions on swimming and wading have been maintained. (See Attachment 2 for LUC inspection checklists.)

The Navy/Marines are currently reviewing the draft Technical Memorandum for Site 3 in support of the Site 3 Final ROD, which will determine if additional remedies are needed.. However, the Navy and MCRD already fund annual long- term groundwater monitoring as part of the IROD requirements. Post-construction sampling (by Navy and US EPA) indicated that sediment would not require long-term monitoring based on the low levels of contaminant concentrations detected. The proposed plan revision is awaiting the approval of the Draft Technical Memo.

No significant changes to the design occurred during remedial construction (Figure 3).

During 2004, significant costs were incurred to fill erosion/settlement along the backsides of each headworks structure. (The headworks structures support the conduits allowing surface water inflow and outflow through the causeway.) At Site 3, the erosion/subsidence normally occurs at the upper backside corners of each concrete headworks and is likely also linked to precipitation runoff – although the area is re-vegetated. The erosion areas at the headwall of the culverts were repaired in 2005 with the installation of Mirafabric FW 700, soil, crushed stone, and rip rap. Since the time of the 2010 Five- Year Review inspection, sinkholes have been observed and repaired (see Site Inspection discussion of sinkholes).

Site 12

The ROD for Site 12 has been signed and implemented. Therefore, Site 12 is being addressed in this Five-Year Review since remedial activity was completed in 2007, but groundwater slightly exceeds MCLs.

Based on the results of the RI, the following RAOs were developed for protection of human health and the environment at Site 12. The RAOs support the remedy selected in the Proposed Plan and were included in the site ROD. (The RGOs are substantially the same as developed for Site 1 and Site 3):

- Eliminate contact with debris and impacted surface soils by human and ecological receptors.

- Eliminate the migration of COCs from the source material (impacted soil and debris) to down-gradient media (i.e., sediment, surface water, and groundwater).

- Eliminate human exposure (i.e., direct exposure to construction workers, adolescent trespassers, adolescent recreational users, adult recreational users, child residents, adult residents, and lifelong residents) to COCs in sediment and sediment waste at concentrations in excess of RGOs. RGOs take into consideration an ILCR of 1.0E-06 for individual COCs. Additionally, RGOs take into consideration an HQ of 1.0 where non-carcinogenic effects would be expected. Elimination of COCs in sediment will also address human health concerns identified from chemicals detected in surface water.

- Eliminate exposure of ecological receptors to COCs in sediment/sediment waste at concentrations greater than RGOs. The sediment RGOs take into account direct contact with COCs by

macroinvertebrates and are expected to be protective of upper-food-chain receptors. RGOs address risks where "low effects" may be anticipated by ecological receptors and consider site background concentrations.

- Comply with chemical-specific, location-specific, and action-specific federal and state ARARs (see Table 4).

The components of the preferred alternative consist of the following:

Excavate Surface Debris, Soil, and Sediment. The three surface debris piles located on Jericho Island and underlying soil and sediment (approximately 2,300 cubic yards of material) were excavated. Additionally, approximately 1,700 cubic yards of PAH-contaminated soil in the vicinity of sample locations PAI-10-SS-08 and PAI-012-03 (37) and inorganic-contaminated sediments (approximately 370 cubic yards) in the vicinity of sediment sample PAI-10-SD-08 was removed in 2006. Lastly, the causeway connecting Jericho Island to the mainland was removed. Approximately 800 cubic yards of soil, sediment, and waste was removed as part of the causeway excavation.

Verification sampling and laboratory analysis was performed to determine whether excavation activities achieved RGOs for the protection of human and ecological receptors. A post-removal assessment was also performed. The ecological and human health RGOs were used to confirm that remaining materials do not pose a risk to receptors. The evaluation was based on both individual sample results and an overall evaluation of the remaining soil and sediment.

To allow for easier excavation, a temporary cofferdam system was installed along the southern portion of the island and along the causeway to eliminate daily flooding due to the tidal cycle. The cofferdam system was removed after all excavation activities were completed. Moreover, approximately 1.6 acres of wetlands were restored upon completion of excavation activities. All existing monitoring wells located on Jericho Island were properly abandoned.

Transport Excavated Material to an Approved Disposal Facility. All excavated surface debris, soil, and sediment were loaded and transported to an approved off-site disposal facility. Prior to loading and

Tran sport, excavated sediment and wet surface debris were dewatered. Additionally, all excavated material was characterized to determine the appropriate disposal facility. Approximately 650 truckloads (8 cubic yards each) were required to transport this material.

Restoration. The surface debris piles and PAH-contaminated soil excavation areas were restored to original surface levels and were re-vegetated. Areas where sediment was removed from the marsh were restored by filling with a clean sand material and re-vegetated. The area was temporarily stabilized to minimize erosion. Alternatives for the salt marsh restoration were considered that would be enacted based on inadequate vegetative establishment or reestablishment of soil conditions. Also, if verification testing indicated that residual sediment contamination remained, additional excavation and/or covering with soils was to be considered to provide a barrier to reduce contact with contaminated sediment. No additional cover was necessary. Inspection reports are submitted annually to both EPA and SCDEHC ensure the portion of the remedy remains effective.

Land Use Controls. Although waste has been removed LUCs are still required at the site because ground water impacts still exist, therefore, there is a prohibition against the use or extraction of groundwater on site, and a requirement to monitor Spartina recovery. (See attachment 3 for LUC Inspection Checklist.)

5.0 PROGRESS SINCE THE LAST REVIEW

This is the second Five- Year Review for any site at MCRD Parris Island. For purposes of assessing progress since the last Five- Year Review in 2005, the Protectiveness Statement, issues and recommendations have been copied here and the status updated accordingly.

2005 Protectiveness Statement:

"The remedy is considered protective in the short-term; however in order for the remedy to be protective in the long-term, follow-up actions need to be taken. In order for the remedy to remain protective in the long-term, ICs that prevent future disturbance of the cap must be in place to prevent exposure to contaminants and to maintain integrity of the remedy."

2005 ISSUES:

ISSUE	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Inadequate LUC	N	N
Subsidence behind headworks at Site 3	N	N (has been addressed)
Erosion of areas where revegetation has not occurred at Site 1	N	Y (if left unaddressed)

2005 Recommendations and Status:

MCRD and the Navy recommended the following:

- The Navy will ensure that the Site 1 revegetation and localized erosion occurrences are addressed and appropriately documented. **COMPLETE**
- Plans for long-term monitoring of groundwater at Site 3 will be formally implemented as part of the final remedy selection. Although the Site 3 Final ROD is not yet complete, the Navy has been monitoring groundwater at Site 3 annually since completion of the soil cover/causeway. **COMPLETE**
- As identified in the MCRD's letters to EPA and SCDHEC of 18 July 2005 certain interim LUC maintenance enhancement activities are in the process of being implemented. All final LUC remedy related oversight and maintenance procedures will be spelled out in the LUC RD to be developed for Site 1. Those procedures will take into account both the effectiveness of these new procedures and reasons for past LUC non-compliances. Unlike the Five- Year Review Report, the LUC RD will be an enforceable Primary Document under the MCRD FFA:
    1. MCRD will place signs along the causeway to more clearly identify the site restrictions: "No digging. Contact the Environmental Office at ext. 3423." The signs will be mounted on the utility poles, facing in both directions. **COMPLETE**
    2. MCRD will continue to develop the Geographic Information System (GIS). One planned upgrade is to provide Depot-wide access via the web browser. (Any advancement to the GIS is encumbered by issues related to the Navy Marine Corps Intranet (NMCI) which controls all of the hardware and software used throughout the Department of the Navy.). **COMPLETE TO THE EXTENT OF MCRD CONTROL**
    3. MCRD will develop a Depot Order specific to site remedy-related land use controls to create a document that identifies all of the environmental land use restrictions throughout

the Depot. This Order will be provided in draft form by September 6, 2005. **COMPLETE**

4. The Installation Restoration Collaboration Gateway allows all team members to view the IR-specific GIS data to ensure that it adequately reflects the program's status, and there is a Land Use Control Section that is under development. **SUFFICIENTLY COMPLETE**
5. MCRD will enhance its environmental education program to ensure that all managers, with control over projects to significantly impact the environment, receive National Environmental Policy Act (NEPA) training. **COMPLETE**
6. MCRD will continue development of the environmental management system (EMS), providing another layer of visibility and reinforcement for the land use controls. More significantly, the EMS provides a system of auditing and management review. The audits will ensure that written procedures are both adequate and being complied with.

SUFFICIENTLY COMPLETE

- Initiate quarterly site inspections and annual reporting of interim LUC compliance to EPA and SCDHEC pending LUC RD development and regulatory concurrence with final site remedy oversight and maintenance procedures. **COMPLETE**

For detailed information on design and implementation see the Land Use Control Remedial Designs.

Since only one incident has been reported this review period, completion of these activities appears to be correcting the previous issues in the last Five Year Review. The intended effect has been achieved.

Since the last five year review the following progress has been completed with respect to Site Activities:

Site 1 Incinerator Landfill: Quarterly inspections are performed to assure erosion and trees do not impact the integrity of the cap. The Incinerator Land fill site has had both sediment and ground water monitored. The result of the sediment sampling (for Cu, Pb, Hg) have all been below EPA ESVs (see data tabled in Section 7) . The result of ground water monitoring has indicated levels below MCLs.

Site 3 Causeway Landfill : Quarterly inspections are performed for the purpose of guarantying the integrity of the soil cap. Signs have been placed along the side of the adjacent pond stating;" no subsistence fishing". In 2009-2010 a Technical Memorandum has been drafted to support the final ROD.

This technical memorandum includes fish tissue results which are used to clarify risks to human receptors. Additionally, ground water monitoring has been performed every year since the last review.

Site 12 - Jericho Island: Since the last review, Land Use Controls have been put into place to control erosion and prohibit groundwater wells from being installed. The inspections include vegetation monitoring for Spartina as an indicator for re-establishment in excavated areas in the marsh.

6.0 FIVE YEAR REVIEW PROCESS

The MCRD Parris Island TRC was notified at its April 26 meeting of the Navy's intent to develop this Five-Year Review Report and their opportunity to participate in the process.

The Draft Five- Year Review Report was provided to US EPA and SCDHEC for review and comment on 20 March 2010. The USMC will sign the document by August 30, 2010. US EPA and SCDHEC are expected to provide concurrence letters in support of the Navy's conclusions following the Navy's signing the document. The TRC was advised that this report was available upon request.

To prepare this Five- Year Review, the following documents were reviewed:

- Site 1 ROD and LUCRD
- Site 2 ROD
- Site 3 IROD and LUCIP
- Site 12 ROD and LUC RD
- Master Work Plan
- FFA
- SWMU 1 and 3 - LTM Work plans

To prepare this Five Year Review, the following data was reviewed:

- Site 3 GW monitoring

- Site 1 data collection , groundwater monitoring, sediment sample
- No LTM or sampling is required at SWMU 12 because of the removal of contaminants.

Site Inspection

The inspections of Sites 1 3and 12 were conducted June 17, 2010 by the Marines. The purpose of the inspections was to assess the protectiveness of the remedy, including the current condition of previously discussed status of re-vegetation and localized settlement at Site 1, and restoration of the trenching and repair of the subsidence at Site 3. In addition, Site 12 was inspected to verify that the re-vegetation effort is on going and is adequate and no wells have been installed...

Site 1: There was no subsidence observed at the time of inspection. Re-vegetation has not been completed to date. There were no apparent LUC breaches at Site 1. The LUC letters are included as an attachment.

Site 3: Trenching was done on level surface, and grass cover is re-established which should ensure the soil cover integrity. Signs, as required, were present on the inland pier.

No significant issues were identified at the time of inspection regarding the soil cover or erosion control. However, just recently, well after the date of the 2010 Five Year Review inspection, submittal of the Draft Report for review, and comments from EPA and SCDHEC, another subsidence occurred, the first in about five years. Two sinkholes formed on the upper portion of the pond-side of the landfill causeway, each just above the culverts (toward either end of the causeway). The sinkholes were at their widest approximately four feet across. Loose sands at the bottom of the sinkholes were removed by base employees who responded to the report of sinkholes, and the materials removed were placed at the disposal area on Horse Island. Once aware of the sinkholes, MCRD Natural Resources notified EPA and SCDHEC in accordance with the Site 3 LUC Implementation Plan. The culverts were inspected and the sinkholes filled will flow able fill. A slight flaw in the culverts was noted, however, they appear to be too insignificant to cause such sinkholes. Precipitation infiltration may also be contributing.

MCRD is committed to working with EPA and SCDHEC to resolve concerns with the integrity of the landfill cover and compliance with proper procedures regarding handling of wastes removed from the landfill. A Site 3 Final ROD will be developed soon, which will include a specific requirement to maintain the integrity of the landfill cover. After the ROD, a Remedial Design will be developed which will address LUCs and associated proper procedures, inspections for cover integrity including, for example, concerns pertaining to erosion, settlement, woody vegetation, etc. Due to the timing of this event and since recommendations have not yet been formed, any recommendations pertaining to this as a Five Year Review Issue will be addressed in the Next Five Year Review.

Site 12: No significant issues were identified at the time of the inspection. Vegetation recovery has not been complete to date. No signs of ground water use were noted.

Interviews

MCRD Parris Island is a controlled-access facility surrounded by salt-water marsh. Therefore, there are no adjacent property owners, except near Site 12, therefore, the Partnering Team did not recommend any interviews. MCRD environmental affairs personnel have been involved throughout the Five -Year Review process.

There are no unusual situations or problems at the MCRD Parris Island.

7.0 TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Site1:

The synthetic cap at Site 1 is functioning as intended as measured by whether the RAOs continue to be met. The LUCs for Site 1 are functioning as intended. The RAOs require the remedy to: (1) eliminate contact with debris and impacted surface soils by human and ecological receptors; (2) eliminate the migration of COCs from the source material to down- gradient media; (3) eliminate human exposure to COCs in sediment and waste at concentrations in excess of RGOs.; (4) eliminate exposure to ecological receptors in sediment and waste at concentration greater than RGOs; and (5) comply with applicable ARAR./ RAOs.,However there exists the potential in the long- term for RAOs 2 and 4 to not be met due to LUC-related issues with cover integrity. These potential cap integrity issues are monitored during site inspections. For Site 1, the erosion/settlement, limited to several-inch depressions caused by washout of soil where re-vegetation has not yet succeeded, is repaired upon detection. A contract has been awarded to perform minor repairs of 9 inches or less on a quarterly basis. Major repair needs will be reported to MCRD by the contractor. The Partnering Team has also required a study to determine options to improve the success of re-vegetation, which would help to eliminate erosion. This study was conducted and the Partnering Team is considering alternatives. These alternatives include the following: 1) applying fertilizers to aid in growth 2) constructing a change in elevation and 3) continue to allow native species of cord grass to eventually take over the barren areas.

Long term monitoring for Site 1 is in effect, and has been since US EPA and SCDHEC concurrence on the LTM Work Plan. This monitoring includes sediment, vegetation observation and groundwater monitoring. .

For Site 1 , Except in the case of Arsenic, the ground water and sediment results for years 2005-2009 indicate levels below either the DHEC MCLs (groundwater) or the EPA ESVs (sediment) .Ground water results taken in 2009 were non-detect for all COC metals except the following: Chromium (0.0042 mg/L , Zinc (0.026) mg/L, Silver (0.**00052 mg/L), and Arsenic (0.0358mg/L). The sediment results are indicated in the below table:**

Sediment samples	9/2005 (mg/kg)	10/2006(mg/kg)	10/2007	10/2008	10/2009	U.S.EPA Region4 ESV
Copper	2.2	1.7	0.23	0.75	0.36	40
Lead	4.1	6.1	4.8	2.2	1.9	30.2
Mercury	0.042	0.012	0.0092	0.013	0.0049	0.13

For Site 1, evaluation and correction (as appropriate) of the issues of marsh re-vegetation and localized settlement occurrences is in progress. Neither issue represents an imminent threat to the remedy protectiveness.

Site 3

The soil cover at Site 3 is functioning as intended. The landfill contents have been intact since the remedy was put in place. Groundwater long term monitoring for Site 3 has been in effect since 2002, functioning as intended by the decision documents. Ground water concentrations in 2009 were determined to be as follows: Chlorobenzene 630 micro grams/liter ; Benzene 23 micrograms/ liter, and Methylene Chloride 36 micrograms/liter. The 2010 data indicates Benzene 20 micrograms / Lter ; Chlorobenzene 800 micrograms/Liter ; Methylene Chloride 12 micrograms /Liter. The ground water to surface water to ecological receptors pathway has been addressed in the recent draft of the risk assessment and was found to not pose a significant risk. Extraction/use of ground water is prohibited beneath Site 3 according to the Site 3 IROD.

For Site 3, the subsidence occurs at the upper corners of each concrete headworks and is likely also linked to precipitation runoff – although the area is re-vegetated. The erosion areas at the headwall of the culverts were repaired in 2005 with the installation of Mirafabric FW 700, soil, crushed stone, and rip rap.

Site 12 has in place vegetation monitoring as well as monitoring land use to assure ground water wells are not installed. Other than contaminated groundwater, no waste was left on site.

Sites 1, 3, and 12 LUCs for the sites will be maintained to restrict exposure until unlimited use and unrestricted exposure levels have been achieved. Quarterly visual inspections and reviews will be conducted for the purposes of verifying that all necessary LUCs have been implemented and are being properly maintained. Annual reports are prepared and forwarded to the US EPA and SCDHEC signed by the Depot Commanding General certifying the continued retention of all implemented LUCs.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid.

For all sites: The exposure assumptions, toxicity data, cleanup levels and remedial action objectives used at the time of the remedy selection are still valid. Land use expectations have not changed. No ecological routes of exposure or receptors have changed. There are no newly identified contaminant sources. No toxic byproducts have been identified or are expected.

While a few standards used to establish clean-up levels may have changed slightly since the time of the RODs, no changes in standards exceeded previous clean-up levels due to the elevated background levels exceeding the standard .T he 2010 Screening levels were compared against previous ROD Clean-up Levels achieved. All screening values compared were found to be protective according to one or the other of the following:

- NR- Not Relevant. Max = Maximum concentration was below the relevant RGO at time of ROD and is still below 2010 screening values.
- RR- Protective due to Clean-up Level falling within the risk range (i.e. two orders of magnitude above screening levels.)
- C - Protective due to wastes/contaminated media being disposed within landfill with protective cover/cap and LUCs.
- L - Protective due to LUCs restricting Residential Use, invasive activities, groundwater use and required maintenance of cover/cap, etc.
- B Clean-up level not based on risk-based number or ARAR driven, but rather based on background in accordance with EPA

OSWER Guidance as follows:

Role of Background in the CERCLA Cleanup Program, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, April 26, 2002, OSWER 9285.6-07P

"Consideration of Background in Risk Management: Where background concentrations are high relative to the concentrations of released hazardous substances, pollutants, and contaminants, a comparison of site and background concentrations may help risk managers make decisions concerning appropriate remedial actions. The contribution of background concentrations to risks associated with CERCLA releases may be important for refining specific cleanup levels for COCs that warrant remedial action.

For example, in cases where a risk-based cleanup goal for a COC is below background concentrations, the cleanup level may be established based on background."

See Table 1 for all three sited for a detailed comparison.

Site 3: Although measures were put in place to preclude unacceptable human exposure at site 3 (i.e. signage: No subsistence fishing it was determined by interview that a highly exposed individual does exist. This exposure assumption is being re-evaluated in the Risk Assessment Tech Memo, being developed to support a site three final ROD

<u>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</u>

No new information beyond that previously discussed has come to light that would call into question the protectiveness of the remedy.

8.0 ISSUES

No issues were identified which require actions to be taken outside of the normal CERCLA process. As discussed previously, the Site 3 fish consumption concern is being addressed by a post-construction risk assessment Techical Memo being developed in support of a Site 3 Final ROD. The very recent subsidence incident at Site 3 which is still under review will be addressed in the Site 3 Final ROD and Remedial Design with a requirement to maintain the integrity of the cover, as discussed, and will be further documented in the next Five- Year Review.

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Since there were no issues identified which required action outside of the normal CERCLA process, MCRD and the Navy have no recommendations. Any recommendations forthcoming on the very recent Site 3 subsidence incident still under review will be addressed in the next five year review.

10.0 PROTECTIVENESS STATEMENT

For Sites 1, 3, and 12:

"The remedy at OUs 1, 3, and 5 are expected to be or is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled."

11.0 NEXT REVIEW

The Third Five Year Review will be required five years following the signing of the approval letter for this second Five Year Review by EPA. The third Five Year Review will also address any new sites with remedies in place at MCRD Parris Island.

12.0 CERTIFICATION

I certify that the information stated in this report is based on a review of records and visual inspection, and is true and correct to the best of my knowledge and belief.

Date 8/10/10

W. S. TATE
By direction of the
Commanding General

ATTACHMENT 1

Site 1

ANNUAL LUC COMPLIANCE CERTIFICATE
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA

Site Name (include SWMU #): Site 1/SWMU 1 - Incinerator Landfill.

Site Location (provide nearest road name, GIS Coordinates, etc.):
Horse Island, Malecon Drive

Date(s) of Inspection/Review: 27 Aug, 17 Oct 08; 5 Feb, 15 May 09

Property Owner: MCRD Parris Island, Dod

INSPECTION CHECKLIST	YES	NO	See Comment	NA
Land Use Restrictions				
1) No unauthorized construction or intrusive activities (e.g., digging into sediment, soils or cap) observed (See Note 1).	X			
2) No residential development, (including but not limited to, any form of housing, child care facilities, pre-schools, elementary schools, secondary schools, or playgrounds) observed.	X			
3) No extraction, removal or use (including consumption) of groundwater observed (See Note 1).	X			
4) Groundwater monitoring well and/or remedial system (groundwater treatment system or cap) intact (e.g. wells intact, no woody species present on cap, etc.).	X			
Land Use Controls				
5) Warning signs are visible and in good repair.	X			
6) Base Master Plan review identifies this Site and the land use restrictions.	X			
7) Base Geographical Information System review identifies this Site and the land use restrictions.	X			
8) Base Environmental Management System identifies this Site and the land use restrictions.	X			
9) Base Depot Order is available, identifying this Site and the land use restrictions.	X			

Indicate whether any breaches or violations of the Land Use Controls and/or Land Use Restrictions have occurred during the reporting period. NONE

[If breach(s)/violation(s) occurred, then provide date(s) notification sent to EPA and SCDHEC.] N/A.

NOTE 1: Exclude any activities previously approved by Navy, MCRD, US EPA, and SCDHEC such as monitoring wells that are part of the remedial action or maintenance activities that are conducted in accordance with base procedures.

Comments from checklist items 1-4:

ECO RESTORATION: LARGE BARREN AREA ALONG WEST SIDE, MARSH/SPARTINA SLOWLY ENCROACHING FROM NORTH.

IT APPEARS THAT WE NEED TO DO PRESCRIBED/CONTROLLED BURNING IN ORDER TO STIMULATE THE NATIVE GRASSES ON THE COVER.

Identify any observed issues related to cap integrity (subsidence, erosion, intrusive activities, woody species, etc) – attach pictures and/or sketches as necessary:

Comments from Checklist items 5-9:

This evaluation covers the period from 1 ~~January~~ July (year) 08 through ~~31 December~~ 30 June 09.

NOTE: Certificate shall be submitted by 1 March of the year following the reporting period.

I, the undersigned, hereby certify that I am an authorized representative of the Marine Corp/Navy and that the above described Land Use Controls have been implemented properly and the Land Use Restrictions complied with for the period noted. Any known deficiencies have been described and Marine Corp/Navy completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

Name/Signature

15 Jul 09
Date

Mail completed form(s) to:

U.S. Environmental Protection Agency
Region 4
Superfund Division,
Federal Facilities Branch
61 Forsyth Street SW
Atlanta, GA 30303

South Carolina Department of Health and Environmental Control
Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia SC 29201

Commanding Officer
Naval Facilities Engineering Command, Southeast
ATTN: Director, Environmental Restoration Division PO Box 190010
North Charleston, SC 29419

ANNUAL LUC COMPLIANCE CERTIFICATE
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA

Site Name (include SWMU #): Site 1/SWMU 1 - Incinerator Landfill.

Site Location (provide nearest road name, GIS Coordinates, etc.):
HERON ISLAND, MALSEEN DRIVE.

Date(s) of Inspection/Review: 3 SEP, 13 NOV 09; 6 JAN, 17 JUL 10.

Property Owner: MCRD PARRIS ISLAND, DoN

INSPECTION CHECKLIST	YES	NO	See Comment	NA
Land Use Restrictions				
1) No unauthorized construction or intrusive activities (e.g., digging into sediment, soils or cap) observed (See Note 1).	✓			
2) No residential development, (including but not limited to, any form of housing, child care facilities, pre-schools, elementary schools, secondary schools, or playgrounds) observed.	✓			
3) No extraction, removal or use (including consumption) of groundwater observed (See Note 1).	✓			
4) Groundwater monitoring well and/or remedial system (groundwater treatment system or cap) intact (e.g. wells intact, no woody species present on cap, etc.).			✓	
Land Use Controls				
5) Warning signs are visible and in good repair.	✓			
6) Base Master Plan review identifies this Site and the land use restrictions.	✓			
7) Base Geographical Information System review identifies this Site and the land use restrictions.	✓			
8) Base Environmental Management System identifies this Site and the land use restrictions.	✓			
9) Base Depot Order is available, identifying this Site and the land use restrictions.	✓			

Indicate whether any breaches or violations of the Land Use Controls and/or Land Use Restrictions have occurred during the reporting period. NONE

[If breach(s)/violation(s) occurred, then provide date(s) notification sent to EPA and SCDHEC.]

NOTE 1: Exclude any activities previously approved by Navy, MCRD, US EPA, and SCDHEC such as monitoring wells that are part of the remedial action or maintenance activities that are conducted in accordance with base procedures.

Comments from checklist items 1-4:

MARSH RESTORATION AREA: ALONG THE EAST SIDE OF THE SITE THE SPARTINA CONTINUES TO FILL IN AND ENCROACH UPON THE BARREN AREA.

THERE ARE AN INCREASING NUMBER OF WOODY SHRUBS GROWING ON THE COVER. THE COVER NEEDS TO BE BUSH-HOGGED AND BURNED.

Identify any observed issues related to cap integrity (subsidence, erosion, intrusive activities, woody species, etc) – attach pictures and/or sketches as necessary:

Comments from Checklist items 5-9:

This evaluation covers the period from 1 ~~January~~ Jul (year) 2009 through ~~31 December~~ 30 Jun 2010.

NOTE: Certificate shall be submitted by 1 March of the year following the reporting period.

I, the undersigned, hereby certify that I am an authorized representative of the Marine Corp/Navy and that the above described Land Use Controls have been implemented properly and the Land Use Restrictions complied with for the period noted. Any known deficiencies have been described and Marine Corp/Navy completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

Name/Signature

18 Jun 2010
Date

Mail completed form(s) to:

U.S. Environmental Protection Agency
Region 4
Superfund Division,
Federal Facilities Branch
61 Forsyth Street SW
Atlanta, GA 30303

South Carolina Department of Health and Environmental Control
Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia SC 29201

Commanding Officer
Naval Facilities Engineering Command, Southeast
ATTN: Director, Environmental Restoration Division PO Box 190010
North Charleston, SC 29419

Marine Corps Recruit Depot, Parris Island, South Carolina
Land Use Control Remedial Design
Site/SWMU 1 – Incinerator Landfill and SWMU 41 – Former Incinerator

1. PURPOSE

The purpose of this Land Use Control (LUC) Remedial Design (RD) for Site/SWMU 1 – Incinerator Landfill and SWMU 41 – Former Incinerator, (hereafter "Site 1" or "the Site") is to provide information on how the LUC components of the remedy selected in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision (ROD) for the Site will be implemented and maintained.

The ROD, dated August 2006, stipulates the implementation of certain LUCs to prohibit unauthorized construction or intrusive activities, any residential development of the Site, or the extraction or use of groundwater at the Site. These controls will preclude unacceptable human health risks from exposure to waste and contaminated sediment. This LUC RD was prepared as a result of the selection of LUCs as components of the remedy in accordance with the ROD for Site 1. The Navy / MCRD is responsible for implementing, maintaining, reporting on, and enforcing the land use controls.

The LUC requirements described herein will be effective immediately upon approval of this LUC RD by the United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC), and the requirements set forth in this LUC RD shall supersede the requirements of the LUC Memorandum of Agreement (MOA) between the Navy, USEPA and SCDHEC dated May 2002. Once put into effect, the requirements set forth in this document will remain applicable to Site 1 during Navy as well as subsequent ownership of the Site. Land Use Controls will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure.

2. DESCRIPTION OF THE SITE

Site 1 Historical Use – Incinerator Landfill

From 1921 to 1959, Site 1 served as the disposal site for combustion residues incinerated at SWMU 41. The majority of wastes disposed in the landfill were nonhazardous, combustible domestic wastes and other noncombustible wastes (e.g., cans, bottles, and construction debris). Additionally, hazardous wastes generated from the MCRD from 1921 to 1959 were reportedly treated in the incinerator and disposed in the landfill. Paint thinners (mineral spirits), diesel fuels, kerosene, and strippers (methylene chloride) were also reportedly poured onto the landfill and burned. No auxiliary fuels were used for open burning. Although incineration operations at SWMU 41 ceased in 1959, Site 1 continued to be used for disposal of waste until 1965. Approximately 56,000 cubic yards of soil, fill, and waste material were disposed at Site 1 from 1921 to 1965. Since 1965, no significant disposal or intrusive activity has taken place within the boundaries of Site 1. Site 1 was historically covered with mature pine trees. In 2001, timber in the center of the site was harvested.

SWMU 41 Historical Use – Former Incinerator

SWMU 41 consisted of a coal-fired brick chamber, that was approximately 43 feet long, 34 feet tall, and 20 feet wide. Emissions from the incinerator were vented through a hole in the top of the chamber. A ramp was situated along one of the unit's sides to provide access to the top of the incinerator. Trucks carried wastes up the ramp and discharged them into the hole and incinerated wastes were subsequently disposed at Site 1. SWMU 41 remained in operation until 1959. Historical records indicate that SWMU 41 was located in one of two possible locations. Based on the RI/RFI, the Navy determined that SWMU 41 was likely located within the area defined as Site 1 and that remediation of Site 1 would also address SWMU 41.

Site 1 – Post Remedial Action Status

Site 1, the Incinerator Landfill (and SWMU 41, the Former Incinerator), is located on the northeastern tip of Horse Island in the northern section of the MCRD Parris Island. Site 1 is a landfill constructed of incinerated and non-incinerated waste and fill material and is approximately 7 acres in size. Contaminated sediments and waste which had migrated from the landfill were excavated and then placed in the landfill followed by installation of a low-permeability cap system along with slope stabilization and erosion control measures. Site 1 currently extends approximately 670 feet into a saltwater marsh toward Archers Creek and is approximately 400 feet in width. Attachment 1 shows the current site layout and LUC boundaries.

Site 1 and SWMU 41 are not currently used for residential purposes and they are not anticipated to be used as such in the future. The reasonably anticipated land use is to leave this land vacant. No residential use is anticipated.

3. LUC PERFORMANCE OBJECTIVES

The ROD for Site 1 established the following LUC Performance Objectives:

- Prohibit unauthorized construction or intrusive activities.
- Prohibit residential development of the Site. Prohibited uses shall include, but are not limited to any form of housing, child-care facilities, pre-schools, elementary and secondary schools, or playgrounds.
- Prohibit the extraction or use of groundwater at the Site.

4. LUC IMPLEMENTATION ACTIONS

The following LUCs consisting of both Engineering Controls (EC) and Institutional Controls (IC) will be implemented by the Navy (as represented by either MCRD Parris Island or Naval Facilities Engineering Command, Southeast (FEC SE) as specified below) in order to ensure that the aforementioned LUC Performance Objectives for Site 1 are met and maintained:

a. **EC Implementation:** Within 30 days of USEPA and SCDHEC approval of the LUC RD, two warning signs for the Site will be posted on the landward side of Site 1

advising that any excavation, construction or intrusive activity is prohibited within the Site 1 landfill or must be authorized in advance by the MCRD environmental department. The signs shall: 1) include lettering that is legible from a distance of at least 25 feet; 2) contain contact information for MCRD environmental department; 3) be visible from surrounding areas and at potential routes of entry into the Site 1 area. The two warning signs shall contain the following language:

WARNING: INCINERATOR LANDFILL

Solid Waste Management Unit/Site 1

Excavation, Construction, or Intrusive Activity Prohibited

Unless Authorized by the

Commanding General

CONTACT: NREAO, x-2779

b. IC Implementation:

(i) LUC RD Distribution: Within 30 days of receiving USEPA and SCDHEC approval of this LUC RD, MCRD Parris Island will place the LUC RD in the MCRD Parris Island Information Repository currently located at the Beaufort County Public Library's Headquarters Location at 311 Scott Street, Beaufort, South Carolina 29902.

(ii) Updates to Existing Base Documentation: Within 60 days of USEPA and SCDHEC approval of this LUC RD, MCRD Parris Island will update the following base planning and environmental management documents to identify the prohibited groundwater use or extraction consistent with the Site 1 ROD and to depict the Site LUC boundaries shown on Attachment 1. MCRD Parris Island will notify the USEPA and SCDHEC when the Site 1 LUCs have been so incorporated;

(A) Base Master Plan (BMP);
The Base Master Plan will include an appendix which will include the LUC RD requirements, including a figure(s) identifying Depot areas subject to LUC restriction. The BMP will be a reference document available through the Environmental Management System (see 'C' below).

(B) Geographic Information System (GIS);
The GIS is a live version of all IR site data, updated at irregular intervals based on the need to incorporate new site investigation data. Sites are visible as shaded polygons, with sampling data tied to monitoring wells and sampling locations. LUC data and restrictions will be added to each

site as the LUCs are implemented. MCRD's GIS is currently controlled by Camp Lejeune, however MCRD anticipates improving on-base control.

(C) Environmental Management System (EMS)
MCRD shall maintain the LUCs by assuring unauthorized breaches are prohibited and any necessary construction is designed and approved prior to implementation. Additionally, erosion and invasive plant growth on the landfill cover will be controlled.

To accomplish this MCRD has SOPs and established policies and procedures that serve as enforceable compliance assurance measures. These compliance assurance measures will include the following:

1) Depot Order prohibiting unauthorized disturbances in the site area (See 4(b)(iii) below).

2) Standard Operating Procedures that detail the inspection, repair, and prohibitions in the areas. The SOPS also outline requirements for necessary construction approval in the areas.

3) Inspection record keeping, that in addition to inspection documentation, will describe any required repair and note repair completion date. These records are maintained for inspector's review.

4) Training plan and schedule that will explain to key facilities staff the SOPs, updated site information, and approvals required. The training plan includes a course outline and a roster of key facilities personnel that require annual training. Training records are maintained for inspector's review.

MCRD expects to migrate the elements for inspection, repair, and prohibitions into a single existing SOP, versus separate SOPs for each element. The over arching USMC EMS will include LUC compliance as a major environmental compliance aspect. Implementation of these compliance assurance procedures and policies will therefore be audited on an annual basis.

(iii) Base Order Incorporation: Within 120 days of USEPA and SCDHEC approval of this LUC RD, MCRD Parris Island will ensure that the LUCs for Site 1 are incorporated into a base-wide Order governing ground disturbing activities across the Depot.

(iv) Notice of Changes to Procedures: MCRD Parris Island will notify the USEPA and the SCDHEC in advance of any changes to the internal LUC management procedures described in paragraphs (i), (ii) or (iii) above, that could interfere with or negatively impact the effectiveness of, the LUCs for Site 1.

c. **Annual Site Inspections, Reports, and Certifications:** Beginning immediately upon approval of this LUC RD by USEPA and SCDHEC, MCRD Parris Island will conduct annual physical inspections of Site 1 to confirm continued compliance with all LUC Performance Objectives and verify the Base Master Plan, GIS System, Environmental Management System and Depot Order governing ground disturbing activities across the Base correctly describe the prohibited uses and restrictions at Site 1. Beginning upon approval of this LUC RD, the Commanding General, MCRD Parris Island, will provide to USEPA and SCDHEC an annual LUC Compliance Certificate for Site 1 consistent with Attachment 2. Should any deficiency(ies) be found at any time, MCRD Parris Island will separately notify USEPA and SCDHEC within 10 business days of the deficiency(ies) discovery and in accordance with Section 4.d. below.

The annual certification will be used in preparation of the Five Year Review to evaluate the effectiveness of the remedy. The annual certification, submitted to the regulatory agencies by the MCRD will evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.

d. **Compliance and Reporting:** Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs implemented at this Site will be addressed by MCRD Parris Island as soon as practicable, but in no case will the process be initiated later than 10 business days after MCRD becomes aware of the breach.

MCRD Parris Island will notify USEPA and SCDHEC as soon as practicable, but no later than 10 business days after the discovery of any activity that is inconsistent with the LUC Performance Objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs implemented at this Site. MCRD Parris Island will notify USEPA and SCHDEC, within 10 days of sending the initial notification of the breach, via separate written explanation regarding the specific deficiency(ies) found, how they have addressed or will address the breach, and the proposed schedule for addressing the breach.

The following are the agency Points of Contact (POCs) for LUC compliance reporting and other communications between the Navy (FEC SE and MCRD Parris Island), USEPA, and SCDHEC:

Navy / USMC
Commanding Officer
Naval Facilities Engineering Command, Southeast
Attn: Director, Environmental Restoration Division
P. O. Box 190010
North Charleston, SC 29419-9010

Commanding General
Marine Corps Recruit Depot Parris Island
ATTN: NREAO
PO Box: 5028
Parris Island, SC 29905

USEPA
United States Environmental Protection Agency
Region 4
Attn: MCRD Parris Island RPM
Superfund Division, Federal Facilities Branch
61 Forsyth Street
Atlanta, GA 30303

SCDHEC
South Carolina Department of Health and Environmental Protection
Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

e. **Land Use Changes:** MCRD Parris Island shall notify USEPA and SCDHEC at least 45 days in advance of any proposed land use changes at Site 1 that would be inconsistent with the LUC Performance Objectives or the selected remedy. This would include any proposed projects that may result in land use changes for the property encompassing all or a portion of Site 1. If changes are proposed for any area of land within the boundaries the Site where restrictions apply, such changes will not be implemented without the approval of the USEPA and SCDHEC.

f. **Notice of Transfer or Planned Property Conveyances:** The FEC SE or MCRD will provide notice to EPA and SCDHEC at least six (6) months prior to any transfer or sale of Site 1 property so that EPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective LUCs. If it is not possible for the facility to notify EPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify EPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. The notice shall describe the mechanism by which LUCs will continue to be implemented, maintained, inspected, reported, and enforced. In addition to the land transfer notice and discussion provisions above, the FEC SE or MCRD further agrees to provide EPA and SCDHEC with similar notice, within the same time frames, as to federal-to-federal transfer of property. The FEC SE or MCRD shall provide a copy of executed deed or transfer assembly to EPA and SCDHEC.

g. **Opportunity to Review Text of Intended Deed Restrictions:** Prior to conveyance of the real property encompassing all or a portion of Site 1, USEPA and SCDHEC representatives will be given reasonable opportunity to review and concur on the applicable deed language related to all LUCs and associated rights of entry for USEPA and SCDHEC for purposes of LUC oversight and enforcement. It is agreed the provisions in that deed will:

(i) Be no less restrictive than the LUC Performance Objectives described in Section 3 of this LUC RD;

(ii) Include the specific language concerning LUCs and rights of entry to be agreed upon by USEPA and SCDHEC as reflected in the Finding of Suitability to Transfer (FOST) or similar document for this site;

(iii) Include, as required by CERCLA 120(h)(3), a notice of the type and quantity of hazardous substances stored for 1 year or more, known to have been released or disposed on the property, a notice of the time at which such storage, release, or disposal took place, and a description of the remedial action taken, if any;

(iv) Be consistent with South Carolina real property law applicable to federal property being transferred to non-federal entities and be made to run with the land so that they shall be binding on all subsequent owners of the property, unless or until each LUC is terminated, and shall include a legal description of the property where the LUCs are to be implemented;

(v) Acknowledge that SCHDHEC is a third-party beneficiary of those LUCs until such time as each LUC is terminated at the Site;

(vi) Provide that the Navy shall not modify or terminate any LUC, implementation actions or modify land use without prior USEPA and SCHDEC approval.

Either FEC SE or MCRD Parris Island will also provide USEPA and SCDHEC with a copy of the executed deed.

h. Termination of LUCs: The LUCs at Site 1 will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels as to allow for unrestricted use and unlimited exposure.

FEC SE or MCRD Parris Island shall not modify or terminate LUCs, implementation actions, or modify land use at Site 1 without approval by EPA and SCDHEC. FEC SE or MCRD Parris Island shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs.

References

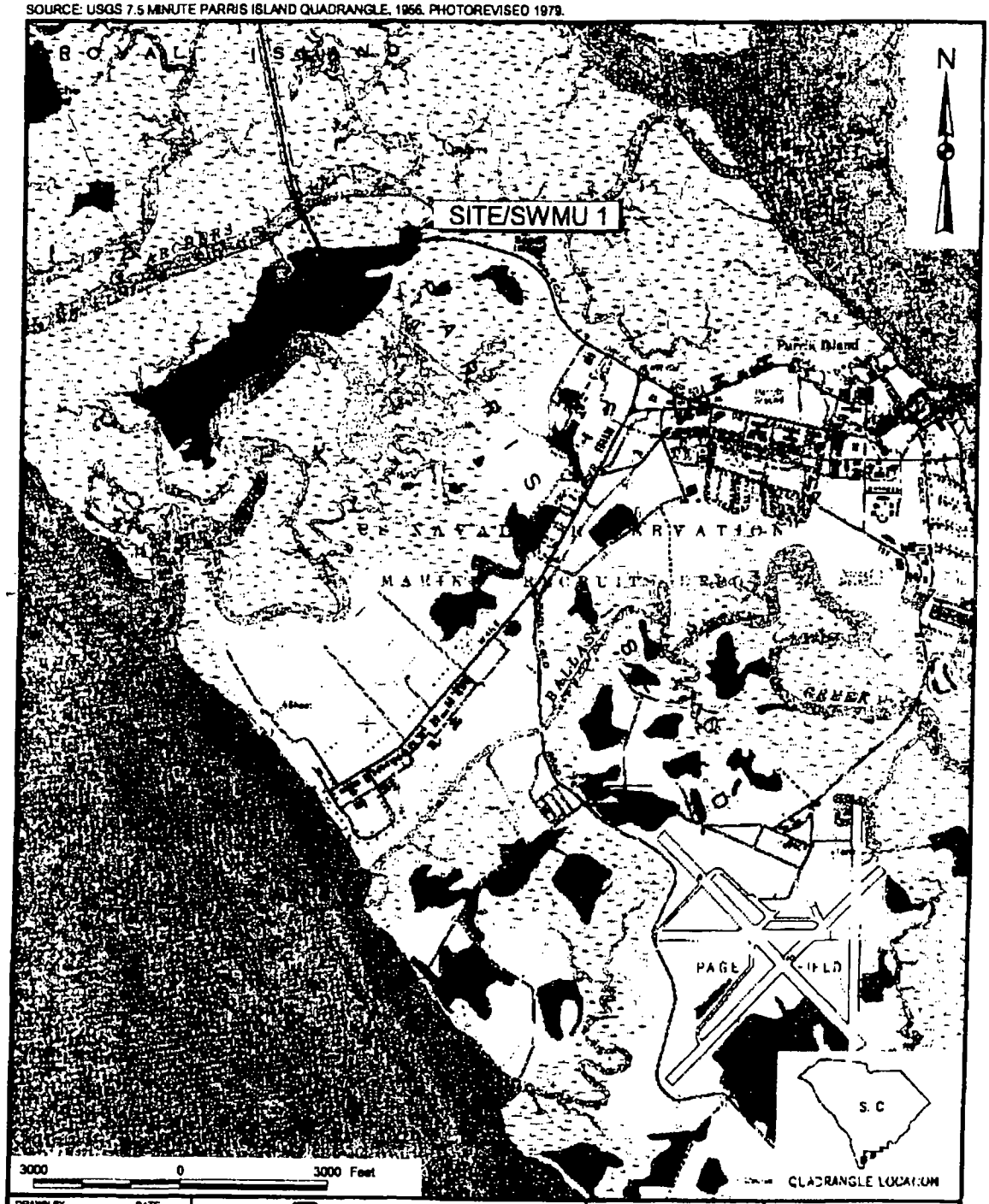
Record of Decision for Site/SWMU 1 Incinerator Landfill and SWMU 41 Former Incinerator, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, August 2006

Final Proposed Plan for Soil and Sediment Remedial Action at Site/SWMU 1 – Incinerator Landfill and SWMU 41 – Former Incinerator, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, February 2000

Final Feasibility Study/Corrective Measures Study for Site/SWMU 1 – Incinerator Landfill and SWMU 41 – Former Incinerator, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, January 2002

Final Remedial Investigation/RCRA Facilities Investigation for Site/SWMU 1 – Incinerator Landfill and SWMU 41 – Former Incinerator, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, June 2001

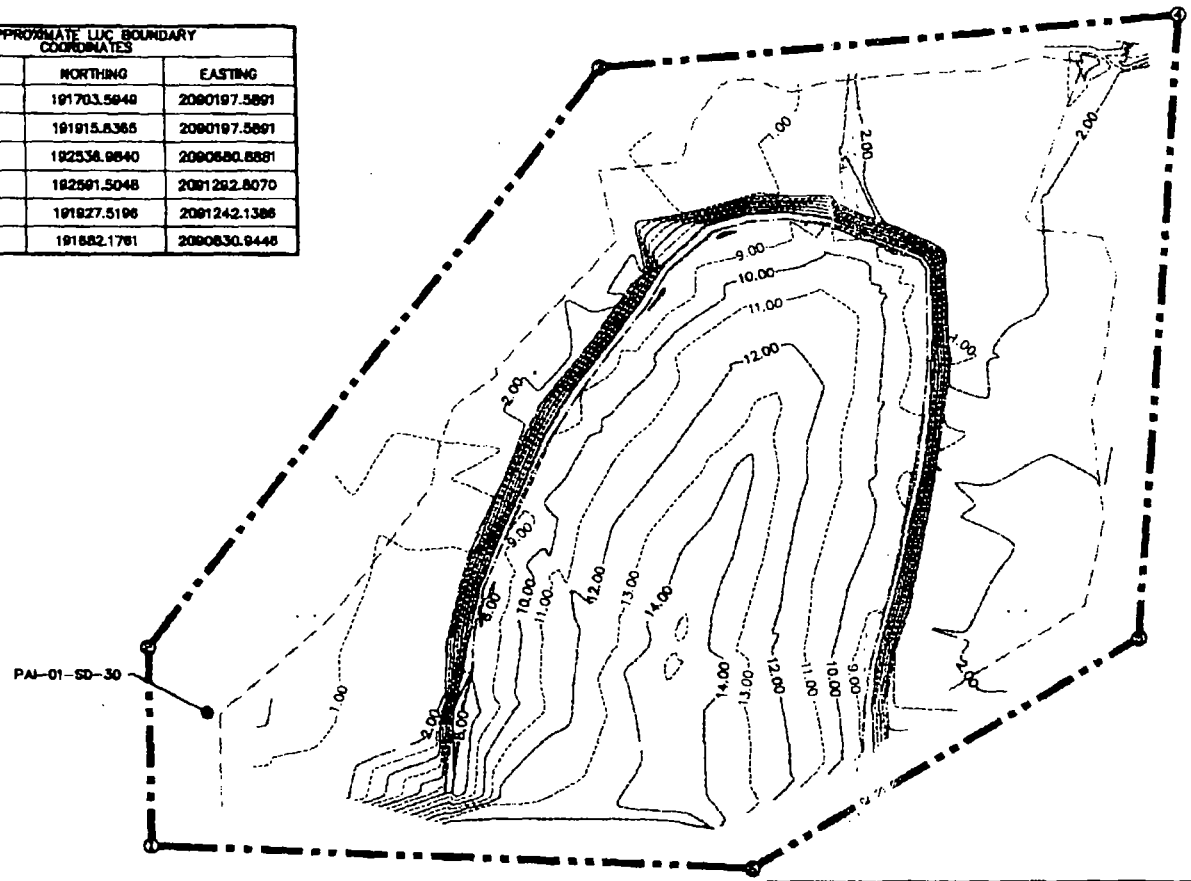
SOURCE: USGS 7.5 MINUTE PARRIS ISLAND QUADRANGLE, 1956, PHOTOREVISED 1979.



DRAWN BY D. PERRY DATE 03/16/99	Tetra Tech NUS, Inc.	CONTRACT NUMBER 7364	OWNER NO. —
CHECKED BY M. SLADIC DATE 01/15/08	DEPOT LOCATION MAP MCRD, PARRIS ISLAND, SOUTH CAROLINA	APPROVED BY — DATE —	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. Attachment 1	REV 0

P:\GIS\PARRIS ISLAND_MCRD\PARRIS.APR 8-14-01 MGS DEPOT LOCATION - SITE 1A1 LAYOUT 01/15/08 SS

APPROXIMATE LUC BOUNDARY COORDINATES		
LOCATION	NORTHING	EASTING
1	191703.5949	2090197.5891
2	191915.8365	2090197.5891
3	192536.9840	2090580.8881
4	192591.5048	2091292.8070
5	191927.5196	2091242.1386
6	191882.1761	2090630.9446



N

NOTE:

NO CONSTRUCTION OR INTRUSIVE ACTIVITY; NO RESIDENTIAL DEVELOPMENT; AND NO EXTRACTION OR USE OF GROUNDWATER IS IS PERMITTED WITHIN THE LUC BOUNDARY.

LEGEND:

- ● PROPOSED SEDIMENT SAMPLE LOCATION
- ① LUC BOUNDARY POINTS (SEE TABLE)
- LUC LAND USE CONTROL
- APPROXIMATE LUC BOUNDARY
- APPROXIMATE SITE BOUNDARY

0 120 240
GRAPHIC SCALE IN FEET

SEDIMENT SAMPLE LOCATION PAI-01-SD-30	
NORTHING	EASTING
191846.17	2090256.89

DRAWN BY MF DATE 4/18/07
CHECKED BY DATE
REVIEWED BY DATE
SCALE AS NOTED

NAVFAC

SITE/SWMU 1 INCINERATOR LANDFILL
LAND USE CONTROL REMEDIAL DESIGN
MCRD PARRIS ISLAND
PARRIS ISLAND, SOUTH CAROLINA

DOCUMENT NO. 0100
DRAWN NO.
APPROVED BY DATE
DRAWING NO. ATTACHMENT 2 REV. 0

ATTACHMENT 2

ANNUAL LUC COMPLIANCE CERTIFICATE
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA

Site Name (include SWMU #): Site/SWMU 3 – Causeway Landfill.

Site Location (provide nearest road name, GIS Coordinates, etc.): ___Third Battalion Causeway_____.

Date(s) of Inspection/Review: 27 Aug, 17 Oct 08; 5 Feb, 15 May 09

INSPECTION CHECKLIST	YES	NO	See Comment	NA
Land Use Restrictions				
1) No extraction, removal or use (including consumption) of groundwater observed.	X			
2) No residential development, (including but not limited to, any form of housing, child care facilities, pre-schools, or playgrounds) observed.	X			
3) No unauthorized construction or intrusive activities (e.g., digging into sediment, soils, or cover material) observed.	X			
4) Groundwater monitoring wells and cover system (e.g. wells intact, no woody species present in cover system) intact.	X			
Land Use Controls				
5) Base Master Plan review identifies this Site and the land use restrictions.	X			
6) Base Geographical Information System review identifies this Site and the land use restrictions.	X			
7) Base Environmental Management System identifies this Site and the land use restrictions.	X			
8) Base Depot Order is available, identifying this Site and the land use restrictions.	X			

Indicate whether any breaches or violations of the Land Use Controls and/or Land Use Restrictions have occurred during the reporting period. None

[If breach(s)/violation(s) occurred, then provide date(s) notification sent to EPA and SCDHEC.] N/A

NOTE 1: Exclude any activities previously approved by Navy, MCRD, US EPA, and SCDHEC such as monitoring wells that are part of the remedial action or maintenance activities that are conducted in accordance with base procedures.

Comments from checklist item1-4:
FACILITIES MAINTENANCE REPORTED EROSION BEHIND HEADWALL. I COULD NOT VERIFY. WOODY VEGETATION IN RIP-RAP.

Comments from checklist items 5-8:

This evaluation covers the period from 1 July (year) 2008 through 30 June 2009.

NOTE 2: Certificate shall be submitted by 1 July of the year following the reporting period.

I, the undersigned, hereby certify that I am an authorized representative of the Marine Corp/Navy and that the above described Land Use Controls have been implemented properly and the Land Use Restrictions complied with for the period noted. Any known deficiencies have been described and Marine Corp/Navy completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

Name/Signature

15 Jul 09
Date

Mail completed form(s) to:

U.S. Environmental
Protection Agency
Region 4
Superfund Division,
Federal Facilities Branch
61 Forsyth Street SW
Atlanta, GA 30303

South Carolina Department
of Health and
Environmental Control
Division of Waste
Management
Bureau of Land and Waste
Management
2600 Bull Street
Columbia SC 29201

Commanding Officer
Naval Facilities Engineering
Command, Southeast
ATTN: Director,
Environmental Restoration
Division PO Box 190010
North Charleston, SC 29419

Land-Use Control Implementation Plan For Site 3
Marine Corps Recruit Depot
Parris Island, South Carolina

This document identifies Land-Use Controls (LUCs) restricting Site 3, Causeway Landfill, at the Marine Corps Recruit Depot (MCRD) Parris Island, South Carolina. LUCs will be implemented for the purposes of (a) restricting human contact with solid waste material and surface soil, groundwater, surface water, and sediment contaminated with organic and inorganic constituents; (b) restricting human ingestion of fin fish and shellfish harvested from the pond adjacent to Site 3; (c) restricting soil disturbance activities (i.e., construction activities); and (d) prohibiting residential development of the site.

1. SITE DESCRIPTION

Site 3 is a primarily gravel, two-lane road overlying layers of solid waste, fill dirt, and debris deposited in a tidal marsh across Ribbon Creek as shown in Figure 2-2 of the main text. Site 3 functioned as the major disposal area for solid waste and other materials discarded in dumpsters around the MCRD during most of the period between 1960 and 1972. After implementation of an Interim Soil Remedy for Site 3, 2 feet of soil cover will be present over the waste and materials at the site, and the sides of the causeway will be stabilized to prevent migration of waste into the marsh and pond.

A human health risk assessment (HHRA) was conducted at Site 3 that evaluated risks to human receptor populations that may come in contact with site contaminants. The HHRA concluded that risk estimates for site construction workers and maintenance workers are considered to be acceptable by the U.S. EPA. Risk estimates to recreational users (fishermen) are not considered to be acceptable by the U.S. EPA under scenarios that assume daily fish consumption over a 30-year period and higher concentrations of contamination in the pond. Although not specifically addressed in the RI, Site 3 may also present potential effects to human receptors if the site were to be used for residential purposes. Consequently, the Depot, U.S. EPA Region 4 and the SCDHEC agreed that LUCs should be implemented at Site 3.

2. LOCATION

MCRD Parris Island (as shown in Figure 2-1 of the main text) is located along the southern coast of South Carolina, approximately 1 mile south of the city of Port Royal and 3 miles south of the city of Beaufort within Beaufort County. Site 3 is located in the northwestern portion of MCRD Parris Island and is an integral part of a causeway connecting Horse Island and Parris Island.

3. LAND-USE CONTROL OBJECTIVES

The Site 3 Proposed Plan for Soil Interim Remedial Action (TtNUS, 2000) calls for the initial implementation and continued application of appropriate restrictions on future usage of the property encompassing Site 3 while it is owned by the federal government. These restrictions will apply until/unless site remediation is conducted to restore the site for unrestricted use. Should the Navy later decide to transfer, by deed, ownership in the property encompassing Site 3 to any private person or entity, then the provisions of paragraph Deed Covenants and Conveyance of Title as set forth on page A-3 of this Land-Use Control Implementation Plan (LUCIP) shall apply. Until that time, the following LUCs addressed in the following section will remain in effect.

4. LUCS IMPLEMENTED TO ACHIEVE OBJECTIVES

Authorized Activities. The following activities are permissible within the confines of Site 3:

- Activities or uses that will not result in residential site development or otherwise allow for continuous, long-term exposure to children residing relatively close to the site (e.g., playgrounds).
- Recreational use of the site (e.g., fishing and jogging) that does not affect the integrity of the soil cover over the causeway.
- Unintrusive site maintenance activities (e.g., mowing) that do not affect the integrity of the soil cover over the causeway.

Unauthorized Activities. Those activities and uses that are inconsistent with the objectives of this LUCIP and that, if implemented at Site 3, could pose an increased risk of harm to health, safety, public welfare, or the environment. The following activities will not be permitted within the confines of Site 3:

- Construction of facilities specifically intended for use as residential housing or child care.
- Intrusive construction activity without the use of Level D personal protection equipment (PPE) (e.g., long sleeve shirt, gloves, and Tyvek® coveralls and boot covers if the potential exists for soiling work attire). Also, intrusive construction activity without the use of continuous air monitoring to determine whether upgrades to Level C or B PPE may be required.
- Extraction of groundwater except as required for groundwater monitoring.

- Swimming or wading in the pond or trespassing in the marsh within 200 feet of the causeway.

- Substance fishing from the pond.

- Any activities or uses not specifically stated under "authorized activities" listed above that could result in continuous, long-term exposure to children.

Proposed Changes in Use. Any proposed changes in permissible uses at Site 3 that may result in the development of Site 3 for residential use shall be evaluated by the MCRD Parris Island Natural Resources and Environmental Affairs Office (NREAO) to determine whether or not the proposed changes might pose potential risks to human health or the environment. Any proposed change in use of the site will be subject to review and approval by U.S. EPA Region 4 and the South Carolina Department of Human Health and Environmental Control (SCDHEC).

Deed Covenants and Conveyance of Title. Should the decision later be made to transfer ownership of the property encompassing Site 3 to any private person or entity, then the Navy shall either (1) take all actions necessary to remediate the site to then-existing residential (i.e., unrestricted use) cleanup standards prior to effecting such transfer or (2) deed record with the Beaufort County Register of Deeds appropriate restrictive covenants prohibiting future residential usage of the property. Should the Navy not have the requisite legal authority to record such deed restrictions, then it shall take all steps necessary to ensure that the cognizant federal agency with such authority does so unless the property is remediated to residential standards prior to such transfer. Should cleanup of the site not be effected to residential standards, then notification will be given to U.S. EPA Region 4 and SCDHEC at least 30 days prior to any conveyance of title to the site to any third party(ies) and the purchaser(s) of the site will be advised via the deed documentation as to then-existing site conditions and any/all associated LUCs and long-term monitoring requirements.

Posting. This LUCIP will be referenced in all MCRD Parris Island Utility Maps and in MCRD Parris Island's Base Master Plan. In conjunction with MCRD Parris Island's Base Master Plan and utility maps, this LUCIP is included in the Land-Use Control Assurance Plan Agreement. No maintenance or construction activities on or near Site 3 should be planned without first referring to these documents.

5. DECISION DOCUMENTS

The following decision documents have been issued for Site 3:

- Interim Record of Decision (IROD) for Soil Remedial Action at Site 3, MCRD Parris Island, South Carolina dated September ___, 2000.

6. OTHER PERTINENT INFORMATION (REFERENCES)

TtNUS, 1999. RCRA Facilities Investigation/Remedial Investigation for Site/SWMU 3, MCRD Parris Island, South Carolina. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, November.

TtNUS, 2000. Proposed Plan for Soil Interim Remedial Action at Site/SWMU 3, MCRD Parris Island, South Carolina. Prepared for Department of the Navy, Southern Division, Naval Facilities Engineering Command, North Charleston, South Carolina, June.

EXHIBIT A

Land Use Controls Annual Inspection Checklist
Site/SWMU 3 Causeway Landfill, MCRD, Parris Island, SC

DATE 15 May 09 DATE OF PREVIOUS INSPECTION Jun 08

TIME _____ DATE OF NEXT PERIODIC REVIEW Jun 10

NAME Tim Harrington

If the answer to any of the following questions deviates from the prescribed LUC, please describe and explain on the attached comment sheet. Photo documentation of discrepancies is recommended.

Land use is limited to "Restricted II" [a], involving infrequent site contact.	As-builts in Appendix E depicts Restricted II development boundaries (Site 3 limits). Has development occurred within the restricted area? Yes (No)
The property will be inspected annually to ensure that unauthorized use of the property does not occur and that status of the property is unchanged.	Did any unauthorized land use changes occur within the last year? Yes (No) Have any major land use changes [b] been requested, since the last inspection report? Yes (No)
The Navy will notify the implementing agency upon the discovery of any unauthorized change in land use.	If any unauthorized change in land use occurred, on what date were the current regulatory authority(ies) notified? N/A
Annual reporting of the site status is required.	Was the annual report submitted for the previous year? Yes (No) Are there any discrepancies from previous reports that have not been addressed? Yes (No)

These Land Use Controls will be documented in the MCRD PI annually.	Has it been greater than a calendar year, since the Base Master Plan was updated with LUCs? Yes No

(a) **Restricted II:** Land use involving infrequent site contact. Examples may include campgrounds in state parks, hiking trails away from population areas, and agricultural sites where farming practices result in very limited site contact (2 weeks total per year or less).

(b) **Major Land Use Change:** Any changes in land use (e.g., from industrial or recreational to residential) that would be inconsistent with those specific exposure assumptions in the human health and/or ecological risk assessments that served as the basis for the LUCs; any site activity that may disrupt the effectiveness of the implemented LUC (for example, excavation at a landfill; groundwater pumping that may impact a groundwater pump and treat system; a construction project that may impact ecological habitat protected by the remedy; removal of a fence; unlocking of a gate, or removal of warning signs); or any site activity intended to alter or negate the need for the specific LUCs implemented at the site.

EXHIBIT A

Land Use Controls Annual Inspection Checklist
Site/SWMU 3 Causeway Landfill, MCRD, Parris Island, SC

DATE 17 Jul 10 DATE OF PREVIOUS INSPECTION Jul 09

TIME 1500 DATE OF NEXT PERIODIC REVIEW Jul 11

NAME Tim Harrington

If the answer to any of the following questions deviates from the prescribed LUC, please describe and explain on the attached comment sheet. Photo documentation of discrepancies is recommended.

Land use is limited to "Restricted II" [a], involving infrequent site contact.	As-builts in Appendix E depicts Restricted II development boundaries (Site 3 limits). Has development occurred within the restricted area? Yes (No)
The property will be inspected annually to ensure that unauthorized use of the property does not occur and that status of the property is unchanged.	Did any unauthorized land use changes occur within the last year? Yes (No) Have any major land use changes [b] been requested, since the last inspection report? Yes (No)
The Navy will notify the implementing agency upon the discovery of any unauthorized change in land use.	If any unauthorized change in land use occurred, on what date were the current regulatory authority(ies) notified? N/A
Annual reporting of the site status is required.	Was the annual report submitted for the previous year? Yes (No) Are there any discrepancies from previous reports that have not been addressed? Yes (No)

These Land Use Controls will be documented in the MCRD PI annually.	Has it been greater than a calendar year, since the Base Master Plan was updated with LUCs? Yes (No)

(a) **Restricted II:** Land use involving infrequent site contact. Examples may include campgrounds in state parks, hiking trails away from population areas, and agricultural sites where farming practices result in very limited site contact (2 weeks total per year or less).

(b) **Major Land Use Change:** Any changes in land use (e.g., from industrial or recreational to residential) that would be inconsistent with those specific exposure assumptions in the human health and/or ecological risk assessments that served as the basis for the LUCs; any site activity that may disrupt the effectiveness of the implemented LUC (for example, excavation at a landfill; groundwater pumping that may impact a groundwater pump and treat system; a construction project that may impact ecological habitat protected by the remedy; removal of a fence; unlocking of a gate, or removal of warning signs); or any site activity intended to alter or negate the need for the specific LUCs implemented at the site.

ANNUAL LUC COMPLIANCE CERTIFICATE
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA

Site Name (include SWMU #): Site 12/SWMU 10 – Jericho Island Disposal Area.

Site Location (provide nearest road name, GIS Coordinates, etc.): Shell Point, Broad River Drive

Date(s) of Inspection/Review: 3 Sep, 13 Nov 09; 6 Jan, 17 Jun 10.

Property Owner: MCRD Parris Island, DoN

INSPECTION CHECKLIST	YES	NO	See Comment	NA
Land Use Restrictions				
1) No extraction, removal or use (including consumption) of groundwater observed (See Note 1).	☑	☐	☐	☐
Land Use Controls				
2) Base Master Plan review identifies this Site and the land use restrictions.	☑	☐	☐	☐
3) Base Geographical Information System review identifies this Site and the land use restrictions.	☑	☐	☐	☐
4) Base Environmental Management System identifies this Site and the land use restrictions.	☑	☐	☐	☐
5) Base Depot Order is available, identifying this Site and the land use restrictions.	☑	☐	☐	☐

Indicate whether any breaches or violations of the Land Use Controls and/or Land Use Restrictions have occurred during the reporting period. None

[If breach(s)/violation(s) occurred, then provide date(s) notification sent to EPA and SCDHEC.] N/A

NOTE 1: Exclude any activities previously approved by Navy, MCRD, US EPA, and SCDHEC such as monitoring wells that are part of the remedial action or maintenance activities that are conducted in accordance with base procedures.

Comments from checklist item1:

ECO RESTORATION AREA ON SOUTHERN END IS STILL LARGELY BARREN. SPARTINA SLOWLY ENCROACHING. CAUSEWAY AREA HAS BEEN RE-GRADED. ELEVATION APPEARS TO BE LOWER, EVIDENCED BY MORE PONDING.

Comments from checklist items 2-5:

This evaluation covers the period from 1 ~~January~~ Jan (year) 2009 through ~~31 December~~ 30 June 2010.

NOTE 2: Certificate shall be submitted by 1 March of the year following the reporting period.

I, the undersigned, hereby certify that I am an authorized representative of the Marine Corp/Navy and that the above described Land Use Controls have been implemented properly and the Land Use Restrictions complied with for the period noted. Any known deficiencies have been described and Marine Corp/Navy completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

Name/Signature

18 JUN 10
Date

ANNUAL LUC COMPLIANCE CERTIFICATE
MARINE CORPS RECRUIT DEPOT PARRIS ISLAND, SOUTH CAROLINA

Site Name (include SWMU #): Site 12/SWMU 10 – Jericho Island Disposal Area.

Site Location (provide nearest road name, GIS Coordinates, etc.): SHELL POINT, BROAD RIVER DRIVE

Date(s) of Inspection/Review: 27 APR, 17 OCT, 9 DEC 08; 5 FEB; 15 MAY 09

Property Owner: MCRD PARRIS ISLAND

INSPECTION CHECKLIST	YES	NO	See Comment	NA
Land Use Restrictions				
1) No extraction, removal or use (including consumption) of groundwater observed (See Note 1).	X			
Land Use Controls				
2) Base Master Plan review identifies this Site and the land use restrictions.	X			
3) Base Geographical Information System review identifies this Site and the land use restrictions.	X			
4) Base Environmental Management System identifies this Site and the land use restrictions.	X			
5) Base Depot Order is available, identifying this Site and the land use restrictions.	X			

Indicate whether any breaches or violations of the Land Use Controls and/or Land Use Restrictions have occurred during the reporting period. NONE

[If breach(s)/violation(s) occurred, then provide date(s) notification sent to EPA and SCDHEC.] N/A

NOTE 1: Exclude any activities previously approved by Navy, MCRD, US EPA, and SCDHEC such as monitoring wells that are part of the remedial action or maintenance activities that are conducted in accordance with base procedures.

Comments from checklist item1:

RESTORATION AREAS DO NOT SHOW ANY SIGNIFICANT CHANGES.

Comments from checklist items 2-5:

This evaluation covers the period from 1 ~~January~~ JUL (year) 2008 through ~~31 December~~ 30 JUN 2009.

NOTE 2: Certificate shall be submitted by 1 March of the year following the reporting period.

I, the undersigned, hereby certify that I am an authorized representative of the Marine Corp/Navy and that the above described Land Use Controls have been implemented properly and the Land Use Restrictions complied with for the period noted. Any known deficiencies have been described and Marine Corp/Navy completed or planned actions to address such deficiencies are described in the attached Explanation of Deficiency(ies).

Name/Signature

15 JUL 09
Date

Marine Corps Recruit Depot, Parris Island, South Carolina
Land Use Control Remedial Design
Site 12 / SWMU 12 – Jericho Island Disposal Area

1. PURPOSE

The purpose of this Land Use Control (LUC) Remedial Design (RD) for Site 12 /SWMU 10 – Jericho Island Disposal Area, (hereafter "Site 12" or "the Site") is to provide information on how the LUC component of the remedy selected in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Record of Decision (ROD) for the Site will be implemented and maintained.

The ROD, dated September 2006, stipulates the implementation of certain LUCs to prohibit the extraction or any use of the groundwater beneath the Site. These controls will preclude unacceptable human health risks from exposure to groundwater. This LUC RD was prepared as a result of the selection of LUCs as components of the remedy in accordance with the ROD for Site 12. The Navy / MCRD is responsible for implementing, maintaining, reporting on, and enforcing the land use controls.

The LUC requirements described herein will be effective immediately upon approval of this LUC RD by the United States Environmental Protection Agency (USEPA) and South Carolina Department of Health and Environmental Control (SCDHEC). Once put into effect, the requirements set forth in this document will remain applicable to Site 12 during Navy as well as subsequent ownership of the Site. Land Use Controls will be maintained until the concentrations of hazardous substances in the groundwater are at such levels to allow for unrestricted use and unlimited exposure.

2. DESCRIPTION OF THE SITE

Site 12 Historical Use

From 1955 to 1968, Site 12 served as a solid waste disposal area by local residents. No organized landfill operations were reported to have occurred at Site 12. Jericho Island is approximately 25 acres in size and was acquired by the Navy in 1968 to satisfy limited distance arc requirements for MCRD's rifle range. Disposed waste consisted of routine domestic refuse including small metal cans, beer and soda bottles, hubcaps, tires, buckets, cinder blocks, rusted metal 5-gallon cans, sheet metal, paper, plastic, and wood. The site had an irregular, undulating surface due to the random scattering of surface debris piles that ranged up to approximately 30 feet in diameter and 5 feet in height. A causeway (a raised way across wet ground or water) was constructed by unknown persons from the mainland to the northern end of Jericho Island for access purposes prior to Navy acquisition of the property. The causeway was constructed with soil commingled with waste material. The date of construction of the causeway is unknown. Since 1968, no significant disposal activity has taken place within the boundaries of Site 12. Site 12 has historically been covered with mature pine trees.

Site 12 is not currently used for residential purposes and is not anticipated to be used as such in the future. The reasonably anticipated land use is to leave this land vacant. No residential use is anticipated.

Corrective Action Taken
Three surface debris piles located on Jericho Island and their underlying soil and sediment (approximately 2,300 cubic yards of material) were excavated. An additional 1,700 cubic yards of PAH-contaminated soil, and approximately 370 cubic yards of inorganics-contaminated sediment were also removed. Lastly, the causeway connecting Jericho Island to the mainland was also removed. Verification sampling was used to confirm the excavation activities achieved remedial goals. All excavated solid waste debris and contaminated soils and sediment were transported to an approved off-site disposal facility. Site restoration, including clean sand fill and revegetation, was completed. The causeway area was re-established as a salt marsh.

3. LUC PERFORMANCE OBJECTIVES

The ROD for Site 12 established the following LUC Performance Objective:

- Prohibit extraction or any use of the groundwater beneath the Site.

4. LUC IMPLEMENTATION ACTIONS

The following LUCs consisting of Institutional Controls (IC) will be implemented by the Navy (as represented by either MCRD Parris Island or Naval Facilities Engineering Command, Southeast (FEC SE) as specified below) in order to ensure that the aforementioned LUC Performance Objective for Site 12 is met and maintained:

a. IC Implementation

(i) LUC RD Distribution: Within 30 days of receiving USEPA and SCDHEC approval of this LUC RD, MCRD Parris Island will place the LUC RD in the MCRD Parris Island Information Repository currently located at the Beaufort County Public Library's Headquarters Location at 311 Scott Street, Beaufort, South Carolina 29902.

(ii) Updates to Existing Base Documentation: Within 60 days of USEPA and SCDHEC approval of this LUC RD, MCRD Parris Island will update the following base planning and environmental management documents to identify the prohibited groundwater use or extraction consistent with the Site 12 ROD and to depict the Site LUC boundaries shown on Attachment 1. MCRD Parris Island will notify the USEPA and SCDHEC when the Site 12 LUCs have been so incorporated;

(A) Base Master Plan (BMP);
The Base Master Plan will include an appendix which will include the LUC RD requirements, including a figure(s) identifying Depot areas subject to

LUC restriction. The BMP will be a reference document available through the Environmental Management System (see 'C' below).

(B) Geographic Information System (GIS);
The GIS is a live version of all IR site data, updated at irregular intervals based on the need to incorporate new site investigation data. Sites are visible as shaded polygons, with sampling data tied to monitoring wells and sampling locations. LUC data and restrictions will be added to each site as the LUCs are implemented. MCRD's GIS is currently controlled by Camp Lejeune, however MCRD anticipates improving on-base control.

(C) Environmental Management System (EMS)
MCRD shall maintain the LUCs by assuring unauthorized breaches are prohibited and any necessary construction is designed and approved prior to implementation.

To accomplish this MCRD has SOPs and established policies and procedures that serve as enforceable compliance assurance measures. These compliance assurance measures will include the following:

1) Depot Order prohibiting unauthorized disturbances in the site area (See 4(a)(iii) below).

2) Standard Operating Procedures that detail the inspection, repair, and prohibitions in the areas. The SOPS also outline requirements for necessary construction approval in the areas.

3) Inspection record keeping, that in addition to inspection documentation, will describe any required repair and note repair completion date. These records are maintained for inspector's review.

4) Training plan and schedule that will explain to key facilities staff the SOPs, updated site information, and approvals required. The training plan includes a course outline and a roster of key facilities personnel that require annual training. Training records are maintained for inspector's review.

MCRD expects to migrate the elements for inspection, repair, and prohibitions into a single existing SOP, versus separate SOPs for each element. The over arching USMC EMS will include LUC compliance as a major environmental compliance aspect. Implementation of these compliance assurance procedures and policies will therefore be audited on an annual basis.

(iii) Base Order Incorporation: Within 120 days of USEPA and SCDHEC approval of this LUC RD, MCRD Parris Island will ensure that the LUCs for Site 12 are

incorporated into a base-wide Order governing ground disturbing activities across the Depot.

(iv) Notice of Changes to Procedures: MCRD Parris Island will notify the USEPA and the SCDHEC in advance of any changes to the internal LUC management procedures described in paragraphs (i), (ii) or (iii) above, that could interfere with or negatively impact the effectiveness of, the LUCs for Site 12.

b. **Annual Site Inspections, Reports, and Certifications:** Beginning immediately upon approval of this LUC RD by USEPA and SCDHEC, MCRD Parris Island will conduct annual physical inspections of Site 12 to confirm continued compliance with the LUC Performance Objective and verify the Base Master Plan, GIS System, and Environmental Management System correctly describe the prohibited uses and restrictions at Site 12. Beginning upon approval of this LUC RD, the Commanding General, MCRD Parris Island, will provide to USEPA and SCDHEC an annual LUC Compliance Certificate for Site 12 consistent with Attachment 2. Should any deficiency(ies) be found at any time, MCRD Parris Island will separately notify USEPA and SCDHEC within 10 business days of the deficiency(ies) discovery and in accordance with Section 4.c. below.

The annual certification will be used in preparation of the Five Year Review to evaluate the effectiveness of the remedy. The annual certification, submitted to the regulatory agencies by the MCRD will evaluate the status of the IC and how any IC deficiencies or inconsistent uses have been addressed.

c. **Compliance and Reporting:** Any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs implemented at this Site will be addressed by MCRD Parris Island as soon as practicable, but in no case will the process be initiated later than 10 business days after MCRD becomes aware of the breach.

MCRD Parris Island will notify USEPA and SCDHEC as soon as practicable, but no later than 10 business days after the discovery of any activity that is inconsistent with the LUC Performance Objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs implemented at this Site. MCRD Parris Island will notify USEPA and SCHDEC, within 10 days of sending the initial notification of the breach, via separate written explanation regarding the specific deficiency(ies) found, how they have addressed or will address the breach, and the proposed schedule for addressing the breach.

The following are the agency Points of Contact (POCs) for LUC compliance reporting and other communications between the Navy (FEC SE and MCRD Parris Island), USEPA, and SCDHEC:

Navy / USMC
Commanding Officer
Naval Facilities Engineering Command, Southeast
Attn: Director, Environmental Restoration Division
P. O. Box 190010
North Charleston, SC 29419-9010

Commanding General
Marine Corps Recruit Depot Parris Island
ATTN: NREAO
PO Box: 5028
Parris Island, SC 29905

USEPA
United States Environmental Protection Agency
Region 4
Attn: MCRD Parris Island RPM
Superfund Division, Federal Facilities Branch
61 Forsyth Street
Atlanta, GA 30303

SCDHEC
South Carolina Department of Health and Environmental Protection
Director of Division of Waste Management
Bureau of Land and Waste Management
2600 Bull Street
Columbia, SC 29201

d. **Land Use Changes:** MCRD Parris Island shall notify USEPA and SCDHEC at least 45 days in advance of any proposed land use changes at Site 12 that would be inconsistent with the LUC Performance Objectives or the selected remedy. This would include any proposed projects that may result in land use changes for the property encompassing all or a portion of Site 12. If changes are proposed for any area of land within the boundaries the Site where restrictions apply, such changes will not be implemented without the approval of the USEPA and SCDHEC.

e. **Notice of Transfer or Planned Property Conveyances:** The FEC SE or MCRD will provide notice to EPA and SCDHEC at least six (6) months prior to any transfer or sale of Site 12 property so that EPA and SCDHEC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective LUCs. If it is not possible for the facility to notify EPA and SCDHEC at least six months prior to any transfer or sale, then the facility will notify EPA and SCDHEC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. The notice shall describe the mechanism by which LUCs will continue to be implemented, maintained, inspected, reported, and enforced. In addition to the land transfer notice and discussion provisions above, the FEC SE or MCRD further agrees to provide EPA and SCDHEC with similar notice, within the same time frames, as to federal-to-federal transfer of property. The FEC SE or MCRD shall provide a copy of executed deed or transfer assembly to EPA and SCDHEC.

f. **Opportunity to Review Text of Intended Deed Restrictions:** Prior to conveyance of the real property encompassing all or a portion of Site 12, USEPA and SCDHEC representatives will be given reasonable opportunity to review and concur on the

applicable deed language related to all LUCs and associated rights of entry for USEPA and SCDHEC for purposes of LUC oversight and enforcement. It is agreed the provisions in that deed will:

(i) Be no less restrictive than the LUC Performance Objectives described in Section 3 of this LUC RD;

(ii) Include the specific language concerning LUCs and rights of entry to be agreed upon by USEPA and SCDHEC as reflected in the Finding of Suitability to Transfer (FOST) or similar document for this site;

(iii) Include, as required by CERCLA 120(h)(3), a notice of the type and quantity of hazardous substances stored for 1 year or more, known to have been released or disposed on the property, a notice of the time at which such storage, release, or disposal took place, and a description of the remedial action taken, if any;

(iv) Be consistent with South Carolina real property law applicable to federal property being transferred to non-federal entities and be made to run with the land so that they shall be binding on all subsequent owners of the property, unless or until each LUC is terminated, and shall include a legal description of the property where the LUCs are to be implemented;

(v) Acknowledge that SCHDHEC is a third-party beneficiary of those LUCs until such time as each LUC is terminated at the Site;

(vi) Provide that the Navy shall not modify or terminate any LUC, implementation actions or modify land use without prior USEPA and SCHDEC approval.

Either FEC SE or MCRD Parris Island will also provide USEPA and SCDHEC with a copy of the executed deed.

g. **Termination of LUCs:** The LUCs at Site 12 will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels as to allow for unrestricted use and unlimited exposure.

FEC SE or MCRD Parris Island shall not modify or terminate LUCs, implementation actions, or modify land use at Site 12 without approval by EPA and SCDHEC. FEC SE or MCRD Parris Island shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs.

References

Record of Decision for Site12/SWMU 10 - Jericho Island Disposal Area, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, September 2006

Final Proposed Plan for Waste, Soil and Sediment Remedial Action at Site 12/SWMU 10 – Jericho Island Disposal Area, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, July 2005

Final Feasibility Study/Corrective Measures Study for Site12/SWMU 10 –Jericho Island Disposal Area, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, May 2004

Final Remedial Investigation/RCRA Facilities Investigation for Site 12/SWMU 10 – Jericho Island Disposal Area, Marine Corps Recruit Depot Parris Island, South Carolina, TtNUS, October 2001

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

January 8, 2008

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

4SD-FFB

Naval Air Station, JAX
Navy Facilities Engineering SE
Installation Restoration, SC IPT
Attn: Charles Cook
PO Box 30
North Ajax Street, Bldg 135
Jacksonville, FL 32212-0030

And

Commanding General
Marine Corps Recruit Depot
Natural Resources & Environmental Affairs
Attn: Heber Pittman
PO Box 5028
Parris Island, SC 29905-9001

SUBJ: EPA Review of the Draft Final OU5 (Site 12) Land Use Control Remedial Design (LUC RD) (Cook cover letter dated November 19, 2007; document dated Rev: 2 October 2007).

Dear Sirs:

EPA has reviewed the Draft Final OU5 (Site 12) LUC RD and the associated Response To Comments (RTC). The review has resulted in this conditional approval letter, which contains a final comment which does not require a response, and two conditions which must be met in order for this approval to remain in effect. The Navy/MCRD has until January 23rd, 2008 to respond to this conditional approval, providing the requested final changes, and/or negotiating revised acceptable final language, either one to be submitted via change pages. EPA's comments and conditions are as follows:

Comments:

1. At the last partnering meeting the language included in the Draft Final LUC RD and the associated RTC were discussed. All responses and changes were acceptable with the

exception of one. The response pertaining to the description of the EMS was unclear. While EPA could accept the language provided in the LUC RD, it appeared the Navy/MCRD was not able to ensure EPA that the system, as described, would be up and functioning within 60 days of approval of the LUC RD, as called for in the LUC RD. Alternatively, EPA suggested the Navy/MCRD revise the Draft Final LUC RD to include, in addition to the description of the proposed EMS, a more current statement regarding a commitment to make new Depot staff aware of the LUCs and their associated SOPs, training requirements, Points of Contact, and reference documents via current procedures and during the period of EMS development. EPA suggested this so that MCRD could ensure they had a design in place that describes what could actually be accomplished within 60 days of LUC RD approval (the current process with a proposal to implement the EMS in the near future.) Anytime after that, the EMS could be implemented and the LUC RD updated as need be. The Navy/MCRD needs to clarify their intentions (See conditions below.)

The Site 12 LUC RD is approved provided the following conditions are met:

Conditions for Approval:

1. Since the drafting of this document, EPA Region 4 has undergone reorganization. As a result, EPA requests a modification be made to EPA's address listed under Compliance and Reporting. Please change "Waste Management Division" to "Superfund Division", and submit the associated change page. (Note: I believe SCDHEC also wishes their address to read "Director of" Division of Waste Management).

2. The Navy/MCRD needs to **EITHER** modify the Draft Final LUC RD to commit to making new Depot staff (marines, civilians, or contractors) aware of LUCs and their associated SOPs, required training, Points of Contact, and reference documents through current procedures (details of which can be submitted in the future or must be explained during future LUC Site inspections) **OR** modify their RTC to indicate that the current Draft Final LUC RD description of the EMS system will be implementable within 60 days of approval of the LUC RD (date of this letter) and modify the Draft Final Language to remove the statement that the EMS is not yet fully operational. **The Navy/MCRD should submit the associated preferred change pages by January 23rd, 2008, and should be made consistent with changes to the Site 1 LUC RD.** (See EPA's original comment letter for acceptable EMS language modification, or provide your own revisions to the RTC.)

The clock for implementation of the LUC RD requirements begins as of the date of this letter. Please note that the LUC RD calls for the Final LUC RD to be placed in the information repository within 30 days of the date of this letter. Therefore, EPA asks that that the Navy/MCRD respond to this letter no later than January 23rd, in order to be able to have an approved version with the change pages within 30 days, as required. Furthermore, Section 4(a)(ii) calls for a series of Base documents/systems to be updated

with the final LUC language within 60 days of the date of this letter. Additionally, within 120 days the Base is to incorporate this LUC information into a Base-wide Order governing ground disturbing activities across the Depot.

If acceptable change pages have not been received by January 23rd, 2008, this conditional approval shall be considered null and void.

EPA appreciates the coordination efforts put forth by the Base and Navy in developing a LUC Remedial Design for this Site. If there are any questions, please do not hesitate to contact me at (404) 562-9969 about these comments and conditions.

Sincerely,

Lila Llamas
Senior RPM

cc: Meredith Amick, SCDHEC
Sommer Barker, SCDHEC
Mark Sladic, TtNUS

Appendix D
Five-Year Review Site Inspection Checklist

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Five-Year Review Site Inspection Checklist

Purpose of the Checklist

The site inspection checklist provides a useful method for collecting important information during the site inspection portion of the five-year review. The checklist serves as a reminder of what information should to be gathered and provides the means of checking off information obtained and reviewed, or information not available or applicable. The checklist is divided into sections as follows:

I. Site Information
II. Interviews
III. On-site Documents & Records Verified
IV. O&M Costs
V. Access and Institutional Controls
VI. General Site Conditions
VII. Landfill Covers
VIII. Vertical Barrier Walls
IX. Groundwater/Surface Water Remedies
X. Other Remedies
XI. Overall Observations

Some data and information identified in the checklist may or may not be available at the site depending on how the site is managed. Sampling results, costs, and maintenance reports may be kept on site or may be kept in the offices of the contractor or at State offices. In cases where the information is not kept at the site, the item should not be checked as "not applicable," but rather it should be obtained from the office or agency where it is maintained. If this is known in advance, it may be possible to obtain the information before the site inspection.

This checklist was developed by EPA and the U.S. Army Corps of Engineers (USACE). It focuses on the two most common types of remedies that are subject to five-year reviews: landfill covers, and groundwater pump and treat remedies. Sections of the checklist are also provided for some other remedies. The sections on general site conditions would be applicable to a wider variety of remedies. The checklist should be modified to suit your needs when inspecting other types of remedies, as appropriate.

The checklist may be completed and attached to the Five-Year Review report to document site status. Please note that the checklist is not meant to be completely definitive or restrictive; additional information may be supplemented if the reviewer deems necessary. Also note that actual site conditions should be documented with photographs whenever possible.

Using the Checklist for Types of Remedies

The checklist has sections designed to capture information concerning the main types of remedies which are found at sites requiring five-year reviews. These remedies are landfill covers (Section VII of the checklist) and groundwater and surface water remedies (Section IX of the checklist). The primary elements and appurtenances for these remedies are listed in sections which can be checked off as the facility is inspected. The opportunity is also provided to note site conditions, write comments on the facilities, and attach any additional pertinent information. If a site includes remedies beyond these, such as soil vapor extraction or soil landfarming, the information should be gathered in a similar manner and attached to the checklist.

Considering Operation and Maintenance Costs

Unexpectedly widely varying or unexpectedly high O&M costs may be early indicators of remedy problems. For this reason, it is important to obtain a record of the original O&M cost estimate and of annual O&M costs during the years for which costs incurred are available. Section IV of the checklist provides a place for documenting annual costs and for commenting on unanticipated or unusually high O&M costs. A more detailed categorization of costs may be attached to the checklist if available. Examples of categories of O&M costs are listed below.

Operating Labor - This includes all wages, salaries, training, overhead, and fringe benefits associated with the labor needed for operation of the facilities and equipment associated with the remedial actions.

Maintenance Equipment and Materials - This includes the costs for equipment, parts, and other materials required to perform routine maintenance of facilities and equipment associated with a remedial action.

Maintenance Labor - This includes the costs for labor required to perform routine maintenance of facilities and for equipment associated with a remedial action.

Auxiliary Materials and Energy - This includes items such as chemicals and utilities which can include electricity, telephone, natural gas, water, and fuel. Auxiliary materials include other expendable materials such as chemicals used during plant operations.

Purchased Services - This includes items such as sampling costs, laboratory fees, and other professional services for which the need can be predicted.

Administrative Costs - This includes all costs associated with administration of O&M not included under other categories, such as labor overhead.

Insurance, Taxes and Licenses - This includes items such as liability and sudden and accidental insurance, real estate taxes on purchased land or right-of-way, licensing fees for certain technologies, and permit renewal and reporting costs.

Other Costs - This includes all other items which do not fit into any of the above categories.

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: MCRD Parris Island	**Date of inspection: 17 Jun 2010**
Location and Region: Beaufort SC	**EPA ID: SC6170022762**
Agency, office, or company leading the five-year review: Dept of the Navy	**Weather/temperature:**
Remedy Includes: (Check all that apply) ✓ Landfill cover/containment ✓ Access controls ✓ Institutional controls G Groundwater pump and treatment G Surface water collection and treatment G Other_____ G Monitored natural attenuation G Groundwater containment G Vertical barrier walls	
Attachments: G Inspection team roster attached	G Site map attached

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	G O&M manual	G Readily available	G Up to date	G N/A
	G As-built drawings	G Readily available	G Up to date	G N/A
	G Maintenance logs	G Readily available	G Up to date	G N/A
	Remarks_____			
2.	**Site-Specific Health and Safety Plan**	G Readily available	G Up to date	G N/A
	G Contingency plan/emergency response plan	G Readily available	G Up to date	G N/A
	Remarks_____			
3.	**O&M and OSHA Training Records**	G Readily available	G Up to date	G N/A
	Remarks_____			
6.	**Settlement Monument Records**	G Readily available	G Up to date	G N/A
	Remarks_____N/A_____			
7.	**Groundwater Monitoring Records**	G Readily available	G Up to date	G N/A
	Remarks_____Readily available and current.			

IV. O&M COSTS

1. **O&M Organization**
G State in-house G Contractor for State
G PRP in-house G Contractor for PRP
G Federal Facility in-house G Contractor for Federal Facility
G Other_____

2. **O&M Cost Records**
G Readily available G Up to date
G Funding mechanism/agreement in place
Original O&M cost estimate_____ G Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ G Breakdown attached
Date Date Total cost
From_____ To_____ _____ G Breakdown attached
Date Date Total cost
From_____ To_____ _____ G Breakdown attached
Date Date Total cost
From_____ To_____ _____ G Breakdown attached
Date Date Total cost
From_____ To_____ _____ G Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS G Applicable G N/A

A. Fencing

1. **Fencing damaged** G Location shown on site map G Gates secured G N/A
Remarks_____

B. Other Access Restrictions

1. **Signs and other security measures** G Location shown on site map G N/A
Remarks_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented G Yes G No G N/A
Site conditions imply ICs not being fully enforced G Yes G No G N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency Quarterly_____
Responsible party/agency MCRD Parris Island
Contact _Tim Harrington_____ _NREAO _____ _17 Jun 10___ 843-228-3423
Name Title Date Phone no.

Reporting is up-to-date G Yes G No G N/A
Reports are verified by the lead agency G Yes G No G N/A

Specific requirements in deed or decision documents have been met G Yes G No G N/A
Violations have been reported G Yes G No G N/A
Other problems or suggestions: G Report attached

2. **Adequacy** ICs are adequate ICs are inadequate N/A
Remarks_____Institutional Controls are adequate_____

D. General

1. **Vandalism/trespassing** Location shown on site map No vandalism evident
Remarks___No vandalism evident_____

2. **Land use changes on site** N/A
Remarks_____N/A_____

3. **Land use changes off site** G N/A
Remarks____N/A_____

VI. GENERAL SITE CONDITIONS

A. Roads Applicable N/A

1. **Roads damaged** Location shown on site map Roads adequate N/A
Remarks____Roads adequate _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS G Applicable G N/A

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map G Settlement not evident
Areal extent_____ Depth_____
Remarks__Site 3: some settlement is occurring and is noticeable on the road however, not yet measurable.

2. **Cracks** Location shown on site map Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks__Cracking not evident

3. **Erosion** G Location shown on site map G Erosion not evident
Areal extent_____ Depth_____
Remarks__Site 3: Erosion occurs occasionally at the western set of culverts. Sinkhole forms on top of the causeway, adjacent to the road.

4. **Holes** G Location shown on site map G Holes not evident
Areal extent_____ Depth_____
Remarks_Sinkhole forms occasionally on Site 3. Due to safety hazard presented, facilities maintenance routinely places clean fill in the hole when it forms. No evidence of sedimentation has been observed following the sinkhole formation.

5. **Vegetative Cover** G Grass G Cover properly established G No signs of stress
G Trees/Shrubs (indicate size and locations on a diagram)
Remarks___Vegetative cover is not stressed. Woody vegetation is growing in the rip-rap at Sites 1 and 3. Woody vegetation is also beginning to grow on the cover system at Site 1.

6. **Alternative Cover (armored rock, concrete, etc.)** G N/A
Remarks_____

7. **Bulges** G Location shown on site map G Bulges not evident
Areal extent_____ Height_____
Remarks__Bulges not evident.

8. **Wet Areas/Water Damage** Wet areas/water damage not evident
G Wet areas G Location shown on site map Areal extent_____
G Ponding G Location shown on site map Areal extent_____
G Seeps G Location shown on site map Areal extent_____
G Soft subgrade G Location shown on site map Areal extent_____
Remarks____Wet areas/water damage not evident.

9. **Slope Instability** G Slides G Location shown on site map G No evidence of slope instability
Areal extent_____
Remarks__No evidence of slope instability at Sites 1 or 3.

D. Cover Penetrations G Applicable G N/A

1. **Gas Vents** G Active G Passive
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance
G N/A
Remarks_____

2. **Gas Monitoring Probes**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

4. **Leachate Extraction Wells**
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

5. **Settlement Monuments** G Located G Routinely surveyed G N/A
Remarks_____

H. Retaining Walls G Applicable G N/A

1. **Deformations** G Location shown on site map G Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_Deformation not evident along the headwalls at Site 3. _____

2. **Degradation** G Location shown on site map G Degradation not evident
Remarks___Headwalls at Site 3 are not degraded.

I. Perimeter Ditches/Off-Site Discharge G Applicable G N/A

1. **Siltation** G Location shown on site map G Siltation not evident
Areal extent_____ Depth_____
Remarks__Siltation not evident at drainage ditch on northeastern end of Site 3.

2. **Vegetative Growth** G Location shown on site map G N/A
G Vegetation does not impede flow
Areal extent_____ Type__grass_____
Remarks__Vegetation does not impede flow._____

3. **Erosion** G Location shown on site map G Erosion not evident
Areal extent_____ Depth_____
Remarks__Erosion not evident._____

4. **Discharge Structure** G Functioning G N/A
Remarks____N/A_____

D. Monitoring Data		
1.	Monitoring Data G Is routinely submitted on time	G Is of acceptable quality
2.	Monitoring data suggests: G Groundwater plume is effectively contained	G Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G All required wells located G Needs Maintenance G N/A
Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

__Although administration of the on-site oversight of the LUCs has improved, greater attention needs to be paid to ensure that reports are submitted in a timely manner so that all parties understand the effectiveness of the remedies and site conditions.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

__Vegetative cover on site 1 requires more consistent maintenance in order to ensure the viability of the native grasses that protect the cover. While prescribed burning is required on a routine basis to stimulate growth and propagation of the bunch grasses, mechanical control (bush hog) will have to be employed when prescribed burning is not possible.

___Restoration of the marsh areas needs to be resolved, particularly at Site 12.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. ___Settlement issues at Site 3 need to be more closely monitored. The swales forming on the causeway should be surveyed in order to assess whether or not settlement is occurring on a large scale. ___Site 1 settlement monuments should be surveyed.

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

DEHC COMMENTS (Engineering)

General Comments

1. Comment: Section 4 Remedial Actions for each site should clearly state each Land Use Control objective under "Land Use Controls and Long-Term Monitoring."

   Response: agree

2. Second 7 please state whether each portion of the remedy for each site will be continued (i.e. groundwater monitoring, sediment monitoring, LUCs, etc).

   Response : agree
3. Some headers read Rev 0 June 2005, please correct the date of issuance.
   Response : agree
4. Some headers read Rev1 September 2005, please correct the revision number and date of issuance.
   Response : agree

Specific Comments

1. Section 1 Page 2 Paragraph 2

   "Specific details for each site are provided in this document..." This is not true, as only some of the sites are discussed in this document. Please correct the discrepancy.

   Agreed

2. Section 1.0 First sentence

   This sentence states that the Five Year Review is for the "remedial actions implemented at Site/SWMU 3;" however, the next paragraph states that the document is for several sites. Please correct the discrepancy.

   Agreed

3. Section 1 Page 2

   The effective date of the FFA is the date of the last signature on the FFA which is January 2005. Please correct the discrepancy.

   Agreed

4. Section 1 Paragraph Five

This paragraph states that, "Subsequent reviews are triggered by the date of EPA's concurrence signature date..." Please note this should be "the date of EPA and DHEC's...".

Agreed, change noted

5. Section 3 Page 4 First Paragraph

This section states, "The projected land use is substantially the same as historic land use (see Figure 1)." Figure 1 is not adequate to show land use. A map should be provided that shows this information.

agreed

6. Section 4 Page 9 First Paragraph

The Department does not understand the statement, "The prohibition of the specific actions identified in the LUCIP is enforced; however the reporting requirement of the LUCIP has not been implemented." Please clarify.

Agreed . The reporting requirements for these LUC'S have been implemented.

7. Section 4 Page 9 Second Paragraph

This section states, "The Partnering Team is currently reviewing the revised Long Term Monitoring Work Plan for Site 1." The Department believes this document has already been approved. Please clarify.

Agreed, statement was deleted

8. Page 10 Last Paragraph

Please replace the following sentence, "Signage was placed at the site to preclude future human ingestion of fin fish and shellfish harvested from the pond adjacent to the site." with "Signage was placed at the site that read, 'No subsistence fishing'.".

Agreed , to concur with both EPA and DEHC, something was left in about human ingestion.

9. Page 10 Last Paragraph

The Department questions if the following statement if accurate, "The annual reporting requirement set forth in the LUCIP has yet to be implemented but will be effective immediately." Please clarify. Additionally for Sites 1, 3, and 12, annual LUC checklists

should be completed and submitted to the regulatory agencies, beginning immediately, if not already initiated.

The MCRD has been submitting annual LUC reports.

10. Page 11 First Paragraph

The Department does not believe that it is accurate that "The Navy/Marines are currently reviewing the draft Proposed Plan for Site 3..." It should be mentioned that the Proposed Plan revision is awaiting approval of the Site 3 Tech Memo which will include Fish Tissue Sampling results.

Agreed change made to reflect that the tech memo is being reviewed not the proposed plan

11. Section 4 Page 13 Site 12

The discussion of Site 12 does not mention annual Land Use Control reporting. This should be mentioned in the Five Year review as well as reports should be submitted annually to ensure that the LUC portion of the remedy remains effective.

Agreed , A statement to that effect is inserted at the end of the paragragh.

12. Section 5 Page 14

The Department cannot yet agree that, "the risk driver for human health risks from fish consumption were potentially due to background concentrations (anthropogenic) of PCBs..." as the Final Tech Memo has not been issued or approved. This statement should be removed.

Agreed statement was removed

13. Section 6 Page 15

The second paragraph states, "The draft Five Year Review Report was provided to US EPA and SCDHEC for review and comment on 20 March 2010. This document has been available for public review through the process. No public comments were received." It is not appropriate to that that "No public comments were received in a document that had not yet been put out for public notice. This statement (if true) can be made in the Draft-Final Five Year Review.

Agree, statement was deleted

14. Section 7.0 Page 16

The Department does not understand the following TWO sentences, "The LUC for Site 3 have been met. While the majority of the remedy selected for Site 1 and Site 3 is

functioning as intended, some portions are not." Please clarify "how the LUC for Site 3 have been met." Additionally if only a "majority of the remedy is functioning as intended" at Site 1 and 3, then the remedies for these sites need to be reevaluated. Please clarify.

Statement was made about a trenching incident more than five years ago, since then more management emphasis and constraint have been put in place . The statement was amended.

15. Section 7.0 Page 16

The next to last sentence states, "RAOs are being met, however there exists the potential in the long term for RAO 3 to not be met due to LUC-related issues pertaining to subsistence fishing." However, as pointed out in Comment #9, the Navy/Marines have stated that the risk is due to a background (anthropogenic) source. Additionally page 18 4th paragraph states that, "As being determined by the team, the risk found in eating the fish are primarily anthropogenic..." Therefore, if the Navy/Marines believe this to be true, then the RAOs of Site 3 are still being met. This is a continuing topic of discussion and it is difficult to reach a decision on this site because of these types of inconsistencies.

Agreed, statements have been amended to state that the issue is still under study.

16. Section 7.0 Page 17 Paragraph 3

"This study was conducted and the partnering team is considering alternatives." Please briefly discuss the alternatives that the Partnering team is considering. Agreed , these alternatives are presented

17. Section 11 Page 19

The last sentence states, "The third Five Year Review will also address all sites at MCRD Parris Island." Please note that this document does not address all sites at PI. Please correct the discrepancy.

Agreed

18. Table 4

Please note that several of the ARAR citations should be updated as screening values have changed.

Agreed

19. Table 4

Table 4 lists RCRA as "potentially applicable". According to page 11 of the FFA, "The general purposes of this Agreement are to: Establish a procedural framework and

Schedule for developing implementing and monitoring appropriate response actions at the Site in accordance with CERCLA/SARA, the NCP, Superfund guidance and policy, RCRA, RCRA guidance and policy, and applicable state law;". Therefore, RCRA is "applicable."

Agreed

20. Figures

A figure is not provided for Site 12. Additionally a better figure could be provided for Site 3.

Agreed

DEHC COMMENTS (Hydrogeology)

On Page 17, 2nd paragraph, the text reads,

"Although above MCLs, as noted in the decision documents, groundwater at this site is not exposed to a human receptor. The groundwater to surface water to ecological receptors pathway has been addressed in the recent draft of the risk assessment and was found to not pose a significant risk. Extraction of any use of groundwater is prohibited beneath site 3."

Please be advised that all groundwater in South Carolina is classified as Class GB water per R.61-68 Water Classifications & Standards. Class GB water is considered to be potable water. Therefore, the MCS (media cleanup standard) for groundwater must be equal to or less than the most current published MCL (maximum contaminant level) or RSL (regional screening level) values listed at the time the remediation technology is implemented. Therefore all groundwater must meet the safe drinking water standards, or MCLs, regardless of the perceived risk potential to any receptors

Response : statement has been deleted

1. On Table 4-Federal ARARs/Media Clean-up Standards and TBCs, Page 1 of 4, under heading 'Rationale for Use at MCRD Parris Island,' first line, reads:

"Would be used as protective levels for groundwater that are current or potential drinking water sources; However groundwater is saline to brackish and is not a viable drinking water source."

This statement is not correct. Please refer to Comment 1 and revise this statement. Response statement was deleted

2. Table 4-Federal ARARs/Media Clean-up Standards and TBCs, Page 2of 4, under the heading 'Location-Specific ARARs- Concurrent State

Regulations are not listed so the table needs to be revised to include a reference applicable to S.C. regulations, (e.g. the SC Water Classifications and Standards).

The Standard for the water classification standard has been noted.

Page 19, Section 9.0- Recommendations and Follow Up Actions- Site 45 is not listed in this section. Please add a discussion stating that contaminants above their respective MCLs are discharging to the marsh and make recommendations to address the discharge of contaminants to the marsh from Site 45

Response ; Under site 45 discussion discussion was added

Please quote the Five Year Review guidance (*EPA Comprehensive Five Year Review Guidance, June 2001- OSWER No. 9355.7-03B-P*) used to generate this report.

Agreed , first paragraph of text has included.

EPA SPECIFIC COMMENTS:

1. **Page 3-4:** Include a line for the Site 3 IROD, signed by EPA in September of 2000, the first Five Year Review (5YR) approved in September 2005, the Site 12 Remedial Action Start in October 2005, and the Site 12 Remedial Action Completion in September 2007.
   Agreed

2. **Page 6, last paragraph, 3rd sentence:** Please modify the text to read "... in 2002, and conditionally approved in early 2005."
   Agreed

3. **Page 7:** After the first full paragraph regarding Site 12, add another paragraph briefly describing the history of contamination at Site 12 and the response action taken. Then move all of the Site 12 information to be included before the Site 45 information, in order to keep those Sites which have remedies in place together as the focus of the document.

   Include a Table in the back showing Site 12 COCs and reference it in the text here.

   Table 1.1 was added

4. **Page 7, just before the last paragraph of Section 3 AND Page 14-15, last 4 paragraphs of Section 5**: Section 5, Progress Since Last Review, is intended to address those sites which have remedies in place requiring a FYR. Therefore, the appropriate location for the last 4 paragraphs of Section 5 (addressing Sites 45, 27, 14, and 5) is in Section 3, Background. Please relocate these paragraphs to Section 3, immediately after the existing paragraph in Section 3 that addresses Site 45. Consider adding subheadings (and restructuring paragraphs) to Section 3, identifying those sites which required "No Action" (Sites 2/15), Sites with "Remedies In Place" (Sites 1/41, 3, and 12), and "Other Sites in Progress" (Sites 45, 27/55/9/16, 14, 5, etc.). This will help to keep the focus on remedies which require 5YRs.

   For each site addressed, please ensure the information suggested by the 5YR Guidance is briefly discussed. The 5YR Guidance specifies for each site the physical characteristics, land and resource use, history of contamination, initial response action, and summary of basis for taking an action is to be described very briefly.

   Agreed

5. **Page 7, last paragraph before Section 4**: Table 3 is missing. Please add the table. It can be updated from the 1995 accounting as mentioned, or could be an update from the most recent SMP listing of sites, in which case modify the text to reflect that.
   Update table from SMP was added

6. **Page 7, Section 4 Remedial Actions, last bullet**: Table 5 is missing. Include it or correct the text.
Table included

7. **Page 9, first partial paragraph:** The text states "... the LUCIP is enforced; however, the reporting requirement of the LUCIP has not been implemented." The reporting requirement is a condition which must be met. Please submit an annual report immediately for all Sites requiring annual reporting and include it as an attachment to this report. (Also see similar site 3 discussion on Page 10.)

   Also, for all Sites requiring LUCs, please include a figure that shows the LUCs and LUC boundaries, and reference it in the text.

   Included reports and changed text

8. **Page 10, last paragraph, 3rd sentence**: Please add the words "subsistence level" after "human" and before "ingestion".

   Agreed

9. **Page 11, first paragraph, 1st sentence**: Please insert the words "in support of a Final ROD" after "Proposed Plan" and before "for Site 3".

   Agreed

10. **Page 11, first paragraph**: No Attachments have been included. Please include the Attachments, or correct the text.

    Attachments are included

11. **Page 12, last bullet:** Table 5 is missing. Include the table or correct the text.

    Table 5 was added

12. **Page 13, just before Section 5**: Add a paragraph explaining that LUCs were required at Site 12.

    A statement to the effect that ground water concerns require LUCs

13. **Section 5, Progress Since Last Review**: This section is intended to address progress made towards issues and recommendations made in the previous 5YR, and to describe its impact on protectiveness. Therefore, please include the following, as suggested by EPA's 5YR Guidance:

    Before the Site 1 discussion, present the previous 5YR Protectiveness Statement, as well as issues and recommendations. After the discussion of progress made at

each Site, describe the impact of the progress on the issues and recommendations affecting protectiveness for that Site.

Agreed

14. **Page 14, paragraph discussing Site 3:** In the last sentence insert the words "most likely" after "are" and before "not"
agreed.

15. **Page 15**: Include the LUC letters mentioned in the last bullet as an attachment.
agreed

16. **Page 15, last paragraph**: Site 12 should also have been inspected. Please modify the first sentence to reflect that is the case, and also include the date of the inspection, attach the inspection report and reference it. If this is not the case, then Site 12 must be inspected first.
Inspection report for site 12 was included

17. **Page 16, Section 6, Site 3, 4th sentence**: Please add the words "occurring prior to the last 5YR" after "hand-hole location" and before "there".
agreed

18. **Page 17, last paragraph**: Please include at least the most recent Site 1 groundwater results.
Agreed

19. **Page 17, sediment results**: Please include the value being used to evaluate copper results.
agreed

20. **Page 18, second paragraph, 2nd sentence**: Please modify as follows "For Sites 1, 3, and 12 annual visual inspections..." and attach the reports mentioned in the next sentence.
Reports attached

21. **Page 18, 4th paragraph, starting with the 5th sentence**: Please modify the text to read "Under consideration by the Parris Island remediation team is the determination that the risk found in eating fish are primarily ubiquitous anthropogenic risks (i.e. due to atmospheric deposition of PCBs) and thus are probably not related to the site remedy. A Final ROD is being developed and will reflect the team's final determination regarding this exposure. There are no ...."
After discussions agreeable language was inserted to meet both EPA and DEHC concern

22. **Page 18, Issues**: Please explain if this was an issue identified during the inspection, or simply an assumed issue related to *potential* erosion due to the

marginal success of revegetation efforts in the marsh. If the latter, please clarify so in the Issue column.

Potential Erosion was inserted into the text.

23. **Page 19, Recommendations**: For each recommendation, a schedule for completion must be provided.
Most of the recommendations are ongoing, dates were inserted for the few that are not ongoing.

24. **Page 19, Protectiveness Statement**: In accordance with the 5YR Guidance, each Site should have a protectiveness statement. If this statement is meant to apply to all three sites in question, then modify the text as follows, " For Sites 1, 3, and 12: The remedies..."
Each site has a protectiveness statement.

25. **Page 19, Next Review**: Please modify the text to read "The third Five Year Review will be required five years following the date of approval of this 5YR by EPA."
Agreed

DHEC COMMENTS (Engineering) and RTC

General Comments

1. The Department received the Final Five Year Review August 17, 2010, which states that the final document will be signed by August 30, 2010. The Department understands that the Final Five Year Review document was signed August 30, 2010. However, we have not received a copy of the signed Five Year Review. The Department was not given 45 days to review and comment to the document prior to signature. The Department expects all of our comments to be addressed and the document to be revised accordingly.

   Noted

2. The Table of Contents and Tables/Figures page still contain the Revision 0, June 2005 date.
   Noted

3. If discussion of sites without remedies selected remains in the Five Year Review, then maps of each of the sites and their location on base should be provided.

   Noted , a map is provided with all the sites. See change page for Figure 1.

4. The section discussing Site 45 mentions a Pump and Treat system installed at the site. Please discuss when and why the system was turned off/removed.

   The system was shut down (2000) because it became inoperable due to iron /bacteria fouling. The pumps still remain at the site. This is a common problem with these systems. Text is changed to reflect.

5. The Department has concerns about the integrity of the Site 3 landfill as well as the compliance with the LUCs at Site 3. The following comment was issued September 10, 2010 to the Site 3 Sinkhole letter,

   "Per the Department's August 3, 2007 letter (Amick to Sanford), methods ensuring that Land Use Controls were implemented and followed properly were to be carried out at Site 3. It is apparent from this letter that both the lack of the stability of the landfill and communication of Land Use Controls at Site 3 are still an issue. The implementation of Land Use Controls (LUCs) as described in the upcoming LUC RD for Site 3, should clearly state how the Depot has corrected these problems and anticipates compliance with the LUCs in the future (i.e. the leaking culvert must be corrected, proof of communication of LUCs must be provided, etc.)."

   MCRD and the Navy will respond to EPA's and SCDHEC's concerns regarding the sinkholes. The Five Year Review has been modified to capture that commitment.

6. Please note in regards to the Site 3 fishing prohibition, the Department's concerns as documented in comments to the Site 3 Tech Memo SAP and Site 3 Tech Memo are still

applicable.

Noted.

7. The Department understands that a causeway has been or will be installed temporarily at Site 12, in order for the Beaufort Jasper Water and Sewer Authority to install water and sewer pipelines to service MCRD. Please discuss how the installation and removal of this causeway will affect the effectiveness of the remedy.

   Since the remedy did not leave waste in place in soils or sediments, construction of this causeway will not cause site related exposures to construction workers. However, the construction itself will likely impact Spartina recovery. MCRD will ensure that Spartina is restored in accordance with Dr. Bloom's recommendations after the construction project is complete.

Specific Comments

1. Page 2 Section 1.0
   The third paragraph states, "Several of the remaining sites have been transferred to the State UST program." The Department believes this statement to be referring to the former AST/Petroleum Restoration program, which no longer exists. Please clarify that these sites are being addressed as petroleum sites.

   Noted. These sites are being addressed by the Navy's Petroleum program.

2. Page 5 Section 3.0
   As stated in the Department's comments to the Draft Five Year Review, land use is not depicted on Figure 1.

   Text has changed to accurately reflect the figure.

3. Page 5 Section 3.0 Paragraph 2
   Please clarify the relevance of the statement, "Commercial and recreational fishing activities are conducted in the vicinity of MCRD…".

   This statement was provided to address the Site's environmental setting in accordance with the Five Year Review Guidance.

4. Under Section 4.0, at a minimum the Land Use Controls that allow the RAOs to be met should be referenced (as they are listed in the Attachments-note proper attachment should be referenced) or Land Use Controls for each site could be added to this section.

   Land use controls will be referenced as attachments.

5. Page 9 First Paragraph
   Please note that the FFA is a three party agreement in which the SCDHEC and EPA have equal stake. All references counter to this should be corrected.

Noted. The language in question was taken directly from the subject ROD. It has been removed.

6. Page 12 First Paragraph
   The Department does not agree with the statement, "Although limited end of pipe data did not confirm major release to the marsh...". Because of the limited data, this statement is merely speculation. The ongoing release to the marsh is of great concern to the Department as documented in many previous correspondence. The MCRD should provide the status of addressing the discharge as a portion of the response to this comment.

   The document was changed to eliminate the subject text.

7. Page 13 Last Sentence
   Please note the Department cannot yet concur with the statement, "These storm water outfalls include 30 discharges that are associated with inland process area sites." Response to Comments is pending on the Site 14 SAP. The Department has requested sampling of non-process areas as well and has challenged the definition of process area, which may result in more than 30 discharge locations to be sampled.

   The document was changed to indicate approximately 30 process outfalls. There may be more.

8. Page 16
   It is unclear why Sites 3 and 12 are discussed under the Site 1 heading.

   The text has been changed.

9. Page 18 and Page 29
   Page 18 states, "This signage was placed to preclude human subsistence ingestion." Page 29 states, "Although measures were put in place to preclude unacceptable human exposure at site 3 (i.e. signage: no subsistence fishing allowed)." The Department's understanding when signing the IROD was that the signage was placed based on the Navy/Marines concern for disturbance of the rip rap/cover that was placed over the landfill to prohibit human contact with landfill material/soil.

   For clarification, the Site 3 IROD stated Remedial Action Objectives were established to control human exposure to COCs in soils. The Site 3 LUCIP indicated Land Use Controls were to be implemented for the purposes of restricting human ingestion of fin fish and shellfish harvested from the pond adjacent to Site 3. The LUCIP was an appendix to the Site 3 IROD. The Five Year Review text was modified.

10. Page 18

It is unclear why Sites 1 and 12 are discussed under the Site 3 heading.

Text was corrected.

11. Page 19 First Paragraph
Based on the Site 3 Sinkhole letter issued August 16, 2010, the statement, "No erosion issues were observed during this Five Year Review period" is incorrect. Please clarify.

The subject text was removed and replaced with, "Since the time of the 2010 Five Year Review inspection, sinkholes have been observed and repaired (see Site Inspection discussion of sinkholes)."

12. Page 19
The statement, "The RAOs support the remedy selected in the Proposed Plan and will be included in the site ROD." These RAOs should already be included in the Site 12 ROD, as it has been finalized.

Text has been corrected.

13. Page 21 First Paragraph
This section states, "Additionally, all excavated material will be characterized to determine the appropriate disposal facility." The Department does not believe that any additional excavation is planned for Site 12. Please clarify.

Text has been changed to agree with the past tense.

14. Page 21 Restoration
This section states, "The surface debris piles and PAH-contaminated soil excavation areas were restored to original surface levels and will then be revegetated." The Department believes this work has already been completed. Please clarify.

Text has been changed to agree with the past tense.

15. Page 21 Restoration
This section states, "Also, if verification testing indicates that residual sediment contamination remain, additional excavation and/or covering with soils may be considered to provide a barrier to reduce contact with contaminated sediment." The Department is not aware that any sediment sampling is planned for Site 12. Please clarify this statement.

Text has been changed to agree with the past tense.

16. Page 21 Land Use Controls
This section should discuss the annual LUC inspection and reporting requirement, which ensures compliance with the groundwater prohibition and monitors Spartina growth.
Response

The text has been changed.

17. Page 22

This section reads, "Plans for long-term monitoring for groundwater at Site 3 will be formally implemented as part of the final remedy selection. The Navy has been monitoring groundwater at Site 3 annually since completion of the soil cover/causeway. COMPLETE". This statement is misleading as it appears to indicate that the remedy for Site 3 has been selected.

The text has been clarified.

18. Page 22

This section states, "MCRD will continue to develop the Geographic Information System (GIS). One planed upgrade is to provide Depot-wide access via the web browser. (Any advancement to the GIS is encumbered by issues related to the Navy Marine Corps Intranet (NMCI) which controls all of the hardware and software used throughout the Department of Navy). COMPLETE" This statement that this action is complete seems to be contradictory, please clarify.

A GIS system is in place, but is subject to continued improvement. The recommendation status has been changed to "COMPLETE TO THE EXTENT OF MCRD CONTROL."

19. Page 23

Due to several Land Use Control violations at Site 3, the Department would like to receive information on the "environmental education program" that "ensure[s] that all managers, with control over projects to significantly impact the environment, receive National Environmental Policy Act (NEPA) training", as this action is now listed as COMPLETE.

Information on training will be sent within 30 days.

20. Page 23

The Department would like a copy of the "Installation Restoration Collaboration Gateway" that "allows all team members to view the IR-specific GIS data to ensure that it adequately reflects the program's status" and the "Land Use Control Section" which is now listed as COMPLETE. The Department has a limited GIS map from the base, but the information listed in this document as COMPLETE is not included.

A description of this program will be provided within 30 days.

21. Page 22

The Department would like a copy of the Depot Order, as the task of providing it to the team is listed as COMPLETE.

This order will be provided with in 30-days.

22. Page 23
The Department would like a copy of the environmental management system for MCRD as this task is listed as COMPLETE.

EMS information will be provided with in 30 days.

23. Page 23
This section states, "No recurring issues were noted in this Five Year Review." This statement is not accurate, as discussed in the April 16 letter (Donohoe to Amick). Subsidence of the Site 3 landfill is recurring, please discuss.

The subject text was removed and replaced with a reference to one incident at Site 3. However, please note, the incident occurred just recently, after the date of the 2010 Five Year Review inspection, submittal of the Draft Report for review, and comments from EPA and SCDHEC. (See Site Inspection discussion of sinkholes in Section 6).

24. Page 24
Please clarify the following statement, "Final risks from this site are being clarified by the partnering team."

The Tech memo was being finalized. The subject text has been removed.

25. Page 24 Site 12 Jericho Island
Please discuss the effect of BJWSA installing a new causeway to lay water and sewer lines through the island.

Since the remedy did not leave waste in place in soils or sediments, construction of this causeway will not cause site related exposures to construction workers. However, the construction itself will likely impact Spartina recovery. MCRD will ensure that Spartina is restored in accordance with Dr. Bloom's recommendations after the construction project is complete.

26. Page 25 Site 3
This section reads, "No significant issues were identified at the time of inspection regarding the soil cover or erosion control." This statement is not accurate, as discussed in the April 16 letter (Donohoe to Amick). Subsidence of the Site 3 landfill is recurring, please discuss.

No subsidence issues had occurred by the time of the inspection. However, text has been added to address the subsidence which occurred after the inspection. Please note, the subsidence occurred just recently, after the date of the 2010 Five Year Review inspection, submittal of the Draft Report for review, and comments from EPA and SCDHEC. (See Site Inspection discussion of sinkholes in Section 6).

27. Page 25 Interviews

This section reads, "MCRD Parris Island is a controlled-access facility surrounded by salt-water marsh. Therefore, there are no adjacent property owners." While this statement is true for the majority of the base, Site 12 (one of the 2 sites with a selected remedy) is not located on MCRD Parris Island and has adjacent property/homeowners.

Concur. The text will be revised

28. Page 26 Site 1
This section states, "For Site 1, the erosion/settlement is limited to several-inch depressions caused by washout of soil where revegetation has not yet succeeded." Please clarify if the erosion/settlement is being corrected each year when noted. Additionally please clarify what is being done to help prevent erosion/settlement in the future.

A contract has been awarded to perform minor repairs of 9 inches or less on a quarterly basis. Major repair needs will be reported to MCRD.

29. Page 27 Site 12
Please clarify the sentence, "Other than groundwater, no waste was left on site."

The text was modified for clarification.

30. Page 27 For Sites 1,3, and 12
This section reads, "LUCs for the sites will be maintained to restrict exposure until unlimited use and unrestricted exposure levels have been achieved." Please note that because Sites 1, 3, and 12 are landfills, these sites will never be released for unlimited use and unrestricted exposure.

Noted.

31. Page 28
Please note that while background values have been determined to be applicable for Sites 1, 3, and 12, these decisions have been site specific and should not be applied across MCRD.

Noted.

32. Page 29 For Site 3
This section states, "it was determined by interview that a potentially subsistence receptor does exist." Please note the Department believes this individual to be a highly exposed individual not a subsistence receptor. This statement should be revised.

The text was modified.

33. Attachment 1 Site 1 LUC Inspection Checklist
The Department is unclear whether the Base Master Plan and Base Geographical Information System have been completed. If they have not been completed, please clarify how the "Base Master Plan review identifies this Site and the land use restrictions" and

the "Base Geographical Information System review identifies this Site and the land use restrictions."

These have been completed

34. Attachment 2 Site 3 LUC Inspection Checklist
Please note because Site 3 is to be inspected quarterly, the Department should be receiving the LUC Inspection Reports quarterly.

The Site 3 LUCIP currently only requires an annual report.

35. Attachment 2 Site 3 LUC Inspection Checklist
In the LUC RD for Site 3 please discuss what is being done about the "woody vegetation in rip-rap." Additionally please discuss the effect that this woody vegetation has on the integrity of the geotextile fabric which was installed as part of the interim remedy for Site 3 to prevent contact with buried debris/soil.

Plans are in place to cut down the woody vegetation because of potential to harm geotextile.

36. Attachment 2 Exhibit A
Please discuss why a different LUC Inspection Checklist is now being used.

Noted. Only one check list will be used in the future.

37. Attachment 2 Exhibit A
Please discuss why both the May 2009 and June 2010 LUC Inspection Checklists say, "Annual reporting of the site status is required," yet "Was the annual report submitted for the previous year? NO." Please note all required reporting should be submitted in a timely manner.

Noted. All required reporting will be submitted in a timely manner in the future.

38. Attachment 4 Page D-7
Please clarify why the Five Year Review Site Inspection Checklist is blank.

Only applicable sections were checked or filled out.

39. Response to Amick Specific Comment #8
The Department disagrees with the compromised reached. This has been documented in General Comment #8 and Specific Comment #8.

Noted. For clarification, the Site 3 IROD stated Remedial Action Objectives were established to control human exposure to COCs in soils. The Site 3 LUCIP indicated Land Use Controls were to be implemented for the purposes of restricting human ingestion of fin fish and shellfish harvested from the pond adjacent to Site 3. The LUCIP was an appendix to the Site 3 IROD. The Five Year Review text was

modified.

40. EPA Specific Comment #21
Please note the Department agrees with EPA Specific Comment #21

"Please modify the text to read, 'Under consideration by the Parris Island remediation team is the determination that the risk found in eating fish are primarily ubiquitous anthropogenic risks (i.e. due to atmospheric deposition of PCBs) and thus are probably not related to the site remedy. A Final ROD is being developed and will reflect the team's final determination regarding this exposure. There are no..'"

Therefore, the Department does not understand the Navy's response to this comment that "agreeable language was inserted to meet both EPA and DHEC concern." It appears no compromise is needed and the Department's disagreement with the compromised reached (see Specific Comment #38) would not remain and the compromise language regarding human consumption risk can be removed from the report.

Noted. The subject text has been removed.

41. Table 3
Please clarify if the marsh at Site 54 will be investigated at Site 14. An inconsistent answer to this question has been given by the Navy in recent months. Please note the Department considers this site to be of high priority due to documented evidence of release to the marsh.

The discharge from this area is being investigated under site 14.

TABLE 1 for SITE 1
SEDIMENT AND SURFACE SOIL COCS and RGOs FOR HUMAN AND ECOLOGICAL RECEPTORS
SITE 1 – INCINERATOR LANDFILL AND SWMU 41 – FORMER INCINERATOR
MCRD PARRIS ISLAND, SOUTH CAROLINA

	Background[1]/ Typical Facility[1] Concentration	ROD Selected Human Health RGO [2]	EPA Region 4 Human Health 2010 Screening Levels at 10^{-6} or HI=1 for Residential Soil [3]	ROD Selected Ecological RGO [2]	EPA Region 4 Ecological 2010 Screening Values [3]
SEDIMENT COCs					
Organics (µg/kg)					
B(a)P Equivalents	NA	434*	(15) [RR]	NA	(100) [RR]
Total PAHs	NR	NR	NA	1684	1684
4,4'-DDD	33.6	NR	(2000)	33.6	3.3 [B]
4,4'-DDE	31.6	NR	(1400)	31.6	3.3 [B]
4,4'-DDT	34.5	NR	1700	34.5	3.3 [B]
DDTR (total DDX)	99.8	NR	NA	99.8	9.9 [B]
Alpha Chlorodane	13.9	NR	1600	13.9	1.7 [B]
Gamma Chlorodane	13.2	NR	1600	13.2	1.7 [B]
Inorganics (mg/kg)					
Arsenic	12	12.4**	.39 [B]	NA(NR)	7.24 [B]
Copper	10	NR	(3,100)	18.7	18.7
Lead	21	NR	400	30.2	30.2
Mercury	0.09	NR	23	0.13	0.13
SURFACE SOIL COCs					
Organics (µg/kg)					
B(a)P Equivalents	NA	434*	(15) [RR]	NA	(100) [RR]
Total PAHs	NA	NR	NA	1,000	1,000
Alpha BHC (HCH)	NA	NR	(77)	2.5	2.5
Beta BHC (HCH)	NA	NR	(270)	1	1
Gamma BHC (HCH)	NA	NR	(520)	0.05	0.05
4,4'-DDD	33.6	NR	(2000)	33.6	Total DDX (2.5) [B]
4,4'-DDE	31.6	NR	(1400)	31.6	
4,4'-DDT	34.5	NR	1700	34.5	
DDTR (total DDX)	99.8	NR	NA	99.8	9.9 [B]
Aroclor 1260	NA	NR	220	20	20
Inorganics (mg/kg)					
Aluminum	7,270	NR	(77,000)	7,270	50 [B]
Antimony	ND	31 (NR)	31 (NR)	3.5	3.5
Arsenic	1.44	1.83 **	Res = 0.39 [RR, C & L] Indust=(1.6) [RR,C & L]	10 (NR)	10 (NR)
Barium	24	NR	(15,000)	165	165
Cadmium	ND	NR	(70)	1.6	1.6
Chromium [@]	6.2	NR	(Cr3 = 120,000) (Cr6 = .29) [B]	6.2	(0.4) [B]
Copper	1.5	NR	(3,100)	40	40
Iron	3,920	26,920 (NR)	(55,000)	3,920	200 [B]

	Background[1]/ Typical Facility[1] Concentration	ROD Selected Human Health RGO [2]	EPA Region 4 Human Health 2010 Screening Levels at 10^{-6} or HI=1 for Residential Soil [3]	ROD Selected Ecological RGO [2]	EPA Region 4 Ecological 2010 Screening Values [3]
Lead	12.5	412.5** (NR)	400 (NR)	50	50
Manganese	129	NR	NA	129	100 [B]
Mercury	0.11	NR	23	0.110	0.10 [B]
Nickle	1.8	NR	(1500) salts	30	30
Selenium	.29	NR	390	.81	.81
Silver	ND	NR	390	2	2
Vanadium	9.5	NR	550	9.5	2 [B]
Zinc	9.7	NR	23,000	50	50

1 For inorganics, the presented value is the MCRD Parris Island Background Value (TtNUS, 1999). For pesticides, the presented value is the MCRD Parris Island Typical Facility Pesticide Concentration (TtNUS, 1999).
2 Human health and ecological RGOs were largely risk-based standards from Region 4 Screening Levels at the time of the ROD, or background levels if screening levels were below background (see letter B below).
3 May 2010 Region 4 current screening values are set at 10-6 or HI=1 for Human Health. Values which have changed from the time of the ROD are denoted by parenthesis ( ). See regional eco screening table footnotes for value references. Where R4 numbers were not available, see National EPA Eco SSLs, or the NOAA SQuiRT table
NA Not Applicable or Not Available
NR Not Relevant. Max = Maximum concentration was below the relevant RGO at time of ROD.
ND Non-Detected Value
* Calculated as 7 x benzo(a)pyrene. Current R4 protocol is to compare to the Benzo(a)pyrene Screening Level.
** Cleanup Level was set at background + PRG and referenced as R4 policy at the time.
@ Chromium: If present above background, additional samples are needed to determine if Cr6 is present. Data are screened against current species-specific RSLs. However, here cleanup was to background.
RR Protective due to Clean-up Level falling within the risk range (i.e. two orders of magnitude above screening levels.)
C Protective due to wastes/contaminated media being disposed within landfill with protective cover/cap.
L Protective due to LUCs restricting Residential Use. invasive activities, gw use and required maintenance of cover/cap, etc.
B Clean-up level not based on risk-based number or ARAR driven, but rather based on background in accordance with EPA OSWER Guidance as follows:

Role of Background in the CERCLA Cleanup Program, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, April 26, 2002, OSWER 9285.6-07P

"**Consideration of Background in Risk Management:** Where background concentrations are high relative to the concentrations of released hazardous substances, pollutants, and contaminants, a comparison of site and background concentrations may help risk managers make decisions concerning appropriate remedial actions. The contribution of background concentrations to risks associated with CERCLA releases may be important for refining specific cleanup levels for COCs that warrant remedial action[6].

[6]For example, in cases where a risk-based cleanup goal for a COC is below background concentrations, the cleanup level may be established based on background."

TABLE 1 for SITE 3
SURFACE SOIL COCS and RGOs FOR HUMAN AND ECOLOGICAL RECEPTORS
SITE 3 – CAUSEWAY LANDFILL
MCRD PARRIS ISLAND, SOUTH CAROLINA

	Background[1]/ Typical Facility[1] Concentration	ROD Selected Human Health RGO [2]	EPA Region 4 Human Health 2010 Screening Levels at 10^{-6} or HI=1 for Residential Soil [3]	ROD Selected Ecological RGO [2]	EPA Region 4 Ecological 2010 Screening Values [3]
SURFACE SOILS COCs					
Organics (µg/kg)					
Benzo(a)anthracene	NA	NR	(150) RR	1,000	5,210 NOAA
Benzo(a)pyrene	NA	890	(15) RR	NR(1000)	(100)
Benzo(b)fluoranthene	NA	NR	(150) RR	1,000	59,800 NOAA
Benzo(g,h,i)perylene	NA	NR	NA	1,000	119,000 NOAA
Benzo(k)flouranthene	NA	NR	(1,500)	1,000	148,000 NOAA
Chrysene	NA	NR	(15,000)	1,000	4,730 NOAA
Indeno(1,2,3-cd)pyrene	NA	NR	(150)	1,000	109,000 NOAA
Inorganics (mg/kg)					
Arsenic	1.44	NR	Res = 0.39 B & RR Indust=(1.6) RR	7.79	10
Lead	12.5	NR	400	61.9	50 RR
ercury	0.11	NR	23	0.11	0.1 RR
nc	9.7	NR	23,000	95.5	50 RR

1 For inorganics, the presented value is the MCRD Parris Island Background Value (TtNUS, 1999). For pesticides, the presented value is the MCRD Parris Island Typical Facility Pesticide Concentration (TtNUS, 1999).
2 Human health and ecological RGOs were largely risk-based standards from Region 4 Screening Levels at the time of the ROD, or background levels if screening levels were below background (see letter B below).
3 May 2010 Region 4 current screening values are set at 10-6 or HI=1 for Human Health. Values which have changed from the time of the ROD are denoted by parenthesis ( ). See regional eco screening table footnotes for value references. Where R4 numbers were not available, see National EPA Eco SSLs, or the NOAA SQuiRT table.
NA Not Applicable or Not Available
NR Not Relevant. Max = Maximum concentration was below the relevant RGO at time of ROD.
ND Non-Detected Value
* Calculated as 7 x benzo(a)pyrene. Current R4 protocol is to compare to the Benzo(a)pyrene Screening Level.
** Cleanup Level was set at background + PRG and referenced as R4 policy at the time.
@ Chromium: If present above background, additional samples are needed to determine if Cr6 is present. Data are screened against current species-specific RSLs. However, here cleanup was to background.
RR Protective due to Clean-up Level falling within the risk range (i.e. two orders of magnitude above screening levels.)
C Protective due to wastes/contaminated media being disposed within landfill with protective cover/cap.
L Protective due to LUCs restricting Residential Use. invasive activities, gw use and required maintenance of cover/cap, etc.
B Clean-up level not based on risk-based number or ARAR driven, but rather based on background in accordance with EPA OSWER Guidance as follows:

Role of Background in the CERCLA Cleanup Program, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, April 26, 2002, OSWER 9285.6-07P

"**Consideration of Background in Risk Management:** Where background concentrations are high relative to the concentrations of released hazardous substances, pollutants, and contaminants, a comparison of site and background concentrations may help risk managers make decisions concerning appropriate remedial actions. The contribution of background concentrations to risks associated with CERCLA releases may be important for refining specific cleanup levels for COCs that warrant remedial action[6].

[6]For example, in cases where a risk-based cleanup goal for a COC is below background concentrations, the cleanup level may be established based on background."

TABLE 1 for SITE 12
SEDIMENT AND SURFACE SOIL COCS and RGOs FOR HUMAN AND ECOLOGICAL RECEPTORS
SITE 12 – JERICHO ISLAND
MCRD PARRIS ISLAND, SOUTH CAROLINA

	Background[1]/ Typical Facility[1] Concentration	ROD Selected Human Health RGO [2]	EPA Region 4 Human Health 2010 Screening Levels at 10^{-6} or HI=1 for Residential Soil [3]	ROD Selected Ecological RGO [2]	EPA Region 4 Ecological 2010 Screening Values [3]
SEDIMENT COCs					
Organics (µg/kg)					
B(a)P Equivalents	NA	NR – Max=113	(15) [RR]	None – Max =113	(100) [RR]
Total PAHs	NA	NR	NA	1684	1684
Bis(2-ethylhexl)phthalate	NA	NR	35000	182	182
Di-n-octyl phthalate	NA	NR – Max=63	NA	NA	61 [NOAA RR]
Pentachlorophenol	NA	NR – Max=180	3000	NA	17 [NOAA RR]
4,4'-DDE	31.6	NR	(1400)	31.6	3.3 [B]
4,4'-DDT	34.5	NR	1700	34.5	3.3 [B]
Alpha Chlordane	13.9	NR	1600	13.9	1.7 [B]
Arochlor - 1254	NA	220	220	NR	33 [RR]
Dieldrin	ND	NR	30	.02	(3.3)
Endrin	ND	NR	18,000	.02	(3.3)
Gamma Chlordane	13.2	NR	1600	13.2	1.7 [B]
Inorganics (mg/kg)					
Antimony	ND	NR	31	2	(12)
Arsenic	12.2	12.59**	.39 [B]	12.2	7.24 [B]
Cadmium	ND	NR	(70)	1.6	1.6
Chromium [@]	35.2	NR	(Cr3 = 120,000) (Cr6 = .29) [B]	52.3	52.3
Copper	10	NR	(3,100)	18.7	18.7
Iron	21,450	23,000	(55,000)	NR	NA
Lead	20.6	400	400	30.2	30.2
Manganese	186	NR – Max = 210	(NA)	None – Max = 210	260,000 [NOAA]
Mercury	0.09	NR	23	0.13	0.13
Nickle	5.95	NR	(1500) salts	15.9	15.9
Silver	ND	NR	390	0.733	2
Zinc	45	NR	23,000	124	124
SURFACE SOIL COCs					
Organics (µg/kg)					
B(a)P Equivalents	NA	434*	(15) [RR]	NA	(100) [RR]
Total PAHs	NA	NR	NA	1,000	1,000
Chloroform (trichloromethane)	NA	NR – Max = 7.5	290	None – Max = 7.5	1,190 [NOAA]
Bis(2-ethylhexl)phthalate	NA	NR – Max = 480	35000	None – Max = 480	(100) [RR]

	Background[1]/ Typical Facility[1] Concentration	ROD Selected Human Health RGO [2]	EPA Region 4 Human Health 2010 Screening Levels at 10^{-6} or HI=1 for Residential Soil [3]	ROD Selected Ecological RGO [2]	EPA Region 4 Ecological 2010 Screening Values [3]
Pentachlorophenol	NA	NR – Max = 240	3000	None – Max = 240	2100
4,4'-DDE	31.6	NR	(1400)	31.6	Total DDX (2.5) [B]
Inorganics (mg/kg)					
Antimony	ND	NR	31 (NR)	3.5	3.5
Arsenic	1.44	1.83 **	Res = 0.39 [B & RR] Indust=(1.6) [RR]	10 (NR)	10 (NR)
Cadmium	ND	NR	(70)	1.6	1.6
Chromium @	6.23	NR	(Cr3 = 120,000) (Cr6 = .29) [B]	10	(0.4) [B]
Copper	1.52	NR	(3,100)	40	40
Iron	3,920	23,000 (NR)	(55,000)	3,920	200 [B]
Lead	12.5	400 (NR)	400 (NR)	50	50
Manganese	129	NR	NA	129	100 [B]
Mercury	0.11	NR	23	0.1	0.1
Nickle	1.8	NR	(1500) salts	30	30
Zinc	9.7	NR	23,000	50	50

1 For inorganics, the presented value is the MCRD Parris Island Background Value (TtNUS, 1999). For pesticides, the presented value is the MCRD Parris Island Typical Facility Pesticide Concentration (TtNUS, 1999).
2 Human health and ecological RGOs were largely risk-based standards from Region 4 Screening Levels at the time of the ROD, or background levels if screening levels were below background (see letter B below).
3 May 2010 Region 4 current screening values are set at 10-6 or HI=1 for Human Health. Values which have changed from the time of the ROD are denoted by parenthesis ( ). See regional eco screening table footnotes for value references. Where R4 numbers were not available, see National EPA Eco SSLs, or the NOAA SQuiRT table.
NA Not Applicable or Not Available
NR Not Relevant. Max = Maximum concentration was below the relevant RGO at time of ROD.
ND Non-Detected Value
* Calculated as 7 x benzo(a)pyrene. Current R4 protocol is to compare to the Benzo(a)pyrene Screening Level.
** Cleanup Level was set at background + PRG and referenced as R4 policy at the time.
@ Chromium: If present above background, additional samples are needed to determine if Cr6 is present. Data are screened against current species-specific RSLs. However, here cleanup was to background.
RR Protective due to Clean-up Level falling within the risk range (i.e. two orders of magnitude above screening levels.)
C Protective due to wastes/contaminated media being disposed within landfill with protective cover/cap.
L Protective due to LUCs restricting gw use.
B Clean-up level not based on risk-based number or ARAR driven, but rather based on background in accordance with EPA OSWER Guidance as follows:

Role of Background in the CERCLA Cleanup Program, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response, April 26, 2002, OSWER 9285.6-07P

"**Consideration of Background in Risk Management:** Where background concentrations are high relative to the concentrations of released hazardous substances, pollutants, and contaminants, a comparison of site and background concentrations may help risk managers make decisions concerning appropriate remedial actions. The contribution of background concentrations to risks associated with CERCLA releases may be important for refining specific cleanup levels for COCs that warrant remedial action[6].

[6]For example, in cases where a risk-based cleanup goal for a COC is below background concentrations, the cleanup level may be established based on background."

TABLE 2

PRE-CONSTRUCTION SEDIMENT AND SURFACE SOIL COCS FOR HUMAN AND ECOLOGICAL RECEPTORS
SITE 3 – CAUSEWAY LANDFILL
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sediment COCs	Maximum Concentration	Background/Typical Facility Sediment Concentration	Selected to Protect Human or Ecological Receptors?
Organics (µg/kg)			
Anthracene	770	ND	E
Benzo(a)pyrene	1200	ND	H
Benzo(a)anthracene	1200	ND	H
Benzo(b)fluoranthene	990	ND	H
Carbazole	ND	ND	H
Chrysene	1900	ND	E
Fluoroanthene	3500	ND	E
Indeno(1,2,3-CD)Pyrene	660	518	H
Phenanthrene	2400	ND	E
Pyrene	2700	ND	E
Aroclor-1254	370	ND	E,H
Aroclor-1260	70	ND	H
Alpha-Chlordane	28	13.9	H
4,4'-DDD	290	33.6	E,H
4,4'-DDE	75	31.6	E,H
Gamma-Chlordane	28	13.2	H
Inorganics (mg/kg)			
Arsenic	19.8	12	E,H
Cobalt	5.6	2.6	E
Copper	46.9	1.5	E
Lead	105	21	E
Mercury	0.35	0.09	E
Selenium	1.1	ND	E
Thallium	0.62	0.41	E
Vanadium	63.7	50	E
Zinc	159	45	E
SURFACE SOIL COCs			
Organics (µg/kg)			
Acenapthylene	1800	ND	E
Anthracene	340	ND	E
Benzo(a)Anthracene	3000	ND	E
Benzo(a)Pyrene	4000	ND	H,E
Benzo(b)fluoranthene	3400	ND	E

TABLE 2

PRE-CONSTRUCTION SEDIMENT AND SURFACE SOIL COCS FOR HUMAN AND ECOLOGICAL RECEPTORS
SITE 3 – CAUSEWAY LANDFILL
MCRD PARRIS ISLAND, SOUTH CAROLINA

Sediment COCs	Maximum Concentration	Background/Typical Facility Sediment Concentration	Selected to Protect Human or Ecological Receptors?
Benzo(g,h,i)Perylene	2500	ND	E
Benzo(k)Fluoranthene	1300	ND	E
Chrysene	2900	ND	E
Fluoranthene	5100	ND	E
Indeno(1,2,3-CD)Pyrene	2600	518	E
Phenanthrene	1200	ND	E
Pyrene	4500	ND	E
Aroclor-1254	56	ND	E
Aroclor 1260	100	ND	E
Inorganics (mg/kg)			
Arsenic	11.8	1.4	E
Lead	264	12.5	E
Mercury	0.43	0.11	E
Vanadium	21.4	9.5	E
Zinc	205	9.7	E

TABLE 3
ANNUAL UPDATE FOR FFA APPENDIX C
LISTING OF SITES WHICH REQUIRE FURTHER INVESTIGATION
SITE MANAGEMENT PLAN
MCRD PARRIS ISLAND

Site	SWMU	Description	Status
3	3	Causeway Landfill	Proposed Plan in progress, following refinement of HHRA and SERA.
4	4	Dredge Spoils Fire Training w/SWMU13	SI/CS Investigation in progress.
5	5	Former Paint Shop Disposal Area	SI/CS Investigation near complete. RI/FS in progress
7	7	Page Field Fire Training Pit	SI/CS Investigation near complete. RI/FS in progress.
8	AOC A&B	PCB Spill Areas	PA required.
9	8	Paint Waste Storage (RFA AOC C)	RI/FS Investigation of overlapping sites 9/16/27/55 funded in FY06. Initial phase of investigation created new data gaps to be investigated in FY10.
13	13	Inert disposal Dredge Spoils Area C	SI/CS Investigation in progress.
14	14	Storm Sewer Outfall	RI/FS in progress.
16	16	Pesticide Rinsate Disposal Area	RI/FS Investigation of overlapping sites 9/16/27/55 funded in FY06. Initial phase of investigation created new data gaps to be investigated in FY010.
21	21	Weapons Power Plant Oil/Water Separator	Existing OWS to be removed by Depot; closure sampling will provide data to support RI/FS advance.
27	27	Equipment Parade Deck	RI/FS Investigation of overlapping sites 9/16/27/55 funded in FY06. Initial phase of investigation created new data gaps to be investigated in FY10.
32	32	Laundry SAA with SWMU 45	With Site 45.
35	35	DRMO	SI/CS Investigation in progress.
39	39	Electrolyte Basin	PA required.
45	45	Dry Cleaning Facility	Treatability Studies FY06 – FY10; FS in progress. Vapor Intrusion Study FY10
46	46	Hobby Shop	PA required.

28 October 2008

TABLE 3
ANNUAL UPDATE FOR FFA APPENDIX C
LISTING OF SITES WHICH REQUIRE FURTHER INVESTIGATION
SITE MANAGEMENT PLAN
MCRD PARRIS ISLAND

Site	SWMU	Description	Status
47	47	Old Photo Shop	PA required.
48	48	Existing Photo Shop	PA required.
49	49	DRMO	PA required.
50	50	Hue City Range Waste Munitions Disposal Site	To be addressed when the range closes
52	52	Old Weapons Cleaning Areas	PA required.
53	53	Debris near Causeway	Trash removal FY04; EMAC Report reviewed. Team to determine path forward.
54	54	Old Waste Water Treatment Plant	Demolition and confirmation sampling FY04; EMAC Report reviewed. SAR reviewed. Marsh area to be investigated with Site 14.
55	55	Fiber Optic Vault	RI/FS investigation of overlapping sites 9/16/27/55 funded in FY06. Initial phase of investigation created new data gaps to be investigated in FY10.

List of Acronyms in Table

CS/SI - Confirmatory Sampling/Site Investigation
FY – Fiscal Year
IM - Interim Measure
NFI - No Further Investigation
PA - Preliminary Assessment
RI/FS - Remedial Investigation/ Feasibility Study
SAA - Satellite Accumulation Area

TABLE 4

FEDERAL ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
MCRD PARRIS ISLAND, SOUTH CAROLINA

ARAR	Citation/Reference	ARAR Type	Rationale for Use at MCRD Parris Island
Chemical-Specific ARARs			
Safe Drinking Water Act MCLs, MCLGs, and SMCLs	40 CFR 140-143	applicable	Would be used as protective levels for groundwater that are current or potential drinking water sources
Ambient Water Quality Criteria	Section 304 of the Clean Water Act	Relevant and appropriate	Criteria for assessing the need for surface water remedial action/corrective measures.
Clean Air Act National Ambient Air Quality Standards (NAAQs)	42 U.S.C §7401- 7642, 40 CFR Part 50	applicable	Remedial action/corrective measures involving treatment of media could result in emissions to the atmosphere.
RCRA Subtitle C – Hazardous Waste Identifications and Listing Regulations	40 CFR 261	applicable	Would be used to identify a material as a hazardous waste and thus determine the applicability and relevance of RCRA C Hazardous Waste Rules.
U.S. EPA Health Advisories	U.S. EPA, 1996a	To be considered criteria (TBC)	Benchmark values for assessing the need for groundwater remedial action/corrective measures.
Risk-Based Concentration (RBCs)	U.S. EPA Region III, 1998	TBC	Benchmark values for assessing the need for soil and groundwater remedial action/corrective measures.
Generic Soil Screening Levels	U.S. EPA, 1996b	TBC	Benchmark values for assessing the need for soil remedial action/corrective measures.
Dutch Soil Clean-up Act Ecological Screening Values	Beyer, 1990	TBC	Benchmark values for assessing the need for soil remedial action/corrective measures.
Dutch Ministry of Housing Intervention Values and Target Values – Soil Quality Standards	MHSPE, 1994	TBC	Benchmark values for assessing the need for soil remedial action/corrective measures.
Oak Ridge National Laboratory Toxicity Benchmarks for Soil	Efroymson, 1997a and 1997b	TBC	Benchmark values for assessing the need for soil remedial action/corrective measures.
Canadian Council of Ministers of the Environment Soil Quality Guidelines	CCME, 1997	TBC	Benchmark values for assessing the need for soil remedial action/corrective measures.
Ecological Risk Assessment at Military Bases	U.S. EPA Region 4, 1998	TBC	Memorandum consists of benchmark values for assessing the need for surface soils, sediment and surface water remedial action/corrective measures.
ER-L and ER-M Levels	Long et al., 1995	TBC	Benchmark values for assessing the need for sediment remedial action/corrective measures.

TABLE 4

FEDERAL ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
MCRD PARRIS ISLAND, SOUTH CAROLINA

ARAR	Citation/Reference	ARAR Type	Rationale for Use at MCRD Parris Island
PELs and TELs	FDEP, 1994	TBC	Benchmark values for assessing the need for sediment remedial action/corrective measures.
Location-Specific ARARs			
U.S. EPA's Groundwater Protection Strategy	U.S. EPA, 1984	TBC	Surficial groundwater at Site 3 is likely designated Class IIIA.
CWA Section 404 River and Harbors Act, Section 10	40 CFR 230, 33 CFR 320-330	Not applicable	Prohibits the unauthorized obstruction or alteration of any navigable waters of the United States; however, waters within the vicinity of Site 3 are not classified as navigable waters.
Floodplain Management	Executive Order 11988	Applicable	Site 3 is located within the 100-year floodplain.
Protection of Wetlands	Executive Order 11990	Applicable	Site 3 is located within a wetlands area.
Endangered Species Act	16 U.S.C 1531 et seq.	Applicable	A bald eagle is known to nest in the vicinity of Site 3. Wood storks and alligators are sometimes observed in the vicinity.
Fish and Wildlife Coordination Act	16 U.S.C 661 et seq., 40 CFR Part 122.49	Applicable	Ensures that remedial action/corrective measures protect nearby wetlands and protected habitats.
Coastal Zone Management Act	16 U.S.C. 1451 et seq.	Applicable	Ensures that remedial action/corrective measures protect coastal resources.
Historic Sites, Buildings, and Antiquities Act	16 U.S.C. 461 et seq.	Applicable	This Act would be applicable if information is found to classify Site 3 as a historic or prehistoric property of national significance
Archaeological and Historic Preservation Act of 1974	16 U.S.C. 469 et seq.	Applicable	This Act would be applicable if historic and archaeological artifacts were to be affected by remedial activities. No such artifacts are known to exist within the boundaries of Site 3.
Archeological Resources Protection Act of 1979	16 U.S.C. 479(aa) et seq.	Applicable	This Act would be applicable if archeological artifacts were discovered during remedial activities.
Native American Grave Protection and Repatriation Act of 1990	25 U.S.C. 3001 et seq.	Applicable	This Act would be applicable if human remains were discovered during remedial activities.
Bald Eagle Protection Act of 1940, as Amended	16 U.S.C. 688 et seq.	Applicable	This Act includes provisions for prohibiting the disturbance of bald eagles. Because a bald eagle is known to nest within the vicinity of Site 3, remedial activities would need to be conducted to minimize the disturbance to this species.

TAB 4

FEDERAL ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
MCRD PARRIS ISLAND, SOUTH CAROLINA
PAGE 3 OF 4

ARAR	Citation/Reference	ARAR Type	Rationale for Use at MCRD Parris Island
Conservation Programs on Military Reservations (Sikes Act) of 1960, as Amended	16 U.S.C. 670(a) et seq.	Applicable	This act requires that military installations manage natural resources for multipurpose uses and public access appropriate for those uses consistent with the military department's mission.
Marine Mammal Protection Act of 1972 as Amended	16 U.S.C. 1361 et seq.	Not Applicable	Marine mammals are not known to inhabit the Pond or Ribbon Creek. Marine mammals are usually not associated with shallow marshes and small tidal inlets like those near Site 3.
Action-Specific ARARs			
Solid Waste Disposal Act (SWDA)/ Resource Conservation Recovery Act (RCRA) Subtitle C	42 U.S.C 6905, 6912a, 6924-6925	–	–
• Standards for Hazardous Waste Generators	40 CFR 262	applicable	Applicable for removed site wastes determined to be hazardous.
• Standards for Hazardous Waste Transporters	40 CFR 263	applicable	Applicable for removed site wastes determined to be hazardous that are transported off site.
• Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities	40 CFR 264	applicable	These regulations would be applicable to waste removed from the site including both on-site and off-site management.
• Interim status standards for owners and operators of hazardous waste TSD facilities	40 CFR 265	Relevant and appropriate	Establishes design and operating criteria for hazardous landfills. Because the type of waste disposed in the causeway was primarily nonhazardous in nature, these requirements are not applicable; however, certain aspects are relevant and appropriate.
• RCRA Land Disposal Restrictions (LDR) Requirements	40 CFR 268	applicable	Treatment or disposal of contaminated media and/or disposal of treatment residuals that may be considered hazardous waste would be subject to land disposal restrictions.
Hazardous and Solid Waste Amendments of 1984	42 U.S.C. 6926	Applicable	Establishes a corrective actions program requiring four basic elements (assessment, investigation, CMS, implementation).
RCRA Subtitle D	40 U.S.C 6901	Relevant and appropriate	Establishes design and operating criteria for solid waste (nonhazardous) landfills; however, disposal activities ceased prior to the effective date of the regulation.

TAB...

FEDERAL ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
MCRD PARRIS ISLAND, SOUTH CAROLINA

ARAR	Citation/Reference	ARAR Type	Rationale for Use at MCRD Parris Island
The Clean Water Act (CWA) National Pollution Discharge Elimination System	40 CFR 122	applicable	These requirements are applicable for all alternatives that include a water discharge.
Toxic Substances Control Act	40 CFR 761	Not an ARAR	Remedial action/corrective measures may be driven by reducing PCB concentrations in affected media to meet published levels.
U.S. EPA Clean Air Act New Source Performance Standards (NSPS)	40 CFR 60	Not an ARAR	Remedial action/corrective measures involving treatment of media could result in emissions to the atmosphere.
Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR 60	Potentially applicable	Existing source types are not present on site.
DOT Hazardous Materials Transportation	49 CFR	Potentially applicable	These rules are considered potentially applicable to wastes shipped off site for laboratory analysis, treatment, or disposal.
OSHA Standards	29 CFR 1910.120	Applicable	On site activities are required to follow OSHA requirements.
National Environmental Policies Act	42 U.S.C 4321 et seq.	Relevant and appropriate	Remedial action/corrective measures could constitute significant activities, thereby making NEPA requirements ARARs; however, activities conducted in accordance with the NCP are considered to meet the substantive NEPA requirements.
Soil Conservation Act	U.S.C. 5901 et seq.	Applicable	During remedial activities, implementation of soil conservation practices would be required.
Presumptive Remedy for CERCLA Municipal Landfill Sites	U.S. EPA, 1993	TBC	Site 3 was constructed with municipal trash and solid waste from the Depot. Through this directive, U.S. EPA has identified containment as the presumptive remedy for such landfill sites.
Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills	U.S. EPA, 1996c	TBC	Provides the framework for determining the applicability of the containment presumptive remedy to military landfills.

TABLE 5

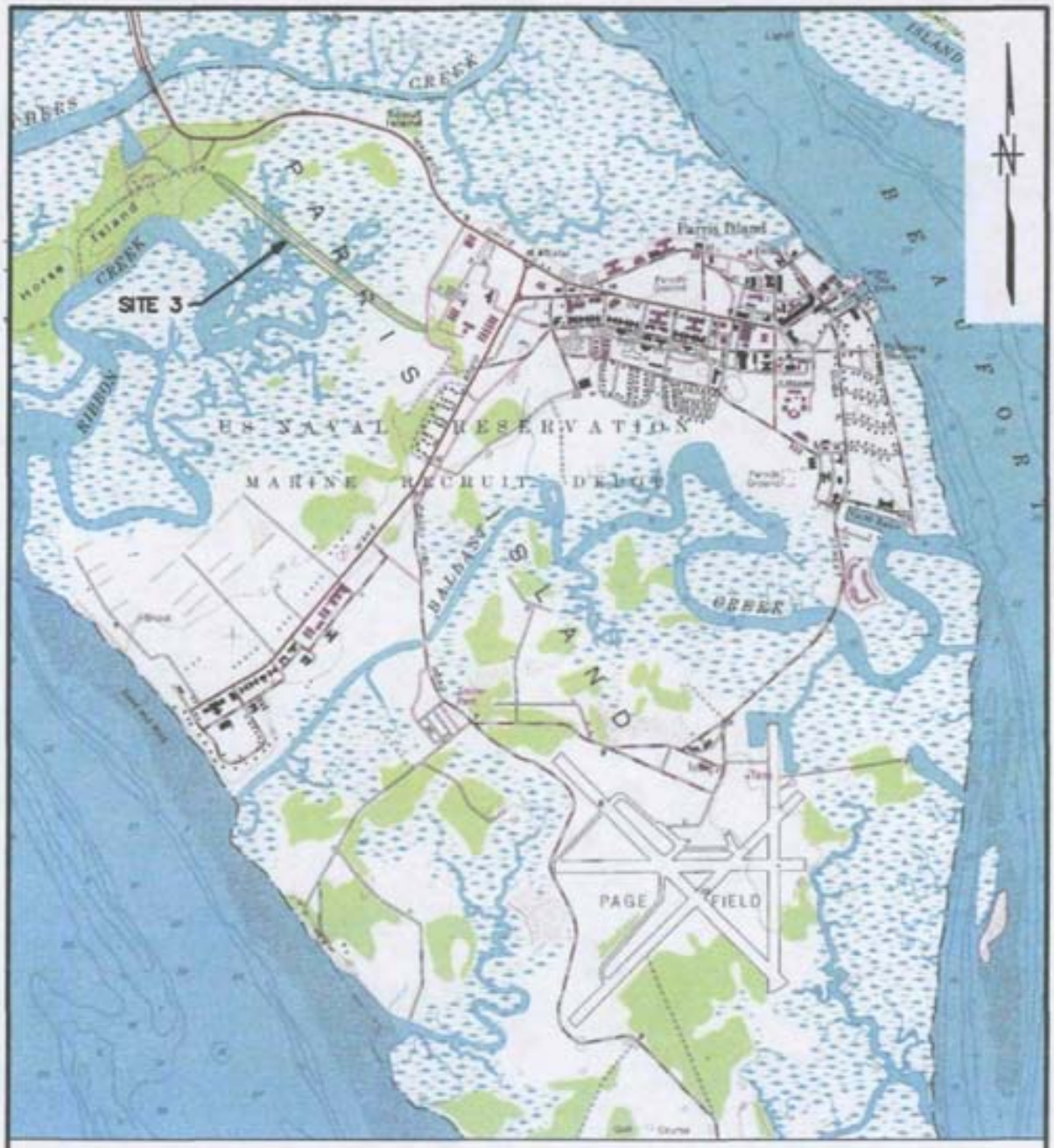
STATE OF SOUTH CAROLINA ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
MCRD PARRIS ISLAND, SOUTH CAROLINA

ARAR	Citation/Reference	ARAR Type	Rationale for Use at MCRD Parris Island
Chemical-Specific ARARs			
State Primary Drinking Water Regulations Groundwater Sources and Treatment Surface Water Sources and Treatment MCL in Drinking Water Control of Lead and Copper	R.61-58 to R.61-58.11 R.61-58.2 R.61-58.3 R.61-58.5 R.61-58.11	applicable	Would be used as protective levels for groundwaters that are current or potential drinking water sources.
South Carolina Hazardous Waste Management Act Hazardous Waste Management Regulations	§44-56-10 R.61-79	applicable	Would be used to identify a material as a hazardous waste and thus determine the applicability and relevance of Hazardous Waste Management Regulations.
Location-Specific ARARs			
Water Classifications and Standards	R.61-68	Applicable	Surficial groundwater is not an underground source of drinking water. Surface water near Site 3 is classified as shellfish harvesting waters.
Coastal Zone Management Act	§48-39-10.	Applicable	Ensures that remedial action/corrective measures protect coastal resources.
Groundwater Mixing Zone Application Guidance	SCDHEC, 1997b	TBC	Guidance for completing an application to obtain groundwater waiver for non-attainment of MCLs.
Action-Specific ARARs			
Well Standards	R.61-71	applicable	Applicable if remedial action/corrective measures involving the installation or abandonment of monitoring wells.
Hazardous Waste Management Act	§44-56-30	-	-
• Standards for Hazardous Waste Generators	R.61-79.262	applicable	Applicable for removed site wastes determined to be hazardous.
• Standards for Hazardous Waste Transporters	R.61-79.263	applicable	Applicable for removed site wastes determined to be hazardous that are transported off site.

TABLE 5

STATE OF SOUTH CAROLINA ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
MCRD PARRIS ISLAND, SOUTH CAROLINA

ARAR	Citation/Reference	ARAR Type	Rationale for Use at MCRD Parris Island
• Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal (TSD) Facilities	R.61-79.264	Potentially applicable	These regulations would be applicable to waste removed from the site including both on-site and off-site management.
• Interim status standards for owners and operators of hazardous waste TSD facilities	R.61-79.265	Relevant and appropriate	Establishes design and operating criteria for hazardous landfills. Because the type of waste disposed in the causeway was primarily non-hazardous in nature, these requirements are not applicable; however, certain aspects are relevant and appropriate.
• Land Disposal Restrictions (LDR) Requirements	R.61-79.268	applicable	Treatment or disposal of contaminated media and/or disposal of treatment residuals that may be considered hazardous waste would be subject to land disposal restrictions.
Air Pollution Control Regulations and Standards	R.61-62	Potentially applicable	Remedial action/corrective measures involving treatment of media could result in emissions to the atmosphere.
Solid Waste Management: Collection, Temporary Storage, and Transportation of Solid Waste	R.61-107.5	Potentially applicable	Applicable if solid waste is generated during remedial action/corrective measures.
Solid Waste Management: Construction, Demolition, and Land Clearing Debris Landfills	R.61-107.11	Relevant and appropriate	Construction, demolition, and land-clearing debris is co-mingled with other wastes.
Solid Waste Management: Municipal Solid Waste Landfills	R.61-107.258	Relevant and appropriate	Contains design and construction requirements for municipal landfills; however, disposal activities ceased prior to the effective date of the regulation.
Sanitary Landfill Design, Construction, and Operation	R.61-70	Relevant and appropriate	Contains design and construction requirements for sanitary landfills; however, disposal activities ceased prior to the effective date of the regulation.
Standards for Stormwater Management and Sediment Reduction	R.72-300 and R.72-405	applicable	Applicable if remedial action/corrective measures involve land-disturbance activities.
General Objectives and Components of Contamination Assessments and Remedial Actions	SCDHEC, 1994	TBC	Provides guidance for conducting remedial action activities.

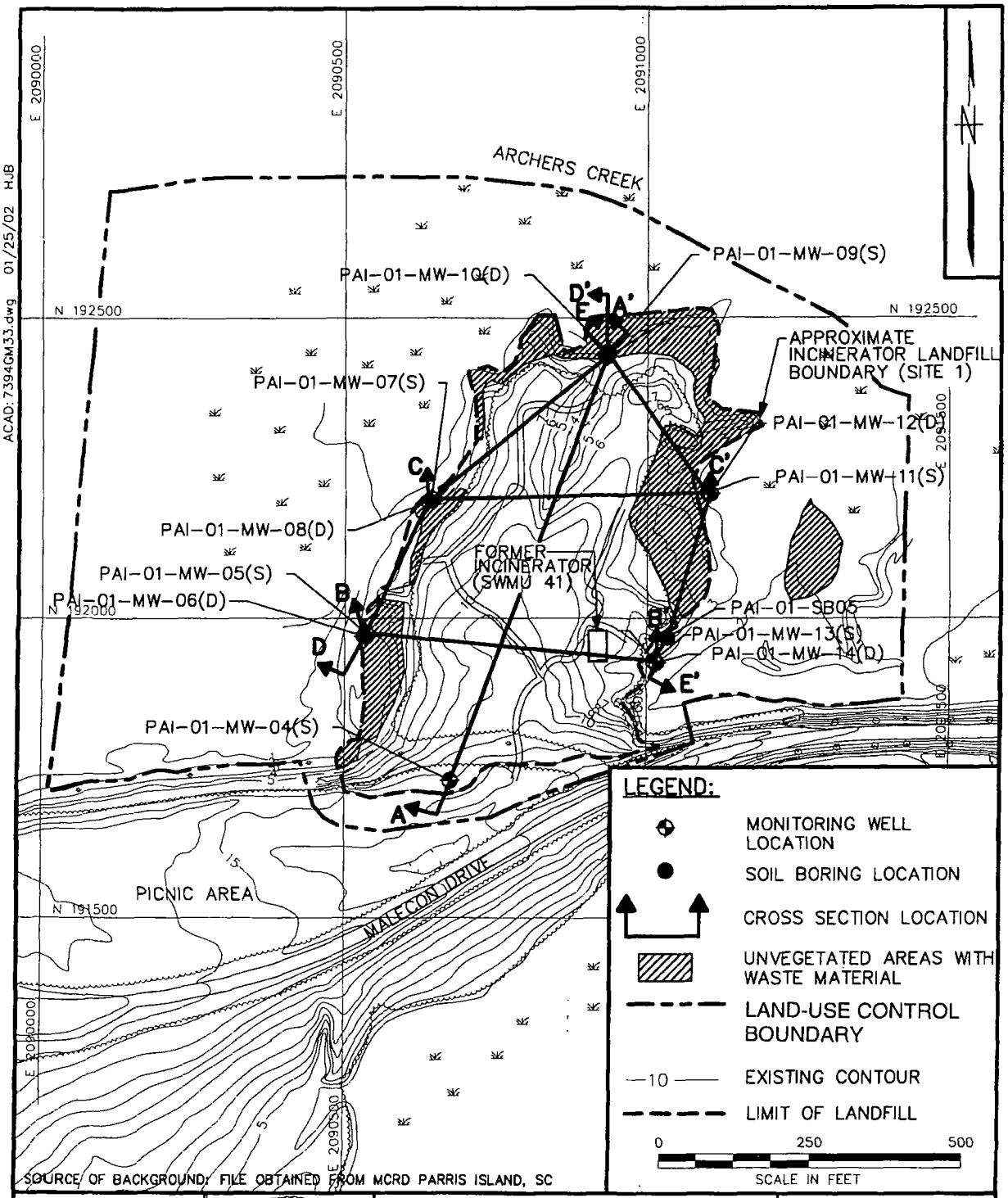


QUADRANGLE LOCATION

SOURCE: USGS 7.5 MINUTE PARRIS ISLAND QUADRANGLE, 1956. PHOTOREVISED 1979.

0 3000 6000
SCALE IN FEET

DRAWN BY DM DATE 8/3/04			CONTRACT NO. 7394
CHECKED BY DATE		SITE/SWMU 3 AND DEPOT LOCATION MAP MCRD PARRIS ISLAND, SOUTH CAROLINA	APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 / REV. 0

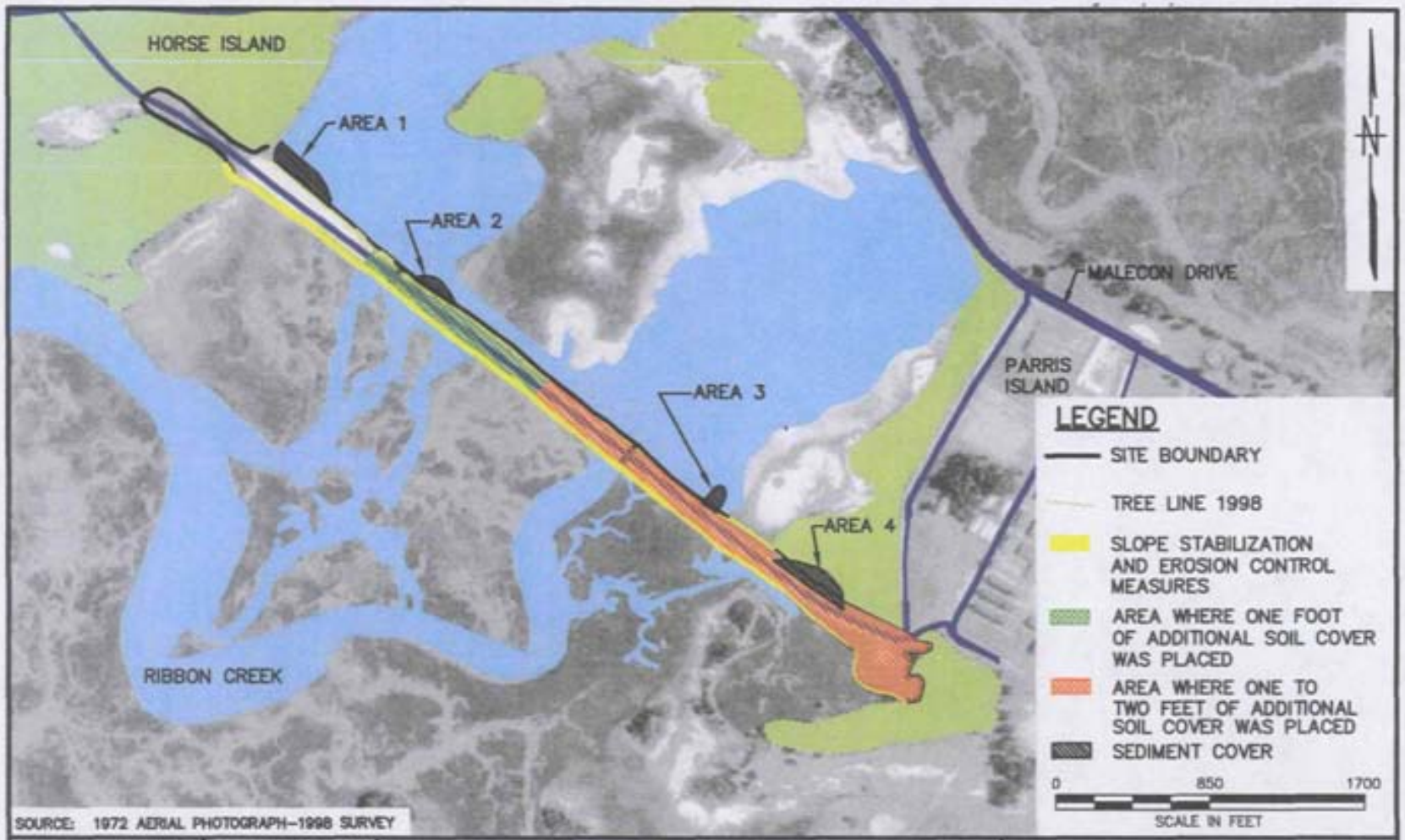


DRAWN BY	DATE	CONTRACT NO.
HJB	1/25/02	7394
CHECKED BY	DATE	APPROVED BY / DATE
COST/SCHED-AREA		APPROVED BY / DATE
SCALE: AS NOTED		DRAWING NO. FIGURE 2-2 / REV. 0

DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMD

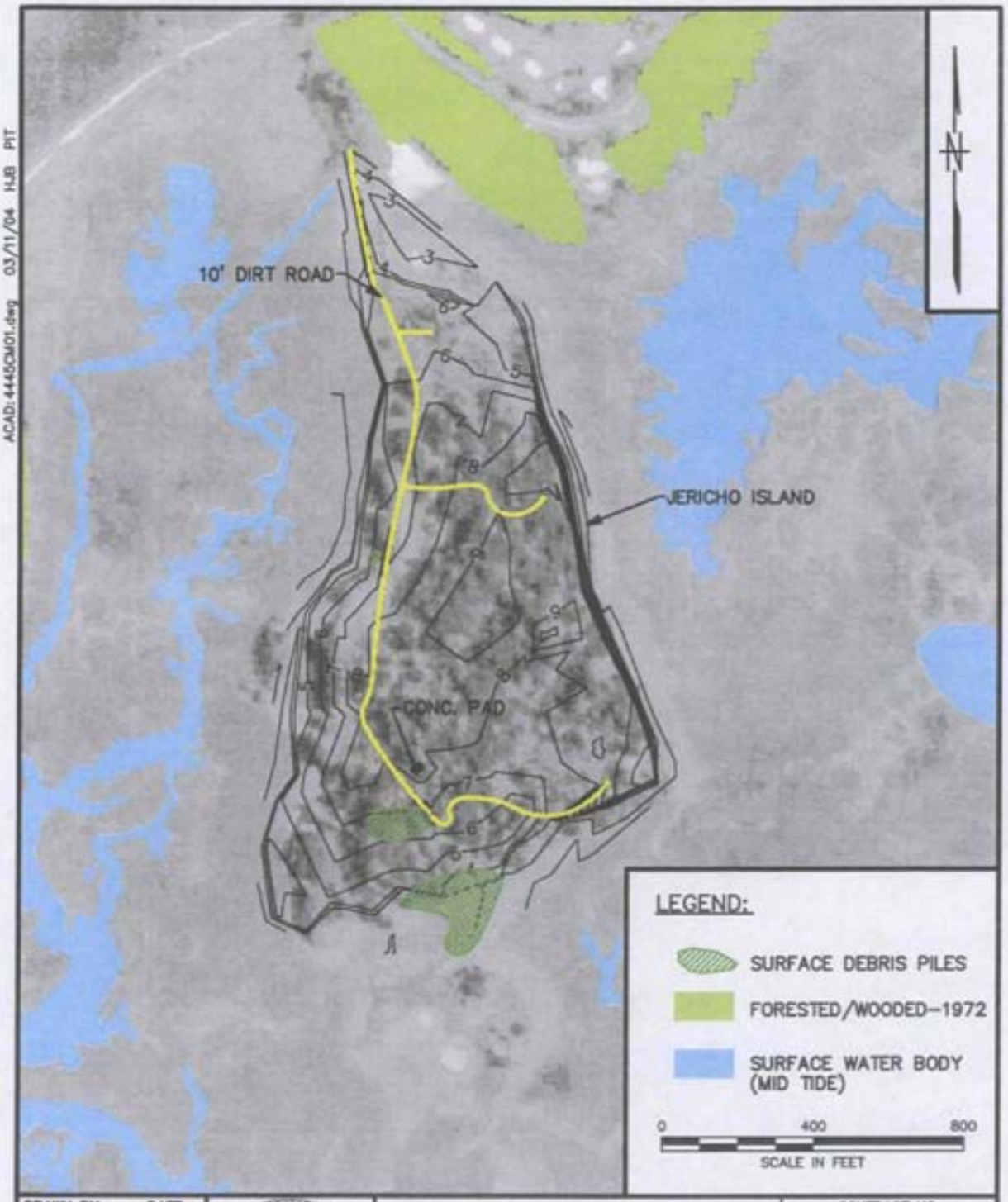
CROSS SECTION LOCATION AND WASTE DELINEATION MAP
SITE 1 – INCINERATOR LANDFILL AND SWMU 41 – FORMER INCINERATOR
MCRD PARRIS ISLAND, SOUTH CAROLINA

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98



DRAWN BY DM DATE 8/3/04			CONTRACT NO. 7394
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 REV. 0

INTERIM REMEDIAL ACTION
SITE 3 – CAUSEWAY LANDFILL
MCRD PARRIS ISLAND, SOUTH CAROLINA



ACAD: 4445OM01.dwg 03/11/04 HJB PIT

DRAWN BY HJP DATE 3/11/04		SITE BOUNDARY SITE 12/SWMU 10 JERICHO ISLAND DISPOSAL AREA MCRD PARRIS ISLAND, SOUTH CAROLINA	CONTRACT NO. 4445
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2 / REV. 0

FORM CADD NO. SSIV_AV.DWG - REV 0 - 1/20/98