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MCB CAMP LEJUENE
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NO ACTION DECISION DOCUMENT SITE 85 FORMER CAMP JOHNSON BATTERY DUMP
MCB CAMP LEJEUNE NC
1/1/2012
CH2M HILL



No Action Decision Document

Installation Restoration Program

Site 85 – Former Camp Johnson Battery Dump

Marine Corps Base Camp Lejeune, North Carolina
January 2012

1 Declaration

This No Action Decision Document (NADD) presents the No Further Action (NFA) determination for Installation Restoration (IR) Site 85-Former Camp Johnson Battery Dump, located at Marine Corps Base Camp Lejeune (MCB CamLej), North Carolina. MCB CamLej was placed on the U.S. Environmental Protection Agency (USEPA) National Priorities List (NPL) effective November 4, 1989 (EPA ID: NC6170022580). As a result of the NPL listing and pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), USEPA Region 4, the North Carolina Department of Environment and Natural Resources (NCDENR), the Department of the Navy (Navy), and the Marine Corps entered into a Federal Facilities Agreement (FFA) for MCB CamLej in 1991. The primary purpose of the FFA is to ensure that the environmental impacts associated with past and current activities at the Base are thoroughly investigated.

Site 85 is in the IR Program at MCB CamLej and was previously granted an NFA determination in 2005 based on the results of historical investigations and removal actions (CH2M HILL, 2011a). However, an additional investigation was conducted to support proposed military construction activities in the vicinity of Site 85 and to confirm the 2005 NFA decision. Site 85 is recommended for NFA in the current version of the Site Management Plan (CH2M HILL, 2010), which is updated annually to reflect the site investigation status and schedule.

The NFA determination has been made in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986, and with the National Oil and Hazardous Substances Pollution Contingency Plan. The 2005 NFA decision has been confirmed by a Focused Preliminary Assessment/Site Inspection (PA/SI; CH2M HILL, 2011a) and an Expanded Site Inspection (ESI; CH2M HILL, 2011b) conducted at Site 85. These documents are in located the MCB CamLej Administrative Record. As a result of the environmental investigation and risk screenings, there are no unacceptable risks to human health or the environment at Site 85. The Navy and the Marine Corps issued this NADD and obtained concurrence from USEPA Region 4 and NCDENR on the NFA decision. Copies of the USEPA and NCDENR approval letters are presented in Attachment A.

1.1 Authorizing Signature

D. J. LECCE
Colonel, U.S. Marine Corps
Commanding Officer
Marine Corps Base, Camp Lejeune

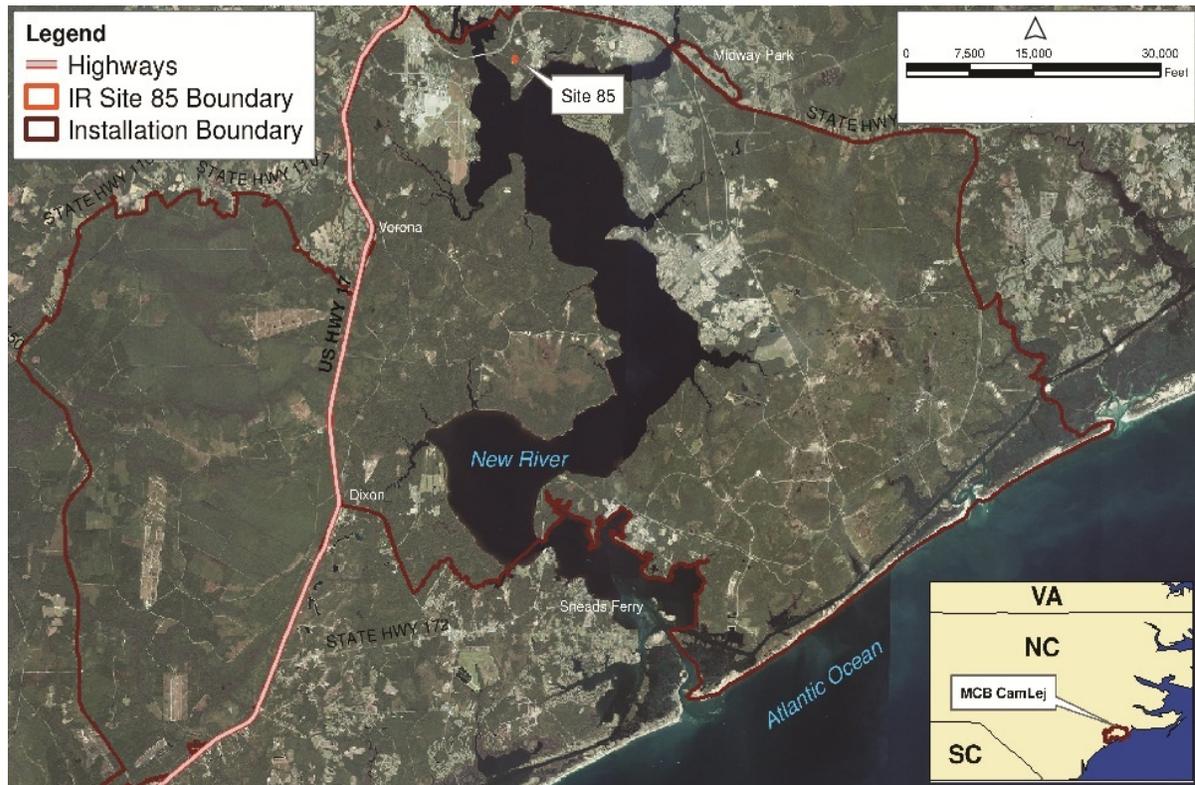
Date

2 Decision Summary

2.1 Site Description and History

MCB CamLej is a 156,000-acre facility located in Onslow County, North Carolina, adjacent to the southern side of the city of Jacksonville (**Figure 1**). The mission of MCB CamLej is to maintain combat-ready units for expeditionary deployment. The Base provides housing, training facilities, and logistical support for Fleet Marine Force units and other assigned units.

FIGURE 1
Base Location Map



IR Site 85 encompasses approximately 4.5 acres of heavily vegetated land in the Camp Johnson area of MCB CamLej. The site was formerly used for battery disposal during the 1950s. In 1992, decomposed batteries used in military communication equipment during the Korean War era were unearthed as a roadway was being widened. Military personnel also discovered discarded charcoal canisters from air-purifying respirators in this area. The discarded battery packs and charcoal canisters were observed in piles randomly located throughout the site.

FIGURE 2
Site Map



2.2 Site Characteristics

Surface topography slopes gently to the southwest, and ground surface elevations range from approximately 14 feet above mean sea level in the southwest part of the site to 18 feet above mean sea level in the northeast part of the site. Access to the site is provided by an unnamed and unimproved road that intersects Hoover Road, and a narrow unimproved road circumnavigates the interior of the site (**Figure 2**).

Previous investigations have encountered fine sands with varying amounts of silt extending to depths of at least 17 feet below ground surface (ft bgs). Thin clay lenses have been encountered at depths of approximately 2 to 4 ft bgs. Shallow groundwater generally flows south toward the New River. During the ESI, depths to groundwater ranged between 10 to 16 ft bgs.

2.3 Previous Investigations

Table 1 provides a brief chronology of historical investigations and removal actions at Site 85.

TABLE 1
Previous Investigations

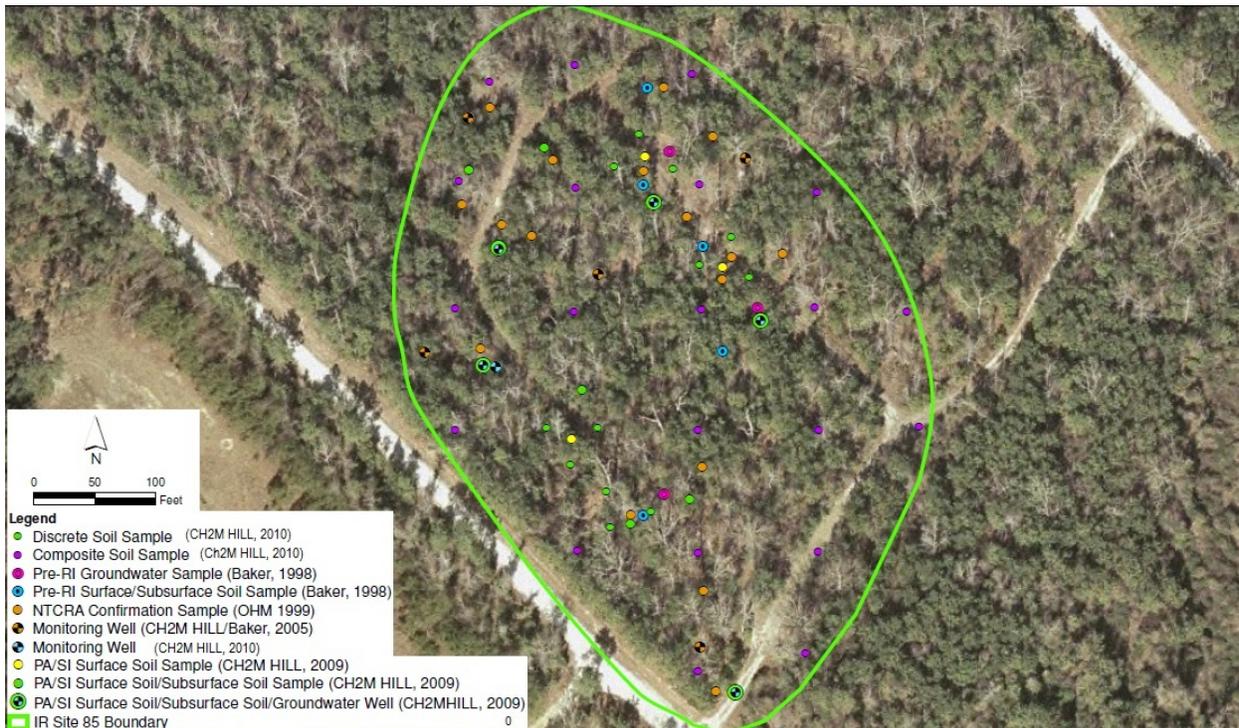
Investigation Phase	Date	Reference	Summary
Pre-Remedial Investigation	1998	Baker 1998	Surface soil, subsurface soil, and groundwater samples collected near battery disposal piles. Potential risks to human receptors identified from exposure to metals in surface soil and groundwater. An Engineering Estimate/Cost Analysis was prepared that recommended removal of soil and batteries through a non-time-critical removal action, followed by re-evaluation of groundwater.
Non-time-critical Removal Action	2000	OHM 2000	Approximately 158 tons of soil and debris removed from 16 separate battery pile locations. Confirmatory data indicated concentrations of metals below USEPA Region III industrial soil risk-based criteria. Post-removal action groundwater monitoring conducted for 1 year. Analytical data indicated concentrations of metals not detected above federal or state regulatory criteria. Site recommended for NFA determination. USEPA and NCDENR concurred with NFA decision (CH2M HILL/Baker, 2005).
Camp Johnson PA/SI	2009	CH2M HILL 2011a	Surface soil, subsurface soil, and groundwater samples collected from Site 85. Potentially unacceptable risks to human health and ecological receptors identified from exposure to metals. Additional groundwater and surface soil assessment recommended.
Site 85 ESI	2011	CH2M HILL 2011b	Groundwater re-sampled and analyzed for total/hexavalent chromium to evaluate potential human health risk from exposure to chromium in groundwater. Analytical data indicated hexavalent chromium was not present, and total chromium was not present at concentrations exceeded screening criteria. Discrete and site-wide composite surface soil samples collected during the ESI did not contain concentrations of metals exceeding screening criteria.

Figure 3 depicts the location of the former battery piles and **Figure 4** depicts the location of historical media sampling locations.

FIGURE 3
Former Battery Pile Locations



FIGURE 4
Sampling Locations



A summary of soil and groundwater exceedances from the PA/SI and ESI are provided in **Table 2** and **Table 3**, respectively. The highest concentrations detected for each chemical or metal between both investigations are listed. Refer to the PA/SI (CH2M HILL, 2011a) for summary of historical investigation and removal action results.

TABLE 2
Soil Exceedances

Chemical Name	Surface Soil Maximum Concentration	Subsurface Soil Maximum Concentration	Residential Soil Adjusted RSL	NC SSL (2010)	MCBCamLej Background Surface Soil 2X Mean	MCBCamLej Background Subsurface Soil 2X Mean
Metals (milligrams per kilogram)						
Aluminum	--	12,000	7,700	--	5,487	10,369
Antimony	5.9 J-	--	3.1	--	0.447	--
Arsenic	9.9 J	2.3	0.39	5.8	0.626	2.12
Cadmium	3.5	--	7	3	0.033	--
Chromium	8.5 J	--	0.29	3.8	6.05	14.5
Cobalt	2.4 J	--	2.3	--	0.294	0.822
Iron	11,500	--	5,500	150	3,245	5,439
Lead	614	--	400	270	12.3	8.49
Manganese	10,700	--	180	65	13.7	9.25
Mercury	8.8	--	2.4	1	0.081	0.071
Thallium	18.7 J	--	0.51	--	0.36	--
Zinc	5,600	--	2,400	1,200	10.8	6.59

J—Analyte present, value may or may not be accurate or precise

RSL—USEPA regional screening level

NC SSL—North Carolina Soil Screening Level

TABLE 3
Groundwater Exceedances

Chemical Name	Groundwater Maximum Concentration	Adjusted Tap Water RSL	NCGWQS (2010)	MCB CamLej Background Groundwater 2X Mean
Metals (micrograms per liter)				
Aluminum	15,100	3,700	--	1,886
Chromium	18.9 J	0.043*	10	3.13
Iron	6,900	2,600	300	5,999
Lead	15.9 J	--	15	2.8

J—Analyte present, value may or may not be accurate or precise.

NCGWQS— North Carolina Groundwater Quality Standards

*Tap water RSL is for hexavalent chromium- data indicate total chromium.

2.4 Current and Potential Future Land and Resource Uses

Currently, Site 85 is used by the Marine Corps Combat Services Support School for training exercises. A military construction project is planned in the vicinity of Site 85.

Groundwater from the surficial aquifer at MCB CamLej, including Site 85, is not currently used as a potable water supply. Potable water supplies for MCB CamLej are provided by wells that pump groundwater from the deeper Castle Hayne aquifer.

2.5 Summary of Human Health Risk Screening

The human health risk screening (HHRS) was conducted in three steps following the Navy risk ratio technique (U.S. Navy, 2000) described below.

Step 1

The maximum detected constituent concentration for each media was screened against the following criteria:

- Soil – USEPA adjusted residential RSLs (USEPA, 2010a; RSLs based on noncarcinogenic endpoints are adjusted by dividing the RSL by 10; RSLs based on cancer are not adjusted) and two times the mean surface and subsurface soil background concentration (for metals) (Baker, 2001).
- Groundwater – USEPA adjusted tap water RSLs (USEPA, 2010a), NCGWQS (NCDENR, 2010), federal maximum contaminant levels, and two times the mean groundwater background concentration (for metals) (Baker, 2002).

If the maximum detected concentration exceeded the screening criteria, the constituent was identified as a chemical of potential concern (COPC) and the screening level risk evaluation proceeded to Step 2.

Step 2

For constituents identified as COPCs in Step 1, a corresponding risk level was calculated in Step 2 using the following equation:

$$\text{corresponding risk level} = \frac{\text{concentration} \times \text{acceptable risk level}}{RSL}$$

The acceptable risk level is 1 for noncarcinogens and 10^{-6} for carcinogens. The corresponding risk levels for each constituent in a medium are summed to calculate the cumulative corresponding hazard index (HI) for noncarcinogens and the cumulative corresponding cancer risk for carcinogens. An HI for each target organ/effect is also calculated. If any target organ/effect HI exceeds 0.5 or if the cancer risk exceeds 5×10^{-5} , the chemicals contributing to these values are retained as COPCs and carried forward to Step 3.

Step 3

Step 3 follows the same procedure as Step 2 with one exception: a corresponding risk level for each COPC is calculated using the 95 percent upper confidence limit (UCL) in place of the maximum concentration, if more than five samples are available for that media. If fewer than five samples are available, the maximum concentration is used. Pro UCL

Version 4.00.05 (USEPA, 2010b) was used to test the data distribution and calculate the 95 percent UCL.

A summary of the HHRS is provided in **Table 4**.

TABLE 4
HHRS Summary

Media	Step 1 COPCs	Step 2 COPCs	Step 3 COPCs	Conclusion
Surface Soil	antimony arsenic chromium cobalt iron lead manganese mercury zinc	lead manganese	manganese	No unacceptable risks to human health expected from exposure to surface soil based on low exceedance rate of screening level for manganese (1/13). Manganese identified as essential human nutrient.
Combined Surface and Subsurface Soil	aluminum antimony arsenic chromium cobalt iron lead manganese mercury zinc	aluminum arsenic chromium lead manganese	aluminum manganese	No unacceptable risks to human health expected from exposure to site soils based on low exceedance rate of screening level for manganese (1/23) and calculated HI for aluminum alone below acceptable screening level. Manganese identified as essential human nutrient.
Groundwater	chloroform methylene chloride aluminum chromium iron lead	chloroform methylene chloride chromium lead	chloroform methylene chloride chromium	No unacceptable risks to human health expected from exposure to site groundwater. Chloroform and methylene chloride are not likely associated with site use and alone are below acceptable risk levels. Hexavalent chromium not detected. Chromium present in trivalent form and detected concentrations below human health risk screening levels for trivalent chromium.

Based on the 2009 PA/SI and 2010 ESI data collected from Site 85, the HHRS concluded that no unacceptable risks to human health from exposure to site media were present.

2.6 Summary of Ecological Risk Assessment

The ecological risk assessment (ERA) conducted for Site 85 included a preliminary ecological risk screening performed during the PA/SI (CH2M HILL, 2011a) and steps 1, 2 (screening-level ERA [SLERA]) and Step 3a (baseline ERA) for terrestrial habitats performed during the ESI (CH2M HILL, 2011b).

Preliminary Ecological Risk Screening

Surface soil, subsurface soil, and groundwater data were screened against ecological screening values (ESVs) intended to be protective of ecological receptors. Potential ecological receptors include: plants, soil invertebrates, benthic invertebrates, amphibians, fish, mammals, reptiles, and birds. For each sample medium, the maximum concentration or maximum detection limit for non-detected analytes were compared to the screening value to derive a hazard quotient (HQ). An HQ greater than 1 suggests the potential for risk. The screening values were identified from the following sources:

- *USEPA Ecological Soil Screening Levels* (<http://www.epa.gov/ecotox/ecosl/>) (USEPA, 2009a)
- *USEPA Region 4 Recommended Ecological Screening Values* (<http://www.epa.gov/region04/waste/ots/ecolbul.htm>) (USEPA, 2001a).
- USEPA National Recommended Water Quality Criteria (USEPA, 2009b)

The USEPA ecological SSLs and recommended water quality criteria were preferentially selected over the Region 4 ESVs.

Based on the results of the preliminary ecological risk screening, no risks to ecological receptors from exposure to subsurface soil and groundwater were identified. However, potential risks to ecological receptors from exposure to antimony, cadmium, copper, lead, manganese, mercury, thallium, and zinc in surface soil were identified.

SLERA

To evaluate the potential risks identified in the PA/SI, a SLERA was completed for Site 85. The SLERA included Steps 1 and 2 and Step 3a (baseline ERA) of the ERA process, and evaluated surface soil data collected from Site 85 in 2009 and 2010. The SLERA was performed in accordance with the following guidance:

- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997)
- *Region 4 Ecological Risk Assessment Bulletins – Supplement to RAGS* (USEPA, 2001b)
- *Navy Guidance for Conducting Ecological Risk Assessments* (Navy, 2003)
- *NCDENR Division of Waste Management - Guidelines for Performing Screening Level Ecological Risk Assessments within the North Carolina* (NCDENR, 2003)

The potential for effects from exposure to surface soil was initially evaluated by comparing ESVs to maximum concentrations (Step 2) of constituents detected at the site. For soil, USEPA's ecological SSLs (USEPA 2001a) were preferentially selected over USEPA Region 4 values (USEPA, 2001b). When no ecological SSL was available for a constituent, the USEPA Region 4 value was selected. Maximum concentrations of metals in surface soil were also compared to MCB CamLej background concentrations.

HQs were calculated for surface soil by dividing the exposure point concentration by the corresponding surface soil ESV. Maximum concentrations for detected analytes and

maximum detection limits for undetected analytes were used to conservatively estimate potential chemical exposures to ecological receptors in Step 2.

North Carolina SLERA guidance (NCDENR, 2003) requires that constituents falling into one of the following categories be identified as a Step 2 COPC:

- Category 1 – Contaminants with a maximum detection exceeding the ESV
- Category 2 – Undetected contaminants with a laboratory sample quantitation limit exceeding the ESV
- Category 3 – Detected contaminants with no ESV
- Category 4 – Undetected contaminants with no ESV

The following are results of the Step 2 surface soil screening:

- Category 1 – One semivolatile organic compound (SVOC) (bis[2-ethylhexyl]phthalate), two pesticides (4,4'-DDE and 4,4'-DDT), one polychlorinated biphenyl (PCB) (Aoclor-1254), and nine inorganics (aluminum, antimony, cadmium, copper, lead, manganese, mercury, thallium, and zinc)
- Category 2 – Three volatile organic compounds (VOCs), eight SVOCs, three pesticides, and six PCBs
- Category 3 – Three VOCs (2-butanone, acetone, and methyl acetate)
- Category 4 – 19 VOCs and 23 SVOCs

Using the conceptual site model, the conservative assumptions used in Steps 1 and 2 were re-evaluated in Step 3a to refine the COPC list. Step 3a includes refinement of the direct exposure screening using more-realistic assumptions (conservative estimate of the mean as the exposure point concentration instead of the maximum concentration and use of supplemental screening values when ESVs were not available), as well as food chain modeling for all detected constituents that were carried to Step 3 and identified as bioaccumulative. Receptors evaluated as part of the terrestrial food chain modeling were the white-footed mouse, short-tailed shrew, red fox, white-tailed deer, American robin, mourning dove, and Eastern screech owl. Refer to the ESI (CH2M HILL, 2011b) for a complete discussion of the COPC refinement. The results of the refined screening are summarized below.

HQs were generally low for the terrestrial receptors under most exposure scenarios as part of the Step 3 surface soil refinement. Based on the refined evaluation, lead, manganese, mercury, and zinc were identified as potentially posing a risk to lower trophic level receptors, but were not identified as posing risk to upper trophic level receptors. Although zinc had a lowest observable effect level-based HQ (just barely above 1) for the eastern screech owl, the risk was considered negligible because of the limited extent of contamination and the conservative nature of the food chain modeling (assumed 100 percent site use). Potential risk was identified for these metals to lower trophic level receptors (terrestrial plants and invertebrates); however, because impacts are isolated, extent is limited, and the site is likely to be developed in the future, overall risk was considered low.

In addition, there was no evidence of stressed vegetation during field visits, and the general character of the plant community at locations with high metals concentrations, as observed by the sampling team, was not noticeably different from other areas of the site. Given these considerations and the fact that lateral and vertical migration are limited and concentrations decrease rapidly with distance from each "hot spot," no additional action is recommended for ecological receptors.

2.7 No Action Determination

Based on results of PA/SI, ESI, and all previous investigations, there are no unacceptable risks to human health or the environment for current and potential future use at Site 85. The Navy and Marine Corps, with concurrence from USEPA Region 4 and NCDENR, conclude that NFA is warranted (Attachment A). The no action determination meets the statutory requirements of CERCLA and the regulatory requirements of the National Oil and Hazardous Substances Pollution Contingency Plan for protection of human health and the environment.

2.8 Community Participation

The Navy, MCB CamLej, USEPA, and NCDENR provide information regarding the environmental cleanup of sites at MCB CamLej to the public through the community relations program, which includes a Restoration Advisory Board, public meetings, the Administrative Record file for the site, and announcements published in local newspapers. Restoration Advisory Board meetings are held quarterly and open to the public to provide an information exchange among community members, the Navy, MCB CamLej, USEPA, and NCDENR.



References

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- USEPA. 2010b. *ProUCL Version 4.00.04 User Guide*. EPA/600/R-07/038. February.

Acronyms and Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPC	chemical of potential concern
ERA	ecological risk assessment
ESI	Expanded Site Investigation
ESV	ecological screening value
FFA	Federal Facilities Agreement
ft bgs	feet below ground surface
HHRS	human health risk screening
HI	hazard index
HQ	hazard quotient
IR	Installation Restoration
MCB CamLej	Marine Corps Base Camp Lejeune
NADD	No Action Decision Document
Navy	Department of the Navy
NC SSL	North Carolina Soil Screening Level
NCDENR	North Carolina Department of Environment and Natural Resources
NCGWQS	North Carolina Groundwater Quality Standards
NFA	No Further Action
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
PA/SI	Preliminary Assessment/Site Inspection
PCB	polychlorinated biphenyl
RSL	regional screening level
SLERA	screening-level ecological risk assessment
SSLs	soil screening levels
SVOC	semivolatile organic compound
UCL	upper confidence limit
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

Attachment A



North Carolina Department of Environment and Natural Resources
Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

August 4, 2011

NAVFAC Mid-Atlantic
Attn: Dave Cleland Code: OPQE
USMC NC IPT, EV Business Line
6506 Hampton Blvd
Norfolk, VA 23508

RE: Comment on the Draft Expanded Site Inspection Report for Site 85- Former Camp Johnson Battery
Dump
Site Number NC6170022580
MCB Camp Lejeune
Jacksonville, Onslow County, North Carolina

Dear Mr. Cleland:

The NC Superfund Section has received and reviewed the Draft Expanded Site Inspection Report for Site 85 - Former Camp Johnson Battery Dump, dated July 2011, for Camp Lejeune, MCB located in Jacksonville, NC. The NC Superfund Section received the Document on July 28, 2011. The following comment and concurrence is offered for the Partnering Teams consideration. If you have any questions or comments please contact me at (919) 508-8467.

General Comment and Concurrence:

The NC Superfund Section has received and reviewed the Draft Expanded Site Inspection Report for IRP Site 85. There continues to be no human health risks from soil and the potential risk from groundwater was eliminated as a result of this ESI and the estimated .29 acre (100 feet X 132 feet) ecological exposure area is not considered a site, therefore, the NC superfund Section concurs with the conclusions and recommendation of the Report. The State has no further Comments.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
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August 11, 2011

NAVFAC Mid-Atlantic
Attn: Bryan Beck
Code: OPCEV
NC/Caribbean IPT, EV Business Line
6506 Hampton Blvd
Norfolk, VA 23508-1273

SUBJ: MCB Camp Lejeune
Draft Expanded Site Inspection Report
Site 85 – Former Camp Johnson Battery Dump

Dear Mr. Beck:

The Environmental Protection Agency has completed its review of the above subject document, dated July 2011 and has no comment. Based on the information as presented in the report, EPA concurs with the Navy's recommendation of "no further assessment is required (NFA)". The May 2005 site closure decision of NFA has been verified and may remain as such.

If there are any questions, I can be reached at (404) 562-8538.

Sincerely,
Gena
Townsend
Gena D. Townsend
Senior Project Manager

Digitally signed by Gena Townsend
DN: cn=Gena Townsend, o=Superfund
Division, Federal Facilities Branch,
ou=Environmental Protection Agency,
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Date: 2011.08.11 10:05:59 -0400

cc: Randy McElven, NCDENR
Charity Rychak, MCB Camp Lejeune