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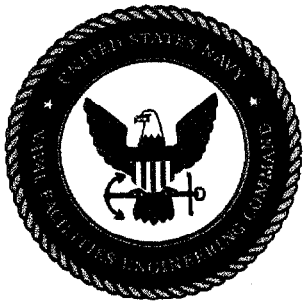
Final

No Action
Decision Document
Site 87
MCB, Camp Lejeune, North Carolina



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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirements
Baker	Baker Environmental, Inc.
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
COPC	Contaminant of Potential Concern
DD	Decision Document
DON	Department of Navy
ESE	Environmental Science and Engineering, Inc.
FFA	Federal Facilities Agreement
FS	Feasibility Study
HI	Hazard Index
HQ	Hazard Quotient
ILCR	Incremental Lifetime Cancer Risk
LANTDIV	Atlantic Division Naval Facilities Engineering Command
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
NA	No Action
NC DENR	North Carolina Department of Environment and Natural Resources
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NCWQS	North Carolina Water Quality Standards
NFRAP	No Further Response Action Plan
NPL	National Priorities List
PA	Preliminary Assessment
PCP	Pentachlorophenol
PCB	Polychlorinated Biphenyls
Pre-RI	Pre-Remedial Investigation
RBC	Risk-Based Concentration
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RA	Removal Action

ACRONYMS AND ABBREVIATIONS (Continued)

SARA	Superfund Amendments and Reauthorization Act
SI	Site Investigation
SVOC	Semivolatile Organic Compound
TCL	Target Compound List
TAL	Target Analyte List
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOC	Volatile Organic Compound

DECLARATION

SITE NAME AND LOCATION

Site 87
Marine Corps Air Station (MCAS) Officer's Housing Area, MCB, Camp Lejeune
Camp Lejeune, North Carolina

STATEMENT OF BASIS

This No Action Plan (NA) decision is based on the results of a Pre-Remedial Investigation (Pre-RI) Screening Study conducted at Site 87 in October 1995. The Pre-RI Screening Study included a review of previous investigations, installation of exploratory test pits, development of monitoring wells, soil, groundwater, sediment, and surface water sampling. The Department of the Navy (DON) and the Marine corps have obtained concurrence from the State of North Carolina Department of Environment and Natural Resources (NC DENR) and from the United States Environmental Protection Agency (USEPA) Region IV on the selected remedy. Copies of the NC DENR and USEPA approval letters are presented in Attachments A and B.

DESCRIPTION OF THE SELECTED REMEDY

Based on the current conditions at Site 87, it has been determined that no threat to public health exists. Therefore, no action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), is warranted.

DECLARATION STATEMENT

This NA Decision Document (DD) represents the selected action for Site 87, developed in accordance with CERCLA, as amended by SARA, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Because contaminant levels at the site have been determined to present no known significant threat to human health, it has been determined that the selected remedy of no action is protective of human health, attains federal and state applicable or relevant and appropriate requirements (ARARs), and is cost-effective. The statutory preference for treatment is not satisfied because treatment was not found to be necessary.

Signature
N. Neal Paul
Installation and Environment Division
Marine Corps Base, Camp Lejeune, NC

5·08·01
Date

DECISION SUMMARY

1.0 INTRODUCTION

Marine Corps Base (MCB), Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) National Priorities List (NPL) on October 4, 1989 (54 Federal Register 41015, October 5, 1989). Subsequent to this listing, the United States Environmental Protection Agency (USEPA) Region IV; the North Carolina Department of Environment and Natural Resources (NC DENR); and the United States Department of the Navy (DON) entered into a Federal Facilities Agreement (FFA) on March 1, 1991 (effective date) for MCB, Camp Lejeune. The objectives of the FFA are:

- To ensure that the environmental impacts with past and present activities at MCB, Camp Lejeune are thoroughly investigated and appropriate CERCLA response actions are developed and implemented as necessary to protect the public health, welfare and the environment;

- To establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at MCB, Camp Lejeune in accordance with CERCLA, the NCP, and USEPA policy relevant to remediation at MCB, Camp Lejeune; and

- To facilitate cooperation, exchange of information and participation of the Parties in such action.

The Fiscal Year 2001 Site Management Plan for MCB, Camp Lejeune, the primary document referenced in the FFA, accounts for each of the sites at the Base and provides detailed strategic planning. Many of the sites listed in the FFA have been investigated through the completion of Remedial Investigation/Feasibility Studies (RI/FS). However, several sites, (Site 87 included) did not warrant a full scale RI/FS. As such, these sites were investigated by completing Pre-Remedial Investigation (Pre-RI) Screening Studies. The goal of these investigations was to determine if a full RI study was necessary or if a decision of no action was appropriate.

This NA Decision Document (DD) supports the no action for Site 87. The purpose of this NA DD is to summarize the existing data for the site and to describe the Marine Corps' rationale for selecting the No Action Alternative.

Decision documents of this type can fall into four categories. The category into which a site is placed is determined by the investigation(s) that have been conducted at the site. They are divided as follows: Category I - NA decision is based on the results of a Preliminary Assessment (PA), a PA supplement, or an equivalent effort; Category II - NA decision is based on the results of a Site Investigation (SI), an SI supplement, or an equivalent effort; Category III - NA decision is based on the results of a Remedial Investigation (RI) and, if required, a Feasibility Study (FS), or an equivalent effort; Category IV - NA decision is based on the completion of a removal action or remedial action (RA) (including interim actions), or an equivalent effort.

Site 87 is a Category II designation. The Pre-RI Screening Study was completed to determine if further investigations were warranted. This effort is equivalent to a SI. The Pre-RI Screening Study completed at Site 87 provides sufficient information about the history, nature of the site and subsequently verifies the lack of contamination. Therefore, a Category II - NA DD is herein presented in accordance with all Category II requirements.

The objectives of this NA DD for Site 87 are:

- To briefly describe the location, history and environmental setting of Site 87 and its relationship to MCB, Camp Lejeune;
- To describe the current status of the site based on the results of the related investigations; and
- To assess the potential risks to human health at the site.

Data from the Pre-RI Screening Study (Baker, 1998) were used to derive and support no action for Site 87. The Pre-RI Screening Study was initiated to detect and characterize potential impacts to human health and to determine if the site required further investigative work. The investigation included a review of previous studies, installation of exploratory test pits, development of monitoring wells, soil sampling, waste sampling, sediment sampling, groundwater sampling, and a site survey.

1.1 Site Location and Description

To provide the reader with the entire framework of Site 87, the following subsections discuss site locations and descriptions for both MCB, Camp Lejeune and Site 87.

1.1.1 MCB, Camp Lejeune

MCB, Camp Lejeune is located on the coastal plain of North Carolina in Onslow County. The facility is bisected by the New River and encompasses approximately 236 square miles (of which approximately 40 square miles is water, made up by the New River and its tributaries). The New River flows in a southeasterly direction and forms a large estuary before entering the Atlantic Ocean. The southeastern border of MCB, Camp Lejeune is the Atlantic Ocean shoreline. The western and northeastern boundaries of the facility are U.S. Route 17 and State Route 24, respectively. The City of Jacksonville borders MCB, Camp Lejeune to the north.

Construction of MCB, Camp Lejeune began in April 1941 at the Hadnot Point Industrial Area, where major functions of the base are still centered today. The facility was designed to be the "World's Most Complete Amphibious Training Base." The MCB, Camp Lejeune complex consists of six geographical and operational locations under the jurisdiction of the Base Command. These areas include Camp Geiger, Montford Point (which includes Camp Johnson), Courthouse Bay, Mainside, the Greater Sandy Run Area, and the Rifle Range Area. Marine Corps Air Station (MCAS) New River is operationally under the control of MCAS Cherry Point. However, MCB, Camp Lejeune, is responsible for the facilities and environmental management of MCAS New River.

The Air Station and Camp Geiger are considered as a single urban area possessing two separate missions and supported by two unrelated groups of personnel. The MCAS New river encompasses 2,772 acres and is located in the northwestern section of the Complex and lies approximately five miles south of Jacksonville. The MCAS includes air support activities, troop housing and personnel support facilities, all of which immediately surround the aircraft operations and maintenance areas. Site 87 is located in the MCAS.

1.1.2 Site 87

Site 87 is located in the MCAS Officer's Housing Area, near the intersection of Longstaff Road and Trotter Street, approximately 375 feet to the east, on the west bank of the New River. As shown on Figure 1-1, access to MCAS Officer's Housing Area is provided by U.S. Route 17, which borders the western portion of the base.

Figure 1-2 is a site location map which shows the boundary and features of the surrounding area. The site is located east of the MCAS Officer's Housing Area, with wooded areas north and south of the site. The New River is located east of the site.

With the exception of the banks of the New River, the land surrounding Site 87 is relatively flat. Overland drainage is unlikely over most of the site due to the flat topography and vegetation. The natural drainage has not been altered in the portion of the site next to the New River, however in the area of the homes, slight regrading and installation of small drainage swales, storm sewers, and paving has occurred. Surface runoff from the eastern portion of the site drains to the New River.

1.2 Site History and Enforcement Activities

Information regarding the history of Site 87 is limited. During an investigation conducted in 1986 by Environmental Science and Engineering, Inc. (ESE, 1990), waste was identified eroding from the cut bank along the New River, in the vicinity of the Officer's Housing Area. The waste was tentatively identified as hospital wastes (i.e., hypodermic needles and vials of white powder). This white powder was believed to contain a chlorine-based substance (ESE, 1990).

The NCP states that sites which the USEPA determines to warrant no additional evaluation are give a "No Further Response Action Plan (NFRAP)" designation within the CERCLA Information System (CERCLIS). Through this designation, no supplemental investigation or remediation work will be performed at the site unless new information at the site is presented indicating that the initial decision was not appropriate. This NA DD presents the pertinent information that supports the conclusion that Site 87 poses little or no potential threat to human health.

Site 87 is a residential area with no restrictions for land use or regulatory requirements in place. Therefore, no enforcement activities are currently being employed at the site.

1.2.1 Investigative Activities

As mentioned above, the conditions at Site 87 have been evaluated through several separate investigative activities. The following subsections provide a summary of the previous studies completed at the site along with the results of the Pre-RI Screening Study.

1.2.1.1 Previous Investigations

Shallow monitoring wells 87-GW01 and 87-GW02 were installed at the site for the purpose of groundwater sampling. The two monitoring wells were constructed with 15 feet of screen and to a total depth of 25 feet below ground surface (bgs). In December 1986, groundwater samples were collected from these monitoring wells. A second round of sampling occurred in March 1987. The two groundwater samples from each sampling event were analyzed for free chlorine, oil and grease, and volatile organic compounds (VOCs). The groundwater was found to be absent of contamination in 1986. Low levels of oil and grease were reported in 1987.

In addition to the groundwater sampling, one surface water sample was collected in the New River just off shore in the area of Site 87 in December 1986. This sample was analyzed for the same contaminants as the groundwater samples. None of the parameters were detected in this sample.

1.2.1.2 Pre-RI Screening Study

The field work for Pre-RI Screening Study was completed by Baker Environmental, Inc. (Baker) in October 1995 with the subsequent final report completed in November 1998. The investigation included researching the previous studies and completing additional investigative tasks. The field activities included installation of exploratory test pits, development of monitoring wells, soil sampling, waste sampling, sediment sampling, groundwater and surface water sampling, and a site survey.

Surface and subsurface soils, sediments, groundwater and surface water samples were collected at Site 87. The soil samples were analyzed for Target Compound List (TCL) organics and Target Analyte List (TAL) Metals. Groundwater, surface water, and sediment samples were analyzed for the same parameters. Table 1-1 provides a summary of the detected compounds and analytes by media.

Tables 1-1 through 1-9 contain criteria against which the sample results were compared by media. These criteria included USEPA Region III Risk Based Concentration (RBC) values, USEPA Soil Screening Levels for transfer from soil to groundwater, North Carolina Water Quality Standards (NCWQS), federal Maximum Containment Levels (MCLs), and twice the average base-specific background concentrations for inorganic analytes. RBCs are promulgated by the USEPA Region III as a tool to determine potential risk to human health from contaminants in soil and groundwater. Region III RBC values were derived using conservative USEPA promulgated default values and the most recent toxicological criteria available. RBCs for potentially carcinogenic and noncarcinogenic chemicals were individually derived based on a target Incremental Lifetime Cancer Risk (ILCR) of 1×10^{-06} and a target Hazard Quotient (HQ) of 1.0, respectively. For potential carcinogens, the toxicity criteria applicable to the derivation of the RBC are oral and inhalation cancer slope factors; for noncarcinogens, they are chronic oral and inhalation reference doses. For noncarcinogens, each RBC value was reduced by a factor of 10 to ensure that chemicals with additive effects are not prematurely eliminated during screening (USEPA, 1993a).

Surface Soil

A total of six surface samples were collected at Site 87. There were no VOCs or polychlorinated biphenyls (PCBs) detected. Semivolatile organic compounds (SVOCs) and pesticides were detected and none were above screening criteria (Table 1-2).

Twenty-one metals were detected among the 6 surface soil samples collected at Site 87 (Table 1-3). Eighteen metals were detected at concentrations exceeding twice the average base-specific (i.e., MCB Camp Lejeune) background levels, three metals were detected at concentrations exceeding the Region III residential RBC values, and no detections exceeded the UESPA Soil Screening Levels.

Subsurface Soil

A total of four subsurface (i.e., greater than one-foot below ground surface) soil sample were collected at Site 87. VOCs, SVOCs, and PCBs were not detected (Table 1-4). Three pesticides were detected but did not exceed their associated screening standards.

Fifteen metals were detected among the samples (Table 1-5). One metal (barium) exceeded twice the average base-specific background level. Three metals (antimony, arsenic, and iron) exceeded the Region III residential RBC values. Iron was the only inorganic analyte to exceed the USEPA Soil Screening Levels.

Sediment

Two sediment samples were collected at Site 87. No pesticides or PCBs were detected (Table 1-6). One VOC, (acetone) was present in the sediment. No screening criteria is established to evaluate acetone. Several SVOCs were present all below associated screening criteria. Iron and silver were the only metals detected above state or federal screening criteria.

Groundwater

Groundwater samples were collected from the two monitoring wells at the site. There were no VOCs pesticides, or PCBs detected, however, two SVOCs were detected (Table 1-7). The SVOC pentachlorophenol (PCP) was detected at concentrations greater then the NCWQS and Region III tapwater RBC value. Fourteen metals were detected in groundwater. Two metals (iron and manganese) were detected above the NCWQS. Four metals (aluminum, iron, manganese, and thallium) were detected above the federal MCL. One metal (thallium) was detected above the Region III tapwater RBC values.

Surface Water

Two surface water samples were collected from the New River near Site 87. No organic compounds were detected in the surface water samples, however, metals were detected in both of the samples (Table 1-8). Of the metals detected, antimony and iron were the only analytes detected at concentrations which exceeded state or federal screening criteria.

1.2.1.3 October 1999 Additional Sampling

Additional sampling was completed by Baker in October 1999 due to the presence of PCP detected in the previous sampling event in October 1998. The USEPA and NC DENR raised the question of concern over PCP because it is typically a soil contaminant, and not usually found in groundwater. It was the Agency's recommendation that additional groundwater samples be taken around the detected area to confirm/deny a source area. Monitoring well GW01 had previously detected PCP and was decided upon for resampling of the contaminant.

The investigation included researching the previous studies and completing additional investigation tasks. The field activity included an additional groundwater sample taken at monitoring well GW01. Results of the investigation are presented in Table 1-9.

VOCs, pesticides, and PCBs were not detected during the last investigation, therefore, these parameters were not tested for. SVOCs, including PCP, were also not detected in the additional groundwater samples. Thirteen metals were detected with concentrations of aluminum and manganese exceeding the state and/or federal standards.

The results from last quarter are comparable to the present quarter for metals in groundwater; however, unlike last quarter, PCP was not detected. The Contaminants of Potential Concern (COPCs) from this investigation do not include iron that was detected at higher concentrations last quarter.

1.2.2 Regulatory Agency/Public Involvement

The USEPA and NC DENR have been actively involved with the investigation of this site through report review and partnering meetings. Based on these results, no further investigative activities are needed at Site 87.

Public involvement is summarized in the following section.

1.3 Community Participation

A public meeting was held at MCAS, New River on August 27, 1996 to discuss the results of the Pre-RI Screening Study. The meeting included members of the local Base community, and representatives from MCB, Camp Lejeune, Atlantic Division Naval Facilities Engineering Command (LANTDIV), and Baker Environmental, Inc. The members of the project team presented the findings of the investigation and discussed the results of the risk assessment. Members of the community were given the opportunity to ask questions and comment on the related information. These comments and questions were immediately and informally addressed at the public meeting.

This NA DD was made available to the public for comment at a public meeting held on April 19, 1998. However, there was no formal comment period. No comments have been received from the public on the draft document. Comments were received from the USEPA, NC DENR, and Camp Lejeune. These comments were incorporated into this document.

2.0 SUMMARY OF SITE CHARACTERISTICS

This section summarizes information pertaining to MCB, Camp Lejeune existing background information. In addition, specific information relevant to Site 87 is presented.

2.1 Climatology

MCB, Camp Lejeune experiences hot and humid summers; however, ocean breezes frequently produce a cooling effect. The winter months tend to be mild, with occasional brief cold spells. Average daily temperatures range from 34° F to 54° F in January, the coldest month, and 72° F to 89° F in July, the hottest month. The average yearly rainfall is 52.4 inches.

2.2 Physiography, Geology and Soils

MCB, Camp Lejeune is located in the Atlantic Coastal Plain physiographic province. The sediments of this province consist primarily of sand, silt, and clay. Other sediments may be present, including shell beds and gravel. Sediments may be of marine or continental origin. United States Geological Survey (USGS) studies at MCB, Camp Lejeune indicate that the base is underlain by sand, silt, clay, calcareous clay and partially cemented limestone. The combined thickness of these sediments beneath the base is approximately 1,500 feet.

2.3 Hydrogeology

The aquifers of primary interest are the surficial aquifer and the underlying Castle Hayne aquifer. The surficial aquifer consists of interfingering beds of sand, clay, sandy clay, and silt that contain some peat and shells. The thickness of the surficial aquifer ranges from 0 to 73 feet and averages nearly 25 feet over MCB, Camp Lejeune. The beds are thin and discontinuous, and have limited lateral continuity. This aquifer is not used for water supply at MCB, Camp Lejeune. The Castle Hayne aquifer lies below the surficial aquifer and consists primarily of unconsolidated sand, shell fragments, and fossiliferous limestone. Between the surficial aquifer and Castle Hayne aquifer lies the Castle Hayne confining unit which consists of clay, silt, and sandy clay beds. The Castle Hayne aquifer is about 150 to 350 feet thick, increasing in thickness to the ocean. The top of the aquifer lies approximately 20 to 73 feet below ground surface. Onslow County and MCB, Camp Lejeune lie in an area where the Castle Hayne aquifer generally contains freshwater; therefore, the Castle Hayne aquifer is a viable potable water source for the region's population.

2.4 Surface Water

The dominant surface water feature at MCB, Camp Lejeune is the New River. It receives drainage from a majority of the base. At MCB, Camp Lejeune, the New River flows in a southerly direction into the Atlantic Ocean through the New River Inlet.

Site 87 is located directly west of the New River as shown on Figure 1-2. Surface runoff from the eastern portion of the site may drain to the New River. Overland drainage is unlikely over most of the site due to the flat topography and vegetation.

2.5 Land Use

Land use within the base is influenced by topography and ground cover, environmental policy, and base operational requirements. Much of the land within MCB, Camp Lejeune consists of freshwater swamps that are wooded and largely unsuitable for development. In addition, 3,000 acres of sensitive estuary and other areas were set aside for the protection of threatened and endangered species and are to remain undeveloped. Operational restrictions and regulations, such as explosive quantity safety distances, impact-weighted noise thresholds, and aircraft landing and clearance zones, may also greatly constrain and influence development (LANTDIV, 1988). The combined military and civilian population of MCB, Camp Lejeune and Jacksonville area is approximately 112,000. Nearly 90 percent of the surrounding population resides within urbanized areas. The presence of MCB, Camp Lejeune has been the single greatest factor contributing to the rapid population growth of Jacksonville and adjacent communities, particularly during the period from 1940 to 1960.

2.6 Receptors

Site 87 is situated in a residential area of MCAS Officer's Housing Area. The risk assessment recognizes this fact by preparing conceptual site models that included the following receptors:

- Current military personnel
- Current base residents (young child [ages 1-6 years] and adult)
- Future on-site residents (young child [ages 1-6 years] and adult)

The contaminants detected at the site in surface soils, subsurface soils, and groundwater can migrate from the various media in several ways, including:

- Vertical migration of contaminants from surface soil to subsurface soil.
- Leaching of contaminants from subsurface soil to water-bearing zones.
- Vertical migration from shallow water-bearing zones to deeper flow systems.
- Horizontal migration in groundwater in the direction of groundwater flow.
- Wind erosion and subsequent deposition of windblown dust.

3.0 DATA ANALYSIS/RISK ASSESSMENT

The risk assessment completed for Site 87 examined exposure pathways associated with each environmental medium and each human receptor. It quantitatively evaluated each of the pathways at the site.

Potential exposure to surface soil may occur by incidental soil ingestion, contaminant absorption through the skin, and inhalation of airborne particulates. Surface soil exposure was evaluated for current and future residential children and adults.

Subsurface soil is available for contact only during excavation activities, so potential exposure to subsurface soil is limited to current military personnel involved in training exercises and maneuvers. These activities do not take place at Site 87, therefore exposure to subsurface soils was not considered.

Current and future base residents were evaluated for groundwater exposure at Site 87. At the present time, shallow groundwater in the vicinity of the site is not used as a potable supply for residents or base personnel. However, in the future, (albeit unlikely due to poor transmissivity and insufficient flow) shallow groundwater may be tapped for potable water. Groundwater exposure was evaluated for future residential children and adults. Potential exposure pathways are ingestion, dermal contact, and inhalation of volatile contaminants while showering. However, it should be noted, that there were no VOCs detected in the groundwater samples. Therefore, inhalation, of VOCs while showering was not evaluated as an exposure pathway.

Potential exposure to surface water/sediment may occur by incidental ingestion and contaminant absorption through the skin. Current and future residents were evaluated for surface water/sediment at Site 87.

Tables 1-1 through 1-8 summarize data and identify contaminants for the media sampled at Site 87 in 1998, and Table 1-9 summarizes data for media sampled in October, 1999. These detections were compared to RBCs for residential soils.

The estimated risk ILCR values fell within the USEPA's acceptable risk range for current base residential child and adult and future residential adult. The hazard index (HI) calculated for the future child receptor (HI = 2.3) exceeded the acceptable risk level (HI = 1). Iron, manganese, and aluminum in the groundwater contributed to this unacceptable HI. However, the presence of these metals in the groundwater is not a concern since they are naturally occurring and found throughout the majority of wells at MCB, Camp Lejeune.

Based on the risk assessment completed for Site 87 in the Pre-RI Screening Study and this most recent evaluation using the USEPA Soil Screening Guidance, no significant human health risks were identified. Iron and manganese are ubiquitous in all media at MCB Camp Lejeune. These compounds often exceed applicable or relevant and appropriate requirements (ARARs) and can be contaminants-of-concern for human health (manganese only) and ecological risk assessments. Previous studies show that concentrations of iron and manganese are variable and can occur naturally in groundwater at levels exceeding ARARs. Therefore, it is possible that elevated levels of iron and manganese in particular media may not be associated with waste disposal and could be ignored in risk assessments and remedial studies.

The following studies describe metals in the environment:

A study (Hem, 1992) of chemical characteristics of natural waters show that iron and manganese can occur in water through natural effects. Also, a wellhead protection study at MCB, Camp Lejeune (Greenhorne & O'Mara, 1992) found iron to exceed its Secondary MCL in 55 of 75 (approximately 73%) water supply wells screened in the Castle Hayne aquifer. Monitoring well GW01 at Site 87 is 30 ft. deep and located in the surficial or shallow aquifer. Levels of iron have been reported to be generally less in the Castle Hayne than the surficial aquifer. And finally, a Draft of Evaluation of Metals in Groundwater had been prepared by Baker for LANTDIV under Contract N62470-89-D-4814 that discusses the prescence of elevated metals are not always related to past disposal activities.

4.0 DESCRIPTION OF THE NA ALTERNATIVE

The risk to human health is minimal at Site 87, and therefore, the no action alternative is proposed on the basis that the site is below action levels. No evidence exists to suggest that the groundwater, surface water, or soil are sufficiently contaminated to pose a threat to human health. Current site conditions and environmental testing data indicated that no action is warranted at Site 87.

5.0 RESPONSIVENESS SUMMARY

This NA DD was made available to the public for comment at a public meeting held on April 19, 1998. However, there was no formal comment period. No comments were received from the public on the draft NA DD.

6.0 REFERENCES

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Environmental Science and Engineering, Inc. (ESE). 1990. Site Summary Report, Final Marine Corps Base, Camp Lejeune, North Carolina. Prepared for the Department of the Navy, Naval Facilities Engineering Command, Atlantic Division, Norfolk, Virginia. ESE Project No. 49-02036.

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LANTDIV. Naval Facilities Engineering Command, Atlantic Division. January 1988. Camp Lejeune Complex Master Plan and Capital Improvements Plans Update. Prepared for the Commanding General, Marine Corps Base, Camp Lejeune, North Carolina.

USEPA, 1993. Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening, Region III Technical Guidance Manual. Region III, Philadelphia, Pennsylvania. January 1993. EPA/903/R-93-001.

TABLES

TABLE 1-1

OCTOBER, 1995
SUMMARY OF SITE CONTAMINATION
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Media	Fraction	Contaminant	Detection Frequency	Concentration Range		Location of Maximum Detection
				Min.	Max.	
Surface Soil	Semivolatiles	Acenaphthene	1/6	37J	37J	87-SB04
		Fluorene	3/6	26J	42J	87-SB05
		Phenanthrene	3/6	240J	500	87-SB05
		Anthracene	3/6	52J	110J	87-SB05
		Carbazole	3/6	21J	42J	87-SB03
		Di-n-butylphthalate	1/6	370J	370J	87-SB04
		Fluoranthene	3/6	400	840	87-SB05
		Pyrene	3/6	330J	660	87-SB05
		Butylbenzylphthalate	3/6	46J	290J	87-SB04
		Benzo(a)anthracene	3/6	230J	380J	87-SB05
		Chrysene	3/6	290J	400J	87-SB05
		Bis(2-ethylhexyl)phthalate	5/6	17J	380	87-SB04
		Benzo(b)fluoranthene	3/6	320J	380J	87-SB03
		Benzo(k)fluoranthene	3/6	300J	380J	87-SB03
		Benzo(a)pyrene	3/6	310J	380	87-SB04
		Indeno(1,2,3-cd)perylene	3/6	170J	270J	87-SB04
		Dibenzo(a,h)anthracene	3/6	46J	100J	87-SB04
		Benzo(g,h,i)perylene	3/6	170J	320J	87-SB04
	Pesticides	4,4'-DDE	6/6	16	97	87-SB03
		4,4'-DDD	5/6	16J	470.0	87-SB04
		4,4'-DDT	6/6	15	310	87-SB04
		Alpha-Chlordane	2/6	12J	21J	87-SB04
		Gamma-Chlordane	2/6	10J	26	87-SB04
	Metals	Aluminum	6/6	2,290	4,250	87-SB06
		Arsenic	6/6	0.94J	4.6J	87-SB06
		Barium	6/6	12J	18J	87-SB05
		Beryllium	5/6	0.49	0.87	87-SB06
		Cadmium	2/6	0.99	1.5	87-SB05
		Calcium	6/6	119J	18,100J	87-SB05
		Chromium	6/6	4.2J	25.2J	87-SB04
		Cobalt	6/6	0.69	1.5	87-SB04
		Copper	6/6	2.3	16.2	87-SB04
		Iron	6/6	3,050	6,530	87-SB06
		Lead	6/6	9.3J	143J	87-SB04
		Magnesium	6/6	144.0	551.0	87-SB05
		Manganese	6/6	7.7	25.8	87-SB02

TABLE 1-1 (Continued)

OCTOBER, 1995
SUMMARY OF SITE CONTAMINATION
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Media	Fraction	Contaminant	Detection Frequency	Concentration Range		Location of Maximum Detection
				Min.	Max.	
Surface Soil (Cont'd.)	Metals	Mercury	1/6	0.1	0.1	87-SB04
		Nickel	2/6	8J	19.7J	87-SB04
		Potassium	6/6	202.0	611.0	87-SB06
		Selenium	1/6	0.36	0.36	87-SB04
		Thallium	1/6	1.8J	1.8J	87-SB01
		Vanadium	6/6	10.6	19.3	87-SB04
		Zinc	5/6	9J	65.7J	87-SB04
Subsurface Soil (Test Pits)	Pesticides	4,4'-DDE	2/4	2.3J	4.7J	87-TP03
		4,4'-DDD	1/4	5.1J	5.1J	87-TP03
		4,4'-DDT	4/4	1.5J	28J	87-TP03
	Metals	Aluminum	4/4	1,450	2,100	87-TP01
		Antimony	1/4	3.3J	3.3J	87-TP04
		Arsenic	4/4	0.47	1	87-TP01
		Barium	4/4	24.6	30.4	87-TP03
		Beryllium	1/4	0.14	0.14	87-TP01
		Calcium	3/4	53.9	72.8	87-TP03
		Chromium	1/4	3.7	3.7	87-TP04
		Cobalt	2/4	0.59	0.63	87-TP01
		Copper	2/4	0.39	0.58	87-TP03
		Iron	4/4	1,400J	3,130J	87-TP04
		Lead	4/4	1.2J	3.2J	87-TP04
		Magnesium	4/4	61.7	94.5	87-TP01
		Manganese	4/4	3.8	5.9	87-TP03
		Vanadium	4/4	3	5.4	87-TP04
		Zinc	4/4	1.9	2.9	87-TP01
Groundwater	Semivolatiles	4-Nitrophenol	1/2	1J	1J	87-GW01
		Pentachlorophenol	1/2	0.8J	0.8J	87-GW01
	Metals	Aluminum	2/2	947	3,770	87-GW01
		Barium	1/2	35.1	35.1	87-GW01
		Calcium	2/2	8,400J	82,300J	87-GW02
		Cobalt	1/2	3.8J	3.8J	87-GW01
		Copper	1/2	18.4	18.4	87-GW02
		Iron	2/2	115	3,130	87-GW02
		Lead	1/2	1.1J	1.1J	87-GW02
		Magnesium	2/2	3,180	5,280	87-GW01
		Manganese	2/2	37.3	224.0	87-GW01
		Potassium	2/2	1250	2020	87-GW01

TABLE 1-1 (Continued)

OCTOBER, 1995
SUMMARY OF SITE CONTAMINATION
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Media	Fraction	Contaminant	Detection Frequency	Concentration Range		Location of Maximum Detection
				Min.	Max.	
Groundwater (Cont'd.)	Metals	Selenium	1/2	1.6J	1.6J	87-GW02
		Sodium	2/2	12,100	14,200	87-GW01
		Thallium	1/2	12J	12J	87-GW02
		Zinc	1/2	28.2	28.2	87-GW01
Surface Water	Metals	Aluminum	2/2	375.0	488.0	87-SW01
		Antimony	1/2	54.5	54.5	87-SW01
		Barium	2/2	16.1	26.7	87-SW01
		Calcium	2/2	116,000J	116,000J	87-SW01
		Copper	1/2	4.9	4.9	87-SW01
		Cyanide	1/2	53.4	53.4	87-SW02
		Iron	2/2	269.0	326.0	87-SW01
		Lead	1/2	8J	8J	87-SW01
		Magnesium	2/2	332,000	334,000	87-SW02
		Manganese	2/2	26.1	26.1	87-SW02
		Potassium	2/2	107,000	109,000	87-SW02
		Selenium	1/2	22J	22J	87-SW02
		Sodium	2/2	2,900,000	3,040,000	87-SW02
		Vanadium	2/2	5.4	11.2	87-SW01
		Zinc	2/2	9.4	11.7	87-SW01
		Cyanide	1/2	53.4	53.4	87-SW02
Sediment	Volatiles	Acetone	1/2	6J	6J	87-SD01
	Semivolatiles	Fluoranthene	1/2	24J	24J	87-SD02
		Pyrene	1/2	28J	28J	87-SD02
		Benzo(a)anthracene	1/2	24J	24J	87-SD02
		Chrysene	1/2	32J	32J	87-SD02
		Bis(2-ethylhexyl)phthalate	1/2	27J	27J	87-SD01
		Benzo(b)fluoranthene	1/2	25J	25J	87-SD02
		Benzo(k)fluoranthene	1/2	32J	32J	87-SD02
		Benzo(a)pyrene	1/2	41J	41J	87-SD02
		Indeno(1,2,3-cd)pyrene	1/2	24J	24J	87-SD02
		Benzo(g,h,i)perylene	1/2	32J	32J	87-SD02
	Metals	Aluminum	2/2	1030.0	1060.0	87-SD02
		Barium	2/2	8.8	35.0	87-SD01
		Calcium	2/2	133.0	514.0	87-SD02
		Chromium	1/2	11.5	11.5	87-SD02
		Copper	1/2	38.4	38.4	87-SD02
		Iron	2/2	922.0	6040.0	87-SD02

TABLE 1-1 (Continued)

OCTOBER, 1995
SUMMARY OF SITE CONTAMINATION
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Media	Fraction	Contaminant	Detection Frequency	Concentration Range		Location of Maximum Detection
				Min.	Max.	
Sediment (Contd.)	Metals	Lead	1/2	6.1	6.1	87-SD02
		Magnesium	1/2	136.0	136.0	87-SD02
		Manganese	2/2	8.4	45.2	87-SD02
		Nickel	1/2	7.2	7.2	87-SD02
		Selenium	2/2	0.44J	0.67J	87-SD01
		Silver	1/2	2.1	2.1	87-SD01
		Sodium	2/2	236.0	242.0	87-SD01
		Vanadium	2/2	2.2	2.5	87-SD02
		Zinc	2/2	4.6	11.0	87-SD02

Notes: -Concentrations are presented in μg/L for liquid and μg/kg for solids (ppb), metal concentrations for soils and sediments are presented in mg/kg (ppm).

TABLE 1-2

OCTOBER, 1995
SURFACE SOIL ORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Parameter	Contaminant Range/Frequency		Comparison to Criteria			
	Range of Positive Detections (µg/kg)	No. of Positive Detects/ No. of Samples	Region III Residential RBC Value[1] (µg/kg)	Detections Above Region III Residential RBC Value	Soil to Groundwater Soil Screening Levels (µg/kg) [4]	Detections Above Soil to Groundwater Soil Screening Levels
Semivolatiles						
Acenaphthene	37J	1/6	470,000	0	8,160	0
Fluorene	26J - 42J	3/6	310,000	0	44,297	0
Phenanthrene	240J - 500	3/6	230,000[2]	0	59,640	0
Anthracene	52J - 110J	3/6	2,300,000	0	995,000	0
Carbazole	21J - 42J	3/6	32,000	0	--	--
Di-n-butylphthalate	370J	1/6	780,000	0	24,800	0
Fluoranthene	400 - 840	3/6	310,000	0	276,080	0
Pyrene	330J - 660	3/6	230,000	0	286,440	0
Butylbenzylphthalate	46J - 290J	3/6	1,600,000	0	27,800	0
Benzo(a)anthracene	230J - 380J	3/6	880	0	343	2
Chrysene	290J - 400J	3/6	88,000	0	38,150	0
bis(2-Ethylhexyl)phthalate	17J - 380	5/6	46,000	0	--	--
Benzo(b)fluoranthene	320J - 380J	3/6	880	0	--	--
Benzo(k)fluoranthene	300J - 380J	3/6	8,800	0	--	--
Benzo(a)pyrene	310J - 380	3/6	88	3	--	--
Indeno(1,2,3-cd)pyrene	170J - 270J	3/6	880	0	--	--
Dibenzo(a,h)anthracene	46J - 100J	3/6	88	1	--	--
Benzo(g,h,i)perylene	170J - 320J	3/6	230,000[2]	0	6,720,000	0

TABLE 1-2 (Continued)

OCTOBER, 1995
SURFACE SOIL ORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Parameter	Contaminant Range/Frequency		Comparison to Criteria			
	Range of Positive Detections (µg/kg)	No. of Positive Detects/ No. of Samples	Region III Residential RBC Value[1] (µg/kg)	Detections Above Region III Residential RBC Value	Soil to Groundwater Soil Screening Levels (µg/kg) [4]	Detections Above Soil to Groundwater Soil Screening Levels
Pesticide/PCBs						
4,4'-DDE	16 - 97	6/6	1,900	0	--	--
4,4'-DDD	16J - 470	5/6	2,700	0	--	--
4,4'-DDT	15 - 310	6/6	1,900	0	--	--
Alpha-Chlordane	12J - 21J	2/6	1,800[3]	0	27.8	0
Gamma-Chlordane	10J - 26	2/6	1,800[3]	0	27.8	0

Notes:

Shaded area indicates contaminant selected as COPC for human health risk assessment.

- = Value not published
µg/kg = micrograms per kilogram
J = Estimated value.
(1) USEPA Region III RBC Table, October 2000.
(2) USEPA Region III RBC value for pyrene used as a surrogate.
(3) USEPA Region III RBC value for Chlordane used as a surrogate.
(4) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

TABLE 1-3

OCTOBER, 1995
SURFACE SOIL INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Analyte	Contaminant Range/Frequency		Comparison to Criteria					
	Range of Positive Detections (mg/kg)	No. of Positive Detects/ No. of Samples	Twice the Average Base Specific Background[1] Concentration (mg/kg)	No. of Times Exceeded Twice the Average Background Concentration	Region III Residential RBC Value[2] (mg/kg)	Detections Above Region III Residential RBC Value	Soil to Groundwater Soil Screening Levels (mg/kg)[4]	Detections Above Soil to Groundwater Soil Screening Levels
Aluminum	2,290 - 4,250	6/6	5,856.083	0	7,800	0	--	--
Arsenic	0.94J - 4.6J	6/6	1.322	4	0.43	6	26.2	0
Barium	12J - 18J	6/6	17.292	1	550	0	848	0
Beryllium	0.49 - 0.87	5/6	0.205	5	0.15	5	--	--
Cadmium	0.99 - 1.5	2/6	0.696	2	3.9	0	2.72	0
Calcium+	119J - 18,100J	6/6	1,372.977	3	--	--	--	--
Chromium	4.2J - 25.2J	6/6	6.607	5	39	0	27.2	0
Cobalt	0.69 - 1.5	6/6	2.046	0	470	0	--	--
Copper	2.3 - 16.2	6/6	7.104	2	310	0	704	0
Iron+	3,050 - 6,530	6/6	3,702.427	4	2,300	6	151.2	6
Lead	9.3J - 143J	6/6	23.37	4	400[3]	0	270.06	0
Magnesium+	144 - 551	6/6	202.96	5	--	--	--	--
Manganese	7.7 - 25.8	6/6	18.51	3	180	0	65.2	0
Mercury	0.1	1/6	0.094	1	2.3	0	0.0154	1
Nickel	8J - 19.7J	2/6	3.455	2	160	0	56.4	0
Potassium+	202 - 611	6/6	200.06	6	--	--	--	--
Selenium	0.36	1/6	0.753	0	39	0	12.2	0
Sodium+	63.3 -138	6/6	59.013	6	--	--	--	--
Thallium	1.8J	1/6	0.924	1	--	--	--	--

TABLE 1-3 (Continued)

OCTOBER, 1995
SURFACE SOIL INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Analyte	Contaminant Range/Frequency		Comparison to Criteria					
	Range of Positive Detections (mg/kg)	No. of Positive Detects/ No. of Samples	Twice the Average Base Specific Background[1] Concentration (mg/kg)	No. of Times Exceeded Twice the Average Background Concentration	Region III Residential RBC Value[2] (mg/kg)	Detections Above Region III Residential RBC Value	Soil to Groundwater Soil Screening Levels (mg/kg)[4]	Detections Above Soil to Groundwater Soil Screening Levels
Vanadium	10.6 - 19.3	6/6	11.447	5	55	0	--	--
Zinc	9J - 65.7J	5/6	13.763	4	2,300	0	1,100.4	0

Notes:

Shaded areas indicate analyte selected as COPC for human health risk assessment.
+ = Essential Nutrient
-- = No criteria published
mg/kg = milligrams per kilogram
J = Estimated Value
(1) Soil background concentrations are based on reference background soil samples collected from MCB Camp Lejeune investigations.
(2) USEPA Region III RBC Table, October 2000.
(3) Action Level for residential soils (USEPA, 1994)
(4) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

TABLE 1-4

OCTOBER, 1995
SUBSURFACE SOIL* ORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Parameter	Contaminant Range/Frequency		Comparison to Criteria			
	Range of Positive Detections (µg/kg)	No. of Positive Detects/ No. of Samples	Region III Residential RBC Value[1] (µg/kg)	Detections Above Region III Residential RBC Value	Soil to Groundwater Soil Screening Levels[2] (µg/kg)	Detections Above Soil to Groundwater Soil Screening Levels
Pesticide						
4,4'-DDE	2.3J - 4.7J	2/4	1,900	0	--	--
4,4'-DDD	5.1J	1/4	2,700	0	--	--
4,4'-DDT	1.5J - 28J	4/4	1,900	0	--	--

Notes:

-- = No criteria published
µg/kg = micrograms per kilogram
J = Estimated value.
* = Test Pits
(1) USEPA Region III RBC Table, October 2000.
(2) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May, 1996).

TABLE 1-5

OCTOBER, 1995
SUBSURFACE SOIL* INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Analyte	Contaminant Range/Frequency		Comparison to Criteria					
	Range of Positive Detections (mg/kg)	No. of Positive Detects/ No. of Samples	Twice the Average Base Specific Background[1] Concentration (mg/kg)	No. of Times Exceeded Twice the Average Background Concentration	Region III Residential RBC Value[2] (mg/kg)	Detections Above Region III Residential RBC Value	Soil to Groundwater Soil Screening Levels[4] (mg/kg)	Detections Above Soil to Groundwater Soil Screening Levels
Aluminum	1,450 - 2,100	4/4	7,413.23	0	7,800	0	--	--
Antimony	3.3J	1/4	6.498	0	3.1	1	--	--
Arsenic	0.47 - 1	4/4	1.971	0	0.43	4	26.2	0
Barium	24.6 - 30.4	4/4	14.37	4	550	0	848	0
Beryllium	0.14	1/4	0.191	0	0.15	0	--	--
Calcium+	53.9 - 72.8	3/4	387.824	0	--	--	--	--
Chromium	3.7	1/4	12.537	0	39	0	27.2	0
Cobalt	0.59 - 0.63	2/4	1.611	0	470	0	--	--
Copper	0.39 - 0.58	2/4	241	0	310	0	704	0
Iron+	1,400J - 3,130J	4/4	7,134.639	0	2,300	2	151.2	4
Lead	1.2J - 3.2J	4/4	8.264	0	400[3]	0	270.06	0
Magnesium+	61.7 - 94.5	4/4	263.398	0	--	--	--	--
Manganese	3.8 - 5.9	4/4	7.99	0	180	0	65.2	0
Vanadium	3 - 5.4	4/4	13.34	0	55	0	--	--
Zinc	1.9 - 2.9	4/4	6.668	0	2,300	0	1,100.4	0

Notes:

Shaded areas indicate analyte selected as COPC for human health risk assessment.
* = Test Pits
\+ = Essential Nutrient
-- = No criteria published
mg/kg = milligrams per kilogram
J = Estimated Value
(1) Soil background concentrations are based on reference background soil samples collected from MCB Camp Lejeune investigations.
(2) USEPA Region III RBC Table, October 2000.
(3) Action Level for residential soils (USEPA, 1994).
(4) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).

TABLE 1-6

OCTOBER, 1995
SEDIMENT ORGANIC AND INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Parameter	Contaminant Range/Frequency		Sediment Screening Values[2]		Comparison to Criteria			
	Range of Positive Detections	No. of Positive Detects/ No. of Samples	ER-L Concentration	ER-M Concentration	Detects Above ER-L	Detects Above ER-M	Soil to Groundwater Soil Screening Levels[1]	Detections Above Soil to Groundwater Soil Screening Levels
Volatiles (µg/kg)								
Acetone	6J	1/2	--	--	--	--	1,560,000	0
Semivolatiles (µg/kg)								
Fluoranthene	24J	1/2	600	5,100	0	0	--	--
Pyrene	28J	1/2	665	2,600	0	0	--	--
Benzo(a)anthracene	24J	1/2	261	1,600	0	0	--	--
Chrysene	32J	1/2	384	2,800	0	0	--	--
Bis(2-ethylhexyl)phthalate	27J	1/2	--	--	NA	NA	46,000	0
Benzo(b)fluoranthene	25J	1/2	--	--	NA	NA	--	--
Benzo(k)fluoranthene	32J	1/2	--	--	NA	NA	--	--
Benzo(a)pyrene	41J	1/2	430	1,600	0	0	--	--
Indeno(1,2,3-cd)pyrene	24J	1/2	--	--	NA	NA	--	--
Benzo(g,h,i)perylene	32J	1/2	--	--	NA	NA	--	--
Inorganics (mg/kg)								
Aluminum	1,030 - 1,060	2/2	--	--	NA	NA	15,600	0
Barium	8.8 - 35	2/2	--	--	NA	NA	1,100	0
Calcium+	133 - 514	2/2	--	--	NA	NA	--	--
Chromium	11.5	1/2	81	370	0	0	78	0
Copper	38.4	1/2	34	270	0	0	620	0
Iron	922 - 6,040	2/2	--	--	NA	NA	4,600	1
Lead	6.1	1/2	46.7	218	0	0	400	0
Magnesium+	136	1/2	--	--	NA	NA	--	--
Manganese	8.4 - 45.2	2/2	--	--	NA	NA	360	0

TABLE 1-6 (Continued)

SEDIMENT ORGANIC AND INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Parameter	Contaminant Range/Frequency		Sediment Screening Values[2]		Comparison to Criteria			
	Range of Positive Detections	No. of Positive Detects/ No. of Samples	ER-L Concentration	ER-M Concentration	Detects Above ER-L	Detects Above ER-M	Soil to Groundwater Soil Screening Levels[1]	Detections Above Soil to Groundwater Soil Screening Levels
Nickel	7.2	1/2	20.9	51.6	0	0	320	0
Selenium	0.44J - 0.67J	2/2	--	--	NA	NA	78	0
Silver	2.1	1/2	1	3.7	1	0	78	0
Sodium+	236 - 242	2/2	--	--	NA	NA	--	--
Vanadium	2.2 - 2.5	2/2	--	--	NA	NA	110	0
Zinc	4.6 - 11	2/2	150	410	0	0	4,600	0

Notes:

Shaded areas indicate parameter selected as COPC for human health risk assessment.
ER-L = Effects Range-Low
ER-M = Effects Range-Medium
+ = Essential Nutrients
NA = Not Applicable
-- = Not Published
μg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
J = Estimated value
(1) USEPA Soil Screening Levels for Transfer from Soil to Groundwater (May 1996).
(2) Long et al., 1995.

TABLE 1-7

OCTOBER, 1995
GROUNDWATER ORGANIC AND INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

	Contaminant Range/Frequency		Comparison to Criteria					
Parameter	Concentration Range (µg/L)	No. of Positive Detects/ No. of Samples	NCWQS[1] (µg/L)	Detections Above NCWQS	MCL[2] (µg/L)	Detections Above MCL	Region III Tapwater RBC Value[3] (µg/L)	Detections Above Region III Tapwater RBC Value
Semivolatiles								
4-Nitrophenol	1J	1/2	--	NA	--	NA	230	0
Pentachlorophenol	0.8J	1/2	0.3	1	1	0	0.56	1
Inorganics								
Aluminum	947 - 3,770	2/2	--	NA	50/200[4]	3/3	37,000	0
Barium	35.1	1/2	2,000	0	2,000	0	260	0
Calcium+	8,400J - 82,300J	2/2	--	NA	--	NA	--	NA
Cobalt	3.8J	1/2	--	NA	--	NA	2200	0
Copper	18.4	1/2	1,000	0	1,300[5]	0	1500	0
Iron	115 - 3,130	2/2	300	1	300[4]	1	11,000	0
Lead	1.1J	1/2	15	0	15[5]	0	--	NA
Magnesium+	3,180 - 5,280	2/2	--	NA	--	NA	--	NA
Manganese (non-food)	37.3 - 224	2/2	50	1	50[4]	1	730	0
Potassium+	1,250 - 2,020	2/2	--	NA	--	NA	--	NA
Selenium	1.6J	1/2	50	0	50	0	180	0
Sodium+	12,100 - 14,200	2/2	--	NA	--	NA	--	NA
Thallium	12J	1/1	--	NA	2	1	2.6	1
Zinc	28.2	1/2	2,100	0	5,000[4]	0	11,000	0

Notes:

Shaded areas indicate parameter selected as COPC for human health risk assessment.
(1) NCWQS = North Carolina Water Quality Standards for Groundwater (15A NCACAL 10/25/94)
(2) MCL = Safe Drinking Water Act Maximum Contaminant Level
(3) USEPA Region III RBC Table, October 2000.
(4) Secondary Maximum Contaminant Level (SMCL).
(5) Treatment Technique Action Level.

\+ = Essential Nutrient
-- = No Criteria Published
NA = Not Applicable
µg/L = micrograms per liter
J = Estimated Value

TABLE 1-8

OCTOBER, 1995
SURFACE WATER INORGANIC DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Contaminant	Contaminant Range/Frequency		Comparison to Criteria					
					Federal Health AWQCs[2]		Detections Above AWQC	
Contaminant	Contaminant Range (µg/L)	No of Positive Detects/No. of Samples	NCWQS[1] (µg/L)	Detections Above NCWQS	Water & Organisms (µg/L)	Organisms Only (µg/L)	Water & Organisms	Organisms Only
Inorganics								
Aluminum	375 - 488	2/2	--	NA	--	--	NA	NA
Antimony	54.5	1/2	--	NA	14	4,300	1	0
Barium	16.1 - 26.7	2/2	1,000	0	1,000	--	0	NA
Calcium+	116,000J	2/2	--	NA	--	--	NA	NA
Copper	4.9	1/2	--	NA	1,300	--	0	NA
Cyanide	53.4	1/2	--	NA	700	220,000	0	0
Iron	269 - 326	2/2	--	NA	300	--	10	NA
Lead	8J	1/2	--	NA	50	--	0	NA
Magnesium	332,000 - 334,000	2/2	--	NA	--	--	NA	NA
Manganese	26.1 - 26.1	2/2	200	0	50	100	0	0
Potassium+	107,000 - 109,000	2/2	--	NA	--	--	NA	NA
Selenium	22J	1/2	--	NA	--	--	NA	NA
Sodium+	2,900,000-3,040,000	2/2	--	NA	--	--	NA	NA
Vanadium	5.4 - 11.2	2/2	--	NA	--	--	NA	NA
Zinc	9.4 - 11.7	2/2	--	NA	--	--	NA	NA

Notes:

Shaded areas indicate parameter selected as COPC for human health risk assessment.
(1) NCWQS = North Carolina Water Quality Standards for Surface Water
(2) AWQC = Ambient Water Quality Criteria
+ = Essential Nutrients
-- = Not Published
NA = Not Applicable
(µg/L) = micrograms per liter
J = Estimated value

TABLE 1-9

OCTOBER, 1999 - ADDITIONAL SAMPLING
SUMMARY OF GROUNDWATER DATA
SITE 87, MCAS OFFICER'S HOUSING AREA
MCB, CAMP LEJEUNE, NORTH CAROLINA
NA DECISION DOCUMENT, CTO-0120

Parameter IR87-GW01-99D	Contaminant Concentration (µg/L)	Comparison to Criteria					
		NCWQS[1] (µg/L)	Detections Above NCWQS	MCL[2] (µg/L)	Detections Above MCL	Region III Tapwater Value[3] RBC (µg/L)	Detections Above Region III Tapwater RBC Value
Inorganic Compounds							
Aluminum	4,370	NE	NA	50 to 200[4]	1[4]	37,000	0
Barium	37.6 B	2,000	0	2,000	0	2,600	0
Beryllium	0.39 B	NE	NA	4	0	73	0
Calcium+	11,000	NE	NA	NE	NA	NE	NA
Cobalt	6.5 B	NE	NA	NE	NA	2,200	0
Copper	2.2 B	1,000	0	1300[5]	0	1,500	0
Iron	31.0 B	300	0	300[4]	NA	11,000	0
Magnesium+	5,260	NE	NA	NE	NA	NE	NA
Manganese (non-food)	272	50	1	50[4]	1[4]	730	0
Nickel	12.1 B	100	0	100	0	730	0
Potassium+	2560 B	NE	NA	NE	NA	NE	NA
Sodium+	8,210	NE	NA	NE	NA	NE	NA
Zinc	37	2,100	0	5000[4]	NA	11,000	0

Notes:

Sample was analyzed for VOCs, SVOCs, pesticides, PCBs, and inorganics. Only inorganics were detected in this sample.
No pentachlorophenol (an SVOC) was detected.
Contaminant concentrations presented in micrograms per liter (µg/L) or parts per billion.
Shaded areas indicate parameter selected as COPC for human health risk assessment.

[1] NCWQS = North Carolina Water Quality Standards for Groundwater (15A NCAC 2L 10/25/94)
[2] MCL = Safe Drinking Water Act Maximum Contaminant Level
[3] USEPA Region III RBC Table, October 2000.
[4] Secondary Maximum Contaminant Level (SMCL)
[5] Treatment Technique Action Level for Drinking Water

B = Reported value is less than Contract Required Detection Limits, but greater than Instrument Detection Limits.
E = Concentration exceeds calibration range of GC/MS instrument.
NA = Not Applicable.
NE = Not Established

FIGURES

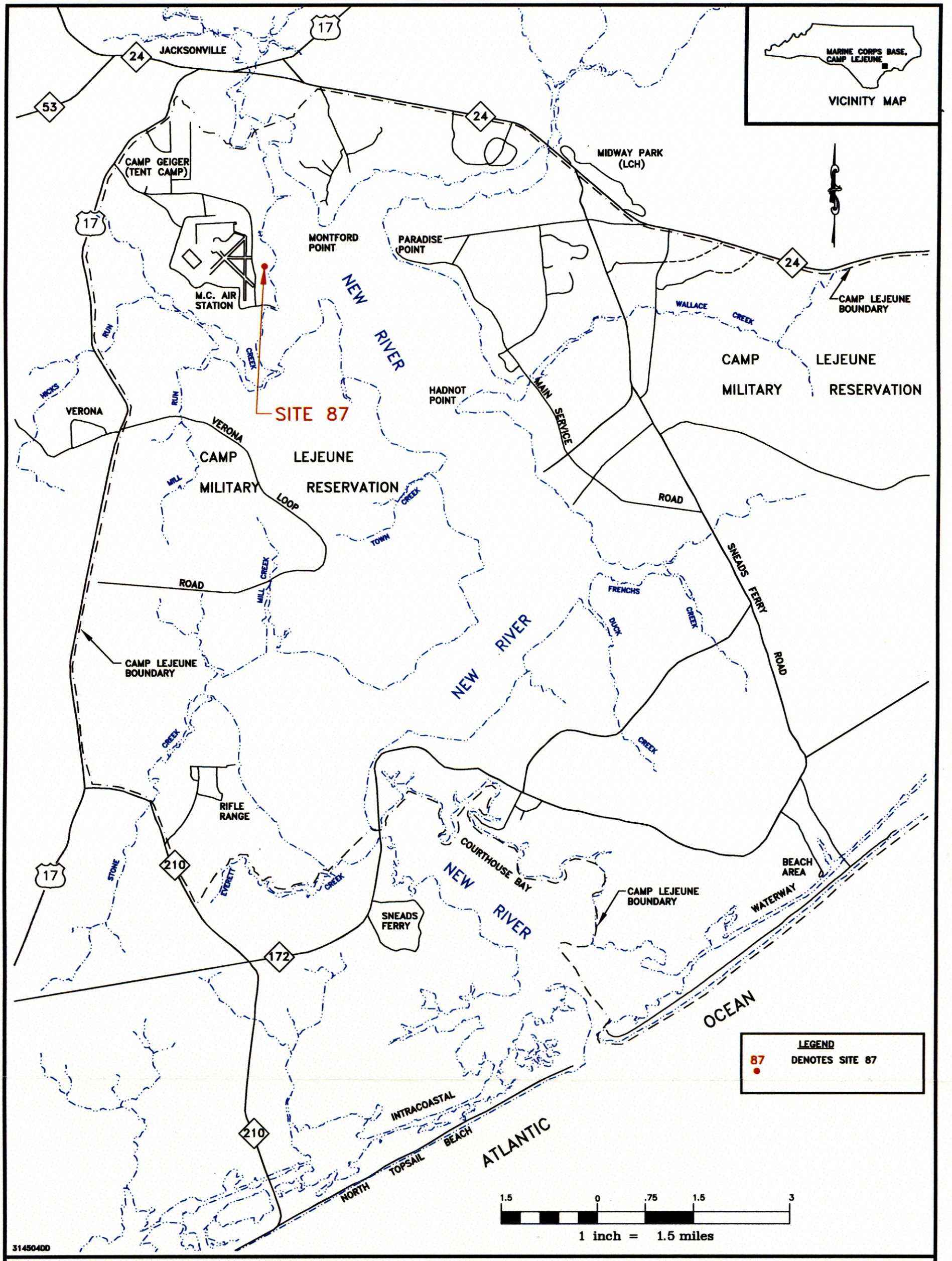

FIGURE 1–1
LOCATION OF SITE 87
MARINE CORPS AIR STATION OFFICER'S HOUSING AREA
NA DECISION DOCUMENT
CTO – 0120

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

314505NF

LONGSTAFF ROAD

TROTTER STREET

TROTTER STREET

BLDG 2015

BLDG 2017

BLDG 2019

BLDG 2021

BLDG 2023

BLDG 2025

BLDG 2027

PVC PIPE

87-GW01

GRASS AREA

ES

DITCH

HEADWALL

WOODED AREA

APPROXIMATE BOUNDARY OF SITE 87

EDGE OF BANK

NEW RIVER

87-SW/SD01

87-SB02

87-SB03

TP-4

87-SB01

87-SB04

TP-3

87-SB05

87-GW02

87-SB06

TP-2

TP-1

87-SW/SD02

WOODED AREA

40 0 20 40

1 inch = 40 ft.

Baker

Baker Environmental, Inc.

LEGEND

87-GW01 – GROUNDWATER MONITORING WELL LOCATION

87-SW/SD01 – SURFACE WATER/SEDIMENT SAMPLE LOCATION

87-SB01 – SOIL BORING LOCATION

TP-1 – TEST PIT LOCATION

– TREE LINE

– TREE

SOURCE: BRENT A. LANIER R.L.S., JANUARY 1998.

FIGURE 1-2
SITE 87 – SITE LOCATION MAP
MCAS OFFICER'S HOUSING AREA
NA DECISION DOCUMENT
CTO – 0120

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

ATTACHMENT A
STATE OF NORTH CAROLINA APPROVAL LETTER

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

MICHAEL F. EASLEY, GOVERNOR
WILLIAM G. ROSS, JR., SECRETARY
DEXTER R. MATTHEWS, INTERIM DIRECTOR

July 30, 2001

Commanding General
(ATTN: AC/S EMD/IRD)
Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004

RE: No Further Action (NFA) Decision Document
Site 87
MCB Camp Lejeune

Dear Sir:

The Superfund Section has completed its review of this document. MCB Camp Lejeune requests that we concur with the NFA designation for Site 87. Based on results presented in the Pre-Remedial Investigation (RI) Screening Study, the Superfund Section concurs with the NFA designation. The Pre-RI Screening Study did not reveal significant contamination. No remediation will be required unless the Superfund Section later determines, based on new information or information not previously provided to the Section, that the site is contaminated above current standards or that the Section was provided with false or incomplete information.

We appreciate the opportunity to review this document. If you have any questions or comments, please contact me at (919) 733-2801, extension 278.

Sincerely,

David J. Lown, LG, PE
Geological Engineer
Superfund Section

1646 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27699-1646
401 OBERLIN ROAD, SUITE 150, RALEIGH, NC 27605
PHONE: 919-733-4996 \ FAX: 919-715-3605

ATTACHMENT B
USEPA REGION IV APPROVAL LETTER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, S.W.
ATLANTA, GEORGIA 30303

June 26, 2001

4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commanding General
Attn.: AC/S, EMD/IRD
Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004

SUBJ: MCB Camp Lejeune
Site 87
No Action Decision Document

Dear Sir:

The U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the above subject decision document and concurs with the selected No Action Remedy for Site 87. This remedy is supported by the previously completed Pre-Remedial Investigation Screening Study.

This remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective.

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

Sincerely,

Gena D. Townsend
Senior Project Manager

cc: Thomas Burton, Camp Lejeune
Dave Lown, NCDENR
Kirk Stevens, LANTDIV