

03.12-11/14/95-01729

~~DRAFT~~ FINAL

**RELATIVE RISK RANKING SYSTEM
DATA COLLECTION INVESTIGATION
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA**

CONTRACT TASK ORDER 0314

NOVEMBER 14, 1995

Prepared For:

**DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
ENGINEERING COMMAND
*Norfolk, Virginia***

Under the:

**LANTDIV CLEAN Program
Contract N62470-89-D-4814**

Prepared By:

**BAKER ENVIRONMENTAL, INC.
*Coraopolis, Pennsylvania***

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
2.0 SITE DESCRIPTIONS	1
2.1 Site 84 - Building 45 Area	1
2.2 Site 87 - MCAS Officer Housing Area	2
3.0 FIELD INVESTIGATIONS AND SAMPLING PROCEDURES	2
3.1 Field Investigations	2
3.1.1 Site 84 - Building 45 Area	2
3.1.2 Site 87 - MCAS Officer Housing Area	3
3.2 Sampling Procedures	3
4.0 RELATIVE RISK RANKING	4

ATTACHMENTS

A	Figures	
	Figure 1	Site Location Map
	Figure 2	Site 84 Sampling Locations
	Figure 3	Site 87 Sampling Locations
B	Tables	
	Table 1	Sample Summary Table
	Table 2	MPF and RF Ratings
C	Analytical Data	

1.0 INTRODUCTION

The Department of Defense (DoD) has developed the Relative Risk Site Evaluation method to categorize Defense Environmental Restoration Program sites into High, Medium, and Low relative risk groups. In order to classify these sites into one of these groups, the following factors are evaluated: contaminants in groundwater, surface water, sediment, and soil, as well as contaminant migration pathways and human and ecological receptors.

The purpose of the Baker Environmental, Inc. (Baker) sample collection effort at Marine Corps Base (MCB), Camp Lejeune, North Carolina was to acquire contaminant, pathway and receptor information to be used in the Navy Relative Risk Ranking (RRR) system. During the Baker field program, environmental samples were collected in order to identify contamination in areas where little or no data had previously been available. Specific requirements for these RRR related investigations at various sites are stipulated in the Scope of Work (SOW), dated October 13, 1995.

This data collection field program, executed by Baker from October 23 through November 5, 1995, was conducted under Naval Facilities Engineering Command Contract Task Order (CTO) 0314, at MCB, Camp Lejeune, North Carolina. The following sites are included under this CTO:

Site 84 - Building 45 Area

Site 87 - MCAS Officer Housing Area (Formerly Site A)

This report is divided into three additional sections and three attachments. Section 2.0 presents a description of each site. Field investigation and sampling procedures are presented in Section 3.0. Section 4.0 presents RRR classifications for each site and environmental medium. Site maps with sampling locations are included in Attachment A. A sample summary table and RRR table are presented in Attachment B. Attachment C contains the analytical data.

2.0 SITE DESCRIPTIONS

The site descriptions presented in this section are based on information obtained from the Activity, and on observations made during field investigations. Figure 1 shows the locations of these sites at MCB, Camp Lejeune.

2.1 Site 84 - Building 45 Area

Site 84 is located approximately 200 yards south of Highway 24 on the main side of MCB, Camp Lejeune, one mile west of the main gate entrance. The study area is bordered by Building 45 (an electrical substation) to the east and by Northeast Creek to the west. The site is mostly wooded or vegetated, covered by thick brush or grass. There is a small lagoon, hidden by trees, near the center of the site. Transformers reportedly containing PCBs were known to be used and possibly stored at the substation. Previous investigations discovered transformers, containing PCB laden oils, in the lagoon. In addition, previously collected soil samples contained low level PCB concentrations. Baker's investigation focuses on the area within and around the lagoon, and along the bank of Northeast Creek. Site 84 is depicted on Figure 2.

There was a strong petroleum odor emitted from the lagoon, when surface water and sediment were disturbed during sample collection. A subsequent sheen was observed on the water surface. It is likely that potentially contaminated water from the lagoon seeps into the shallow groundwater, which may then discharge into Northeast Creek.

People were observed fishing off the bridge, in the portion of Northeast Creek bordering Site 84. Fishermen have also been observed in this area of Northeast Creek during previous Baker field investigations at Camp Lejeune. While it is questionable whether human receptors would come into contact with the lagoon or the area surrounding the lagoon, the presence the substation next to Site 84 suggests that utility workers may visit the site. There are also personnel who work in the machinery warehouse near the railroad tracks.

2.2 Site 87 - MCAS Officer Housing Area

Site 87, formerly Site A, is located near the intersection of Longstaff Road and Trotter Street, approximately 375 feet to the east, on the west bank of the New River. Some portions of the study area are cleared, and some portions are densely vegetated with trees and brush. The suspected former disposal area extends from Trotter Street to the New River bank. Although the specific site history is unknown, previous investigations discovered waste eroding from the cut bank. The waste was identified as hospital waste (hypodermic needles and vials). Baker's investigation focuses on the suspected disposal area. Site 87 is depicted on Figure 3.

Residents have unrestricted access to this area. There are houses built nearby, in fact, two homes are located immediately adjacent to the site. Because the site is immediately adjacent to the New River, potentially contaminated groundwater may discharge directly into the surface water. This area of the New River is used for recreational purposes (eg., fishing and boating). Ducks, herons and fish were observed in the water near the site.

3.0 FIELD INVESTIGATIONS AND SAMPLING PROCEDURES

3.1 Field Investigations

Field investigations and sampling procedures were conducted in accordance with the Relative Risk Ranking System Data Collection Sampling and Analysis Plan prepared by Baker (November 1, 1995) and final project plans submitted under CTO-0193, MCB Camp Lejeune (Baker, 1994).

3.1.1 Site 84 - Building 45 Area

Project plans have been submitted for this site under CTO-0193. The original scope of work for this site included soil, surface water, sediment, and groundwater sampling. The original SOW was executed during the Baker investigation, with one exception; a temporary well was installed instead of a permanent well. Specific surface water and sediment sampling stations, along with a soil sampling grid, were determined in the field during the Baker investigation.

Site 84 sampling locations for soil, surface water, sediment and groundwater are identified in Figure 2. Ten borings were advanced near the lagoon as identified in the final project plans, under CTO-0193. One surface soil sample (0 to 6 inches) and one near surface soil sample (6 to 12 inches) were collected from each boring. Surface water and sediment samples were collected from four

stations around the lagoon and from three stations along the bank of Northeast Creek. Groundwater samples were collected from the two existing shallow wells and from a newly installed temporary well, installed approximately five feet into the water table. All environmental samples were analyzed for TCL PCBs, as identified in Table 1.

3.1.2 Site 87 - MCAS Officer Housing Area

Project plans for this site were submitted under CTO-0193. The original SOW for this site included test pit excavations, groundwater samples from two existing wells, surface water and sediment samples. The test pits were not completed during this field investigation, because Level B personal protective equipment (PPE) is required. The two existing shallow wells were sampled per the original SOW. Specific surface water and sediment sampling stations, along with a soil sampling grid, were determined in the field, during the Baker investigation.

Sampling locations are identified on Figure 2. Six borings were advanced near the approximate locations for test pits proposed in the final project plans. A surface soil sample (0 to 12 inches) was collected from each boring. Surface water and sediment samples were collected from two locations along the bank of the New River. All soil, groundwater, surface water and sediment samples were analyzed for full TCL organics (i.e., volatile, semivolatiles and pesticide/PCBs) and TAL metals, as identified in Table 1.

3.2 Sampling Procedures

The same field sampling procedures were implemented for investigations at Site 84 and Site 87. Sampling procedures used during these field programs are described below.

Soil

Surface soil samples were collected using a stainless steel spoon, from six inches below ground surface. Sample handling procedures and documentation were followed in accordance with the final project plans, under CTO-0193. Soil cuttings were placed back into the borings upon completion.

Groundwater

A temporary one-inch PVC well was installed at Site 84, to approximately five feet below the water table, using a direct push drill rig. Groundwater samples from existing and newly installed temporary wells were collected using a peristaltic pump. A new piece of polyethylene tubing (i.e., dedicated tubing) was used to pump water from each well. Three to five well volumes were purged from each well prior to sampling. After sample collection, the temporary well was pulled from the ground, and the hole was backfilled with soil cuttings. Sample handling procedures and documentation were followed in accordance with the final project plans, under CTO-0193. Purge water generated during the sampling was returned to the ground.

Surface Water

Surface water samples were collected by dipping laboratory sample jars directly into the water. Samples were collected within the first six inches below the water surface. Sample handling

procedures and documentation were followed in accordance with the final project plans, under CTO-0193.

Sediment

Sediment samples were collected by pushing acetate tubes into the sediment, or by using a stainless steel spoon. A new tube (i.e., dedicated tubing) was used to collect each sample. Samples were collected within the first six inches below the surface. Sample handling procedures and documentation were followed in accordance with the final project plans under CTO-0193.

4.0 RELATIVE RISK RANKING

There are three factors incorporated in the RRR system:

- Contaminant Hazard Factor (CHF)
- Migration Pathway Factor (MPF)
- Receptor Factor (RF)

CHF calculation is not included in the SOW for this project. Analytical results that will be used to calculate CHF's are provided in Attachment C.

The MPF summarizes information regarding contaminant migration pathways at a site. MPF ratings are determined according to available site information and professional observations and judgements made by the field team during the field investigations. MPF ratings are as follows:

- Evident (1) - Contamination is present in environmental media.
- Potential (2) - There is a possibility that contamination may be present in media,
or may migrate to a point of exposure.
- Confined (3) - There is little or no possibility that contamination may migrate to a point of exposure.

The RF summarizes information regarding the present or future likelihood of receptors at a site. RF ratings are determined according to available site information and professional observations and judgements made by the field team during the field investigations. RF ratings are as follows:

- Identified (1) - Receptors with access to environmental media have been identified.
- Potential (2) - There is a possibility that receptors may have access to media.
- Limited (3) - There is little or no possibility that receptors may have access to media.

MPF and RF scoring results are presented in Table 2.

ATTACHMENT A
FIGURES

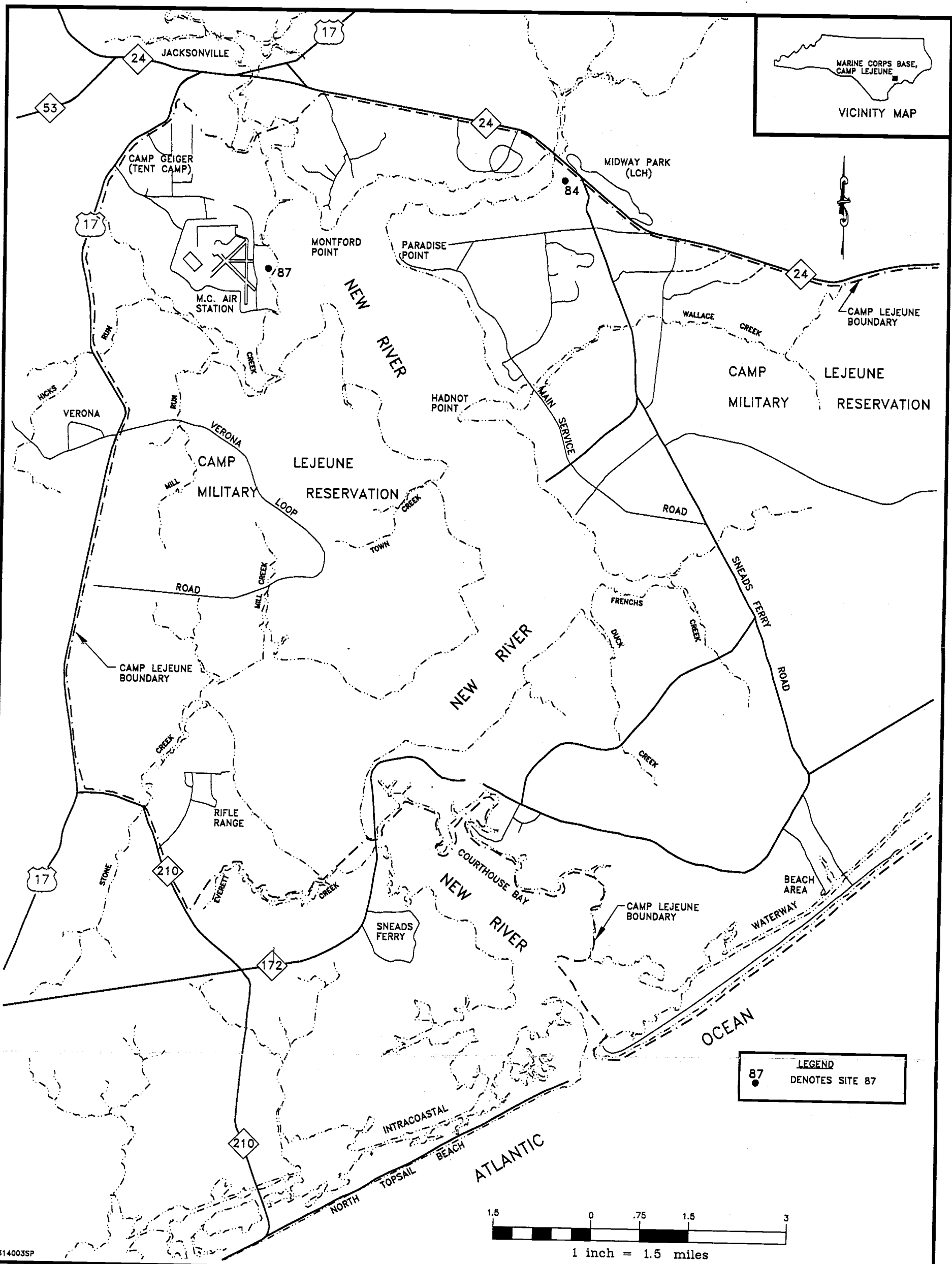
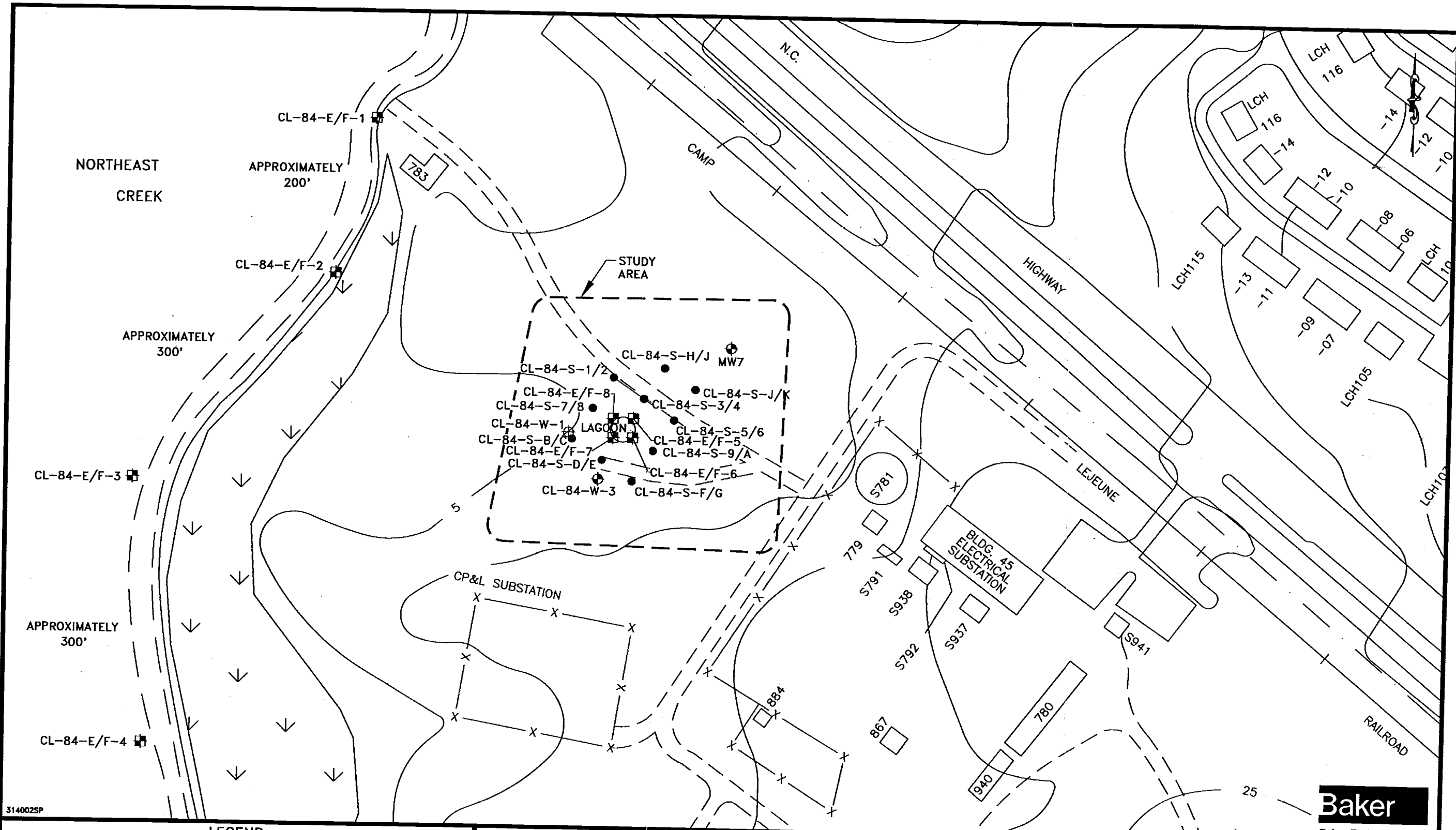


FIGURE 1
 LOCATION MAP, SITES 84 AND 87
 MARINE CORPS BASE CAMP LEJEUNE
 MARINE CORPS BASE, CAMP LEJEUNE
 NORTH CAROLINA

01729VBIZ



314002SP

LEGEND

- MW7 - EXISTING SHALLOW MONITORING WELL
- 84GW1 - SHALLOW TEMPORARY MONITORING WELL
- CL-84-E/F-1 - SURFACE WATER/SEDIMENT SAMPLING LOCATION
- CL-84-S-1/2 - SURFACE SOIL SAMPLING LOCATION

NOTE: 2 SAMPLES WERE COLLECTED PER BORING.
SOURCE: LANTDIV, FEB. 1992

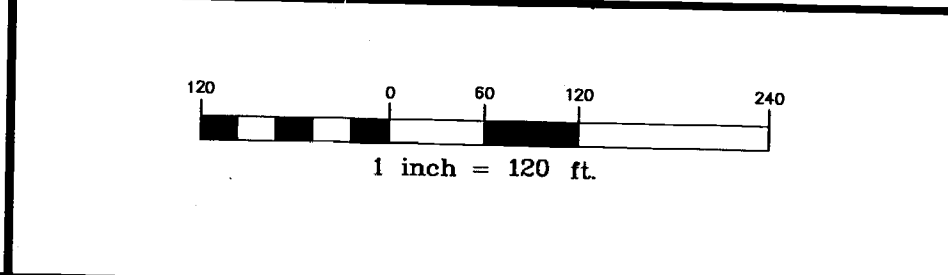
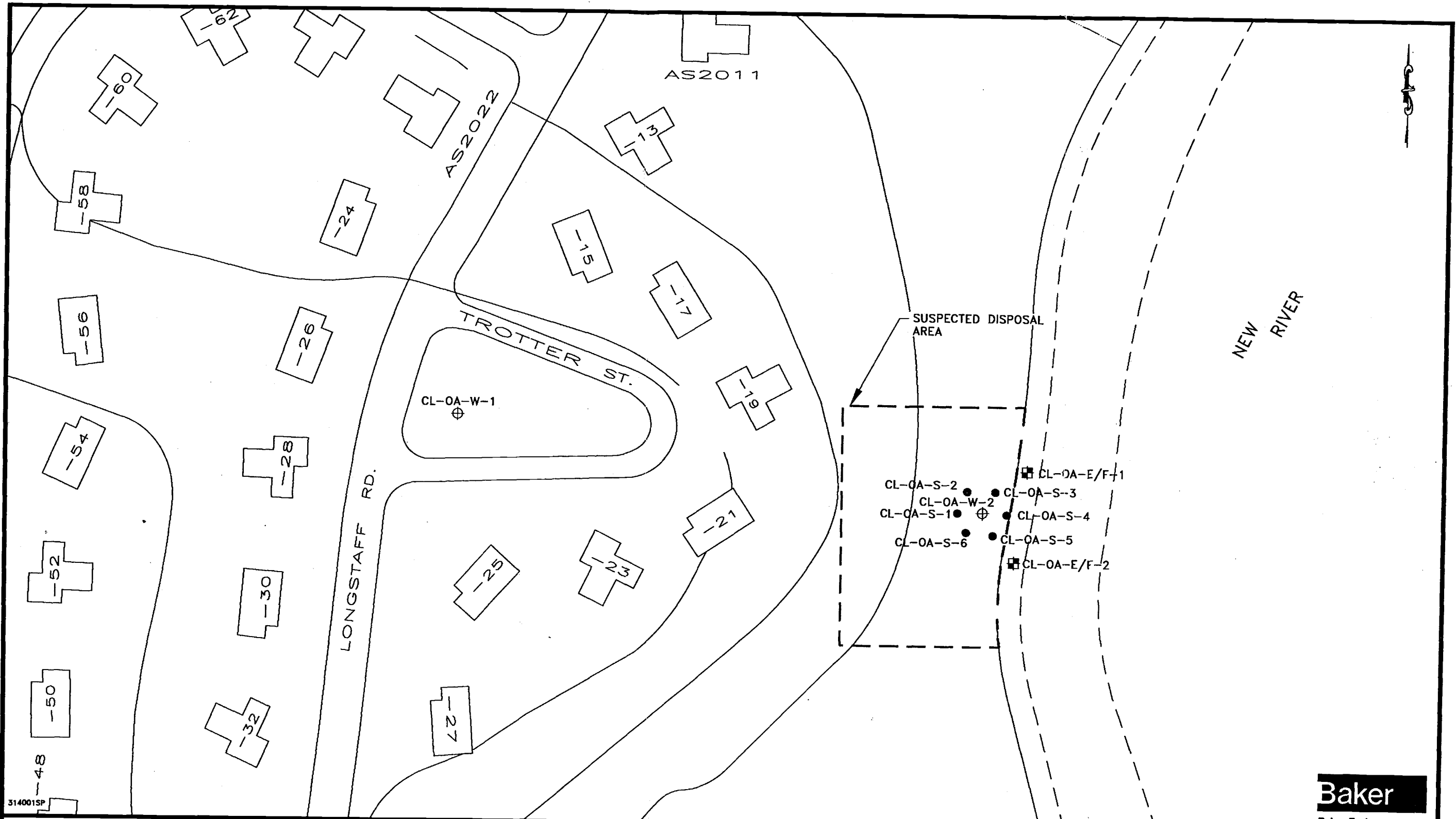


FIGURE 2
SOIL, GROUNDWATER, SURFACE WATER,
AND SEDIMENT LOCATIONS
SITE 84
BUILDING 45 AREA
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA





LEGEND

AGW1 ⊕ - EXISTING SHALLOW MONITORING WELL

CL-OA-S-1 ● - SURFACE SOIL SAMPLING LOCATION

CL-OA-E/F-1 ⊞ - SURFACE WATER/SEDIMENT SAMPLING LOCATION

SOURCE: LANTDIV, FEB. 1992

REVISED: APRIL 21, 1994

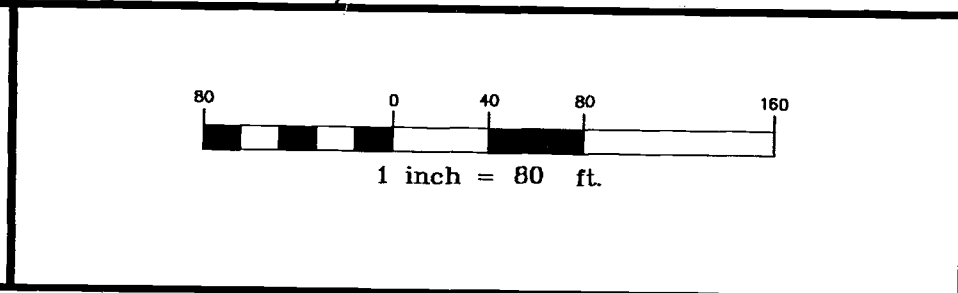


FIGURE 3
 SOIL, GROUNDWATER, SURFACE WATER
 AND SEDIMENT SAMPLING LOCATIONS
 SITE 87
 MCAS OFFICIER'S HOUSING AREA
 MARINE CORPS BASE, CAMP LEJEUNE
 NORTH CAROLINA



ATTACHMENT B
TABLES

TABLE 1

SAMPLE SUMMARY TABLE
 MCB CAMP LEJEUNE
 NORTH CAROLINA
 CONTRACT TASK ORDER 0314

Site Number	Site Name	Baker Site ID	Sample Type	Sample ID	Analytical Parameter				
					VOC	SVOC	TCL PCB's Only	PEST/ PCB's	TAL Metals
87	MCAS Officer's Housing Area	CL0A	Surface Soil	CL0AS1	X	X		X	X
			Surface Soil	CL0AS2	X	X		X	X
			Surface Soil	CL0AS3	X	X		X	X
			Surface Soil	CL0AS4	X	X		X	X
			Surface Soil	CL0AS5	X	X		X	X
			Surface Soil	CL0AS6	X	X		X	X
			Groundwater	CL40W1	X	X		X	X
			Groundwater	CL40W2	X	X		X	X
			Surface Water	CL40F1	X	X		X	X
			Surface Water	CL40F2	X	X		X	X
			Sediment	CL40E1	X	X		X	X
			Sediment	CL40E2	X	X		X	X
84	Building 45 Area	CL84	Surface Soil	CL84S1			X		
			Surface Soil	CL84S2			X		
			Surface Soil	CL84S3			X		
			Surface Soil	CL84S4			X		
			Surface Soil	CL84S5			X		
			Surface Soil	CL84S6			X		
			Surface Soil	CL84S7			X		
			Surface Soil	CL84S8			X		
			Surface Soil	CL84S9			X		
			Surface Soil	CL84SA			X		
			Surface Soil	CL84SB			X		
			Surface Soil	CL84SC			X		
			Surface Soil	CL84SD			X		
			Surface Soil	CL84SE			X		
Surface Soil	CL84SF			X					

TABLE 1 (Continued)

SAMPLE SUMMARY TABLE
 MCB CAMP LEJEUNE
 NORTH CAROLINA
 CONTRACT TASK ORDER 0314

Site Number	Site Name	Baker Site ID	Sample Type	Sample ID	Analytical Parameter				
					VOC	SVOC	TCL PCB's Only	PEST/ PCB's	TAL Metals
84 (Cont.)	Building 45 Area (Cont.)	CL84	Surface Soil	CL84SG			X		
			Surface Soil	CL84SH			X		
			Surface Soil	CL84SI			X		
			Groundwater	CL84W1			X		
			Groundwater	CL84W2			X		
			Groundwater	CL84W3			X		
			Surface Water	CL84F1			X		
			Surface Water	CL84F2			X		
			Surface Water	CL84F4			X		
			Surface Water	CL84F5			X		
			Surface Water	CL84F6			X		
			Surface Water	CL84F7			X		
			Surface Water	CL84F8			X		
			Sediment	CL84E1			X		
			Sediment	CL84E2			X		
			Sediment	CL84E4			X		
			Sediment	CL84E5			X		
			Sediment	CL84E6			X		
Sediment	CL84E7			X					
Sediment	CL84E8			X					

S = Surface Soil - 24 Samples

E = Sediment Samples - 9 Samples

F = Surface Water - 9 Samples

W = Groundwater - 5 Samples

VOC - Volatile Organic Compounds by EPA Method 602

SVOC - Semivolatile Organic Compounds by EPA Method 625

PEST / PCB's - TCL Pesticides and Polychlorinated Biphenyls

TAL Metals - Target Analytical List Metals

TABLE 2

**MPF AND RF RATINGS
MCB CAMP LEJEUNE
NORTH CAROLINA
CONTRACT TASK ORDER 0314**

Migration Pathway Factor and Receptor Factor by Media																
Site Name	Groundwater		Soils - HH		Surf. water -HH		SW - Eco.Mar.		Sed. - HH		Sed. - EM		SW - Eco.Frsh		Sed - EF	
	MPF	RF	MPF	RF	MPF	RF	MPF	RF	MPF	RF	MPF	RF	MPF	RF	MPF	RF
Site 87	2	2	1	1	2	1	NA	NA	2	1	NA	NA	2	1	2	1
Site 84	2	2	2	2	2	2	NA	NA	2	2	NA	NA	2	1	2	1

MPF Ratings

- 1 = Evident
- 2 = Potential
- 3 = Confined

RF Ratings

- 1 = Identified
- 2 = Potential
- 3 = Limited

NA = Not Applicable

ATTACHMENT C
ANALYTICAL DATA

SITE A MCAS OFF. HOUSING
SURFACE WATER
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.

CL-OA-F-1

CL-OA-F-2

GC/MS VOLATILE (ug/L)

GC/MS SEMIVOLATILE (ug/L)

PESTICIDE (ug/L)

No Detects

**SITE A MCAS OFF. HOUSING
SEDIMENT
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	CL-OA-E-1	CL-OA-E-2
METALS (mg/kg)		
Aluminum, Total	1030	1060
Barium, Total	35 B	8.8 B
Calcium, Total	133 B	514 B
Chromium, Total	2.5 U	11.5
Cobalt, Total	1.6 B	1.9 B
Copper, Total	1.2 U	38.4
Iron, Total	922	6040
Lead, Total	0.6 B	6.1
Magnesium, Total	72.3 B	136 B
Manganese, Total	8.4	45.2
Nickel, Total	3.9 U	7.2 B
Selenium, Total	0.67 B	0.44 B
Silver, Total	2.1 B	1.1 U
Sodium, Total	242 B	236 B
Vanadium, Total	2.2 B	2.5 B
Zinc, Total	4.6 B	11

**SITE A MCAS OFF. HOUSING
 SEDIMENT
 INORGANICS
 MCB, CAMP LEJEUNE
 NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
METALS (mg/kg)						
Aluminum, Total	NA	NA	1030	1060	CL-OA-E-2	2/2
Barium, Total	NA	NA	8.8 B	35 B	CL-OA-E-1	2/2
Calcium, Total	NA	NA	133 B	514 B	CL-OA-E-2	2/2
Chromium, Total	2.5 U	2.5 U	11.5	11.5	CL-OA-E-2	1/2
Cobalt, Total	NA	NA	1.6 B	1.9 B	CL-OA-E-2	2/2
Copper, Total	1.2 U	1.2 U	38.4	38.4	CL-OA-E-2	1/2
Iron, Total	NA	NA	922	6040	CL-OA-E-2	2/2
Lead, Total	NA	NA	0.6 B	6.1	CL-OA-E-2	2/2
Magnesium, Total	NA	NA	72.3 B	136 B	CL-OA-E-2	2/2
Manganese, Total	NA	NA	8.4	45.2	CL-OA-E-2	2/2
Nickel, Total	3.9 U	3.9 U	7.2 B	7.2 B	CL-OA-E-2	1/2
Selenium, Total	NA	NA	0.44 B	0.67 B	CL-OA-E-1	2/2
Silver, Total	1.1 U	1.1 U	2.1 B	2.1 B	CL-OA-E-1	1/2
Sodium, Total	NA	NA	236 B	242 B	CL-OA-E-1	2/2
Vanadium, Total	NA	NA	2.2 B	2.5 B	CL-OA-E-2	2/2
Zinc, Total	NA	NA	4.6 B	11	CL-OA-E-2	2/2

SITE A MCAS OFF. HOUSING
SEDIMENT
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-OA-E-1	CL-OA-E-2
GC/MS SEMIVOLATILE (ug/kg)		
Benzo(a)anthracene	430 U	24 J
Benzo(a)pyrene	430 U	41 J
Benzo(b)fluoranthene	430 U	25 J
Benzo(g,h,i)perylene	430 U	32 J
Benzo(k)fluoranthene	430 U	32 J
bis(2-Ethylhexyl)phthalate	27 J	410 U
Chrysene	430 U	32 J
Fluoranthene	430 U	24 J
Indeno(1,2,3-cd)pyrene	430 U	24 J
Pyrene	430 U	28 J

**SITE A MCAS OFF. HOUSING
 SEDIMENT
 ORGANICS
 MCB, CAMP LEJEUNE
 NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
GC/MS SEMIVOLATILE (ug/kg)						
Benzo(a)anthracene	430 U	430 U	24 J	24 J	CL-OA-E-2	1/2
Benzo(a)pyrene	430 U	430 U	41 J	41 J	CL-OA-E-2	1/2
Benzo(b)fluoranthene	430 U	430 U	25 J	25 J	CL-OA-E-2	1/2
Benzo(g,h,i)perylene	430 U	430 U	32 J	32 J	CL-OA-E-2	1/2
Benzo(k)fluoranthene	430 U	430 U	32 J	32 J	CL-OA-E-2	1/2
bis(2-Ethylhexyl)phthalate	410 U	410 U	27 J	27 J	CL-OA-E-1	1/2
Chrysene	430 U	430 U	32 J	32 J	CL-OA-E-2	1/2
Fluoranthene	430 U	430 U	24 J	24 J	CL-OA-E-2	1/2
Indeno(1,2,3-cd)pyrene	430 U	430 U	24 J	24 J	CL-OA-E-2	1/2
Pyrene	430 U	430 U	28 J	28 J	CL-OA-E-2	1/2

**SITE A MCAS OFF. HOUSING
SURFACE SOIL
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	CLOAS1	CLOAS2	CLOAS3	CLOAS4	CLOAS5	CLOAS6
METALS (mg/kg)						
Aluminum, Total	3760	2900	3370	2290	3220	4250
Arsenic, Total	3.8	1.3 B	4 B	0.94 B	1.5 B	4.6
Barium, Total	13.4 B	12 B	13.3 B	14.6 B	18 B	16.1 B
Beryllium, Total	0.49 B	0.76 B	0.76 B	0.34 U	0.51 B	0.87 B
Cadmium, Total	0.79 U	0.8 U	0.8 U	0.99 B	1.5	0.78 U
Calcium, Total	221 B	300 B	2720	15500	18100	119 B
Chromium, Total	8.7	4.2	16.8	25.2	18.2	10.1
Cobalt, Total	0.96 B	0.97 B	0.69 B	1.5 B	1.2 B	0.95 B
Copper, Total	3.6 B	2.3 B	5.6 B	16.2	10.2	3.6 B
Iron, Total	5710	4560	4880	3060	3050	6530
Lead, Total	9.3	13.4	52.8	143	129	45
Magnesium, Total	321 B	144 B	357 B	466 B	551 B	351 B
Manganese, Total	10	25.8	23.7	15.5	23.1	7.7
Mercury, Total	0.06 U	0.06 U	0.06 U	0.1 B	0.06 U	0.06 U
Nickel, Total	3.5 U	3.5 U	3.5 U	19.7	8 B	3.4 U
Potassium, Total	575 B	202 B	539 B	233 B	222 B	611 B
Selenium, Total	0.37 U	0.37 U	0.38 U	0.36 U	0.44 B	0.55 B
Silver, Total	2.2 B	1.8 B	2.3 B	1.2 B	2 B	2.2 B
Sodium, Total	77 B	63.3 B	92 B	138 B	94.7 B	98.1 B
Thallium, Total	1.8 B	0.21 U	0.21 U	0.2 U	0.22 U	0.21 U
Vanadium, Total	12	10.6 B	13.2	19.3	19.1	14.7
Zinc, Total	9	17.6	19.6	65.7	53.5	7.9

**SITE A MCAS OFF. HOUSING
SURFACE SOIL
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
METALS (mg/kg)						
Aluminum, Total	NA	NA	2290	4250	CLOAS6	6/6
Arsenic, Total	NA	NA	0.94 B	4.6	CLOAS6	6/6
Barium, Total	NA	NA	12 B	18 B	CLOAS5	6/6
Beryllium, Total	0.34 U	0.34 U	0.49 B	0.87 B	CLOAS6	5/6
Cadmium, Total	0.78 U	0.8 U	0.99 B	1.5	CLOAS5	2/6
Calcium, Total	NA	NA	119 B	18100	CLOAS5	6/6
Chromium, Total	NA	NA	4.2	25.2	CLOAS4	6/6
Cobalt, Total	NA	NA	0.69 B	1.5 B	CLOAS4	6/6
Copper, Total	NA	NA	2.3 B	16.2	CLOAS4	6/6
Iron, Total	NA	NA	3050	6530	CLOAS6	6/6
Lead, Total	NA	NA	9.3	143	CLOAS4	6/6
Magnesium, Total	NA	NA	144 B	551 B	CLOAS5	6/6
Manganese, Total	NA	NA	7.7	25.8	CLOAS2	6/6
Mercury, Total	0.06 U	0.06 U	0.1 B	0.1 B	CLOAS4	1/6
Nickel, Total	3.4 U	3.5 U	8 B	19.7	CLOAS4	2/6
Potassium, Total	NA	NA	202 B	611 B	CLOAS6	6/6
Selenium, Total	0.36 U	0.38 U	0.44 B	0.55 B	CLOAS6	2/6
Silver, Total	NA	NA	1.2 B	2.3 B	CLOAS3	6/6
Sodium, Total	NA	NA	63.3 B	138 B	CLOAS4	6/6
Thallium, Total	0.2 U	0.22 U	1.8 B	1.8 B	CLOAS1	1/6
Vanadium, Total	NA	NA	10.6 B	19.3	CLOAS4	6/6
Zinc, Total	NA	NA	7.9	65.7	CLOAS4	6/6

SITE A MCAS OFF. HOUSING
QA/QC
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-OA-R-1	CL-OA-R-2	CL-OA-T-1
GC/MS VOLATILE (ug/L)			
Chloroform	1.9 J	10 U	10 U

**SITE A MCAS OFF. HOUSING
QA/QC
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.

	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
GC/MS VOLATILE (ug/L)						
Chloroform	10 U	10 U	1.9 J	1.9 J	CL-OA-R-1	1/3

**SITE A MCAS OFF. HOUSING
GROUNDWATER
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	CL-OA-W-1	CL-OA-W-2
GC/MS SEMIVOLATILE (ug/L)		
4-Nitrophenol	1 J	30 U
Pentachlorophenol	0.78 J	30 U

**SITE A MCAS OFF. HOUSING
GROUNDWATER
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
GC/MS SEMIVOLATILE (ug/L)						
4-Nitrophenol	30 U	30 U	1 J	1 J	CL-OA-W-1	1/2
Pentachlorophenol	30 U	30 U	0.78 J	0.78 J	CL-OA-W-1	1/2

SITE A MCAS OFF. HOUSING
QA/QC
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-OA-R-1	CL-OA-R-2
METALS (ug/L)		
Aluminum, Total	37.4 B	60.1 B
Calcium, Total	686 B	433 B
Copper, Total	12.2 B	4.7 U
Iron, Total	25.8 B	16.9 U
Lead, Total	1.4 B	0.9 B
Magnesium, Total	251 B	142 B
Sodium, Total	5440	3540 B

**SITE A MCAS OFF. HOUSING
QA/QC
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
METALS (ug/L)						
Aluminum, Total	NA	NA	37.4 B	60.1 B	CL-OA-R-2	2/2
Calcium, Total	NA	NA	433 B	686 B	CL-OA-R-1	2/2
Copper, Total	4.7 U	4.7 U	12.2 B	12.2 B	CL-OA-R-1	1/2
Iron, Total	16.9 U	16.9 U	25.8 B	25.8 B	CL-OA-R-1	1/2
Lead, Total	NA	NA	0.9 B	1.4 B	CL-OA-R-1	2/2
Magnesium, Total	NA	NA	142 B	251 B	CL-OA-R-1	2/2
Sodium, Total	NA	NA	3540 B	5440	CL-OA-R-1	2/2

**SITE A MCAS OFF. HOUSING
SURFACE WATER
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	CL-OA-F-1	CL-OA-F-2
METALS (ug/L)		
Aluminum, Total	488	375
Antimony, Total	54.5 B	43.2 U
Barium, Total	26.7 B	16.1 B
Calcium, Total	116000	116000
Copper, Total	4.9 B	4.7 U
Cyanide	5 U	53.4
Iron, Total	326	269
Lead, Total	8.2	0.8 U
Magnesium, Total	332000	334000
Manganese, Total	26.1	26.1
Potassium, Total	107000	109000
Selenium, Total	1.6 U	22 B
Sodium, Total	2900000	3040000
Vanadium, Total	11.2 B	5.4 B
Zinc, Total	11.7 B	9.4 B

**SITE A MCAS OFF. HOUSING
SURFACE WATER
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
METALS (ug/L)						
Aluminum, Total	NA	NA	375	488	CL-OA-F-1	2/2
Antimony, Total	43.2 U	43.2 U	54.5 B	54.5 B	CL-OA-F-1	1/2
Barium, Total	NA	NA	16.1 B	26.7 B	CL-OA-F-1	2/2
Calcium, Total	NA	NA	116000	116000	CL-OA-F-2	2/2
Copper, Total	4.7 U	4.7 U	4.9 B	4.9 B	CL-OA-F-1	1/2
Cyanide	5 U	5 U	53.4	53.4	CL-OA-F-2	1/2
Iron, Total	NA	NA	269	326	CL-OA-F-1	2/2
Lead, Total	0.8 U	0.8 U	8.2	8.2	CL-OA-F-1	1/2
Magnesium, Total	NA	NA	332000	334000	CL-OA-F-2	2/2
Manganese, Total	NA	NA	26.1	26.1	CL-OA-F-2	2/2
Potassium, Total	NA	NA	107000	109000	CL-OA-F-2	2/2
Selenium, Total	1.6 U	1.6 U	22 B	22 B	CL-OA-F-2	1/2
Sodium, Total	NA	NA	2900000	3040000	CL-OA-F-2	2/2
Vanadium, Total	NA	NA	5.4 B	11.2 B	CL-OA-F-1	2/2
Zinc, Total	NA	NA	9.4 B	11.7 B	CL-OA-F-1	2/2

**SITE A MCAS OFF. HOUSING
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	CLOAS1	CLOAS2	CLOAS3	CLOAS4	CLOAS5	CLOAS6
GC/MS VOLATILE (ug/kg)						
Acetone	16	60	12 U	11 U	10 J	21
GC/MS SEMIVOLATILE (ug/kg)						
Acenaphthene	390 U	390 U	390 U	37 J	410 U	380 U
Anthracene	390 U	390 U	52 J	95 J	110 J	380 U
Benzo(a)anthracene	390 U	390 U	230 J	350 J	380 J	380 U
Benzo(a)pyrene	390 U	390 U	340 J	380	310 J	380 U
Benzo(b)fluoranthene	390 U	390 U	380 J	350 J	320 J	380 U
Benzo(g,h,i)perylene	390 U	390 U	240 J	320 J	170 J	380 U
Benzo(k)fluoranthene	390 U	390 U	380 J	320 J	300 J	380 U
bis(2-Ethylhexyl)phthalate	39 J	390 U	84 J	380	100 J	17 J
Butylbenzylphthalate	390 U	390 U	54 J	290 J	46 J	380 U
Carbazole	390 U	390 U	42 J	25 J	21 J	380 U
Chrysene	390 U	390 U	290 J	390	400 J	380 U
Dibenz(a,h)anthracene	390 U	390 U	66 J	100 J	46 J	380 U
Fluoranthene	390 U	390 U	400	620	840	380 U
Fluorene	390 U	390 U	26 J	27 J	410 U	380 U
Indeno(1,2,3-cd)pyrene	390 U	390 U	250 J	270 J	170 J	380 U
Phenanthrene	390 U	390 U	240 J	320 J	500	380 U
Pyrene	390 U	390 U	330 J	560	660	380 U
PESTICIDE (ug/kg)						
4,4'-DDD	41	3.9 U	39	440 E	110	16 P
4,4'-DDE	67	16	97	51	35	62
4,4'-DDT	230	15	190	310 E	40	250 E
alpha-Chlordane	9.7 U	2 U	7.8 U	21 P	12 P	1.9 U
gamma-Chlordane	9.7 U	2 U	7.8 U	26	10 P	1.9 U

**SITE A MCAS OFF. HOUSING
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
GC/MS VOLATILE (ug/kg)						
Acetone	11 U	12 U	10 J	60	CLOAS2	4/6
GC/MS SEMIVOLATILE (ug/kg)						
Acenaphthene	380 U	410 U	37 J	37 J	CLOAS4	1/6
Anthracene	380 U	390 U	52 J	110 J	CLOAS5	3/6
Benzo(a)anthracene	380 U	390 U	230 J	380 J	CLOAS5	3/6
Benzo(a)pyrene	380 U	390 U	310 J	380	CLOAS4	3/6
Benzo(b)fluoranthene	380 U	390 U	320 J	380 J	CLOAS3	3/6
Benzo(g,h,i)perylene	380 U	390 U	170 J	320 J	CLOAS4	3/6
Benzo(k)fluoranthene	380 U	390 U	300 J	380 J	CLOAS3	3/6
bis(2-Ethylhexyl)phthalate	390 U	390 U	17 J	380	CLOAS4	5/6
Butylbenzylphthalate	380 U	390 U	46 J	290 J	CLOAS4	3/6
Carbazole	380 U	390 U	21 J	42 J	CLOAS3	3/6
Chrysene	380 U	390 U	290 J	400 J	CLOAS5	3/6
Dibenz(a,h)anthracene	380 U	390 U	46 J	100 J	CLOAS4	3/6
Fluoranthene	380 U	390 U	400	840	CLOAS5	3/6
Fluorene	380 U	410 U	26 J	27 J	CLOAS4	2/6
Indeno(1,2,3-cd)pyrene	380 U	390 U	170 J	270 J	CLOAS4	3/6
Phenanthrene	380 U	390 U	240 J	500	CLOAS5	3/6
Pyrene	380 U	390 U	330 J	660	CLOAS5	3/6
PESTICIDE (ug/kg)						
4,4'-DDD	3.9 U	3.9 U	16 P	440 E	CLOAS4	5/6
4,4'-DDE	NA	NA	16	97	CLOAS3	6/6
4,4'-DDT	NA	NA	15	310 E	CLOAS4	6/6
alpha-Chlordane	1.9 U	9.7 U	12 P	21 P	CLOAS4	2/6
gamma-Chlordane	1.9 U	9.7 U	10 P	26	CLOAS4	2/6

**SITE A MCAS OFF. HOUSING
GROUNDWATER
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	CL-OA-W-1	CL-OA-W-2
METALS (ug/L)		
Aluminum, Total	3770	947
Barium, Total	35.1 B	7.1 U
Calcium, Total	8400	82300
Cobalt, Total	3.8 B	2.7 U
Copper, Total	4.7 U	18.4
Iron, Total	115	3130
Lead, Total	0.8 U	1.1 B
Magnesium, Total	5280	3180 B
Manganese, Total	224	37.3
Potassium, Total	2020 B	1250 B
Selenium, Total	1.3 U	1.6 B
Sodium, Total	14200	12100
Thallium, Total	0.9 U	12 B
Zinc, Total	28.2	3 U

**SITE A MCAS OFF. HOUSING
GROUNDWATER
INORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
METALS (ug/L)						
Aluminum, Total	NA	NA	947	3770	CL-OA-W-1	2/2
Barium, Total	7.1 U	7.1 U	35.1 B	35.1 B	CL-OA-W-1	1/2
Calcium, Total	NA	NA	8400	82300	CL-OA-W-2	2/2
Cobalt, Total	2.7 U	2.7 U	3.8 B	3.8 B	CL-OA-W-1	1/2
Copper, Total	4.7 U	4.7 U	18.4	18.4	CL-OA-W-2	1/2
Iron, Total	NA	NA	115	3130	CL-OA-W-2	2/2
Lead, Total	0.8 U	0.8 U	1.1 B	1.1 B	CL-OA-W-2	1/2
Magnesium, Total	NA	NA	3180 B	5280	CL-OA-W-1	2/2
Manganese, Total	NA	NA	37.3	224	CL-OA-W-1	2/2
Potassium, Total	NA	NA	1250 B	2020 B	CL-OA-W-1	2/2
Selenium, Total	1.3 U	1.3 U	1.6 B	1.6 B	CL-OA-W-2	1/2
Sodium, Total	NA	NA	12100	14200	CL-OA-W-1	2/2
Thallium, Total	0.9 U	0.9 U	12 B	12 B	CL-OA-W-2	1/2
Zinc, Total	3 U	3 U	28.2	28.2	CL-OA-W-1	1/2

SITE 84 - BLDG. 45 AREA
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-84-S-1	CL-84-S-2	CL-84-S-3	CL-84-S-4	CL-84-S-5	CL-84-S-6
PCBS (ug/kg) Aroclor-1260	12000	1700	4400	12000	5300	5700

SITE 84 - BLDG. 45 AREA
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-84-S-7	CL-84-S-8	CL-84-S-9	CL-84-S-A	CL-84-S-B	CL-84-S-C
PCBS (ug/kg) Aroclor-1260	6200	2300	5000	4300 P	1300 P	2800

SITE 84 - BLDG. 45 AREA
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-84-S-D	CL-84-S-E	CC-84-S-F	CC-84-S-G	CC-84-S-H	CC-84-S-I
PCBS (ug/kg) Aroclor-1260	360 P	880	2500	6100	12000	10000

SITE 84 - BLDG. 45 AREA
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CC-84-S-J	CC-84-S-K
PCBS (ug/kg)		
Aroclor-1260	1100	7500

SITE 84 - BLDG. 45 AREA
SURFACE SOIL
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.

	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PCBS (ug/kg) Aroclor-1260	NA	NA	360 P	12000	CC-84-S-H	20/20

SITE 84 - BLDG. 45 AREA
SEDIMENT
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-84-E-1	CL-84-E-2	CL-84-E-4	CL-84-E-5	CL-84-E-6	CL-84-E-7
PCBS (ug/kg)						
Aroclor-1248	42 U	59 U	58 U	2700	3300 U	4700 U
Aroclor-1260	42 U	59 U	58 U	15000 E	8100	17000

SITE 84 - BLDG. 45 AREA
SEDIMENT
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.

CL-84-E-8

PCBS (ug/kg)

Aroclor-1248

450 U

Aroclor-1260

3700

**SITE 84 - BLDG. 46 AREA
 SEDIMENT
 ORGANICS
 MCB, CAMP LEJEUNE
 NORTH CAROLINA**

Sample ID.	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PCBS (ug/kg)						
Aroclor-1248	42 U	4700 U	2700	2700	CL-84-E-5	1/7
Aroclor-1260	42 U	59 U	3700	17000	CL-84-E-7	4/7

SITE 84 - BLDG. 45 AREA
GROUNDWATER
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL84W1	CL-84-W-2	CL-84-W-3
------------	--------	-----------	-----------

PCBS (ug/L)

No Detects

SITE 84 - BLDG. 45 AREA
SURFACE WATER
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.	CL-84-F-1	CL-84-F-2	CL-84-F-4	CL-84-F-5	CL-84-F-6	CL-84-F-7
------------	-----------	-----------	-----------	-----------	-----------	-----------

PCBS BY GC (ug/L)

No Detects

SITE 84 - BLDG. 45 AREA
SURFACE WATER
ORGANICS
MCB, CAMP LEJEUNE
NORTH CAROLINA

Sample ID.

CL-84-F-8

PCBS BY GC (ug/L)

No Detects