

**FINAL**

**OPERABLE UNIT EVALUATION REPORT  
MARINE CORPS BASE, CAMP LEJEUNE,  
NORTH CAROLINA**

**CONTRACT TASK ORDER 0086**

*Prepared For:*

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

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## TABLE OF CONTENTS

	<u>Page</u>
<b>1.0 INTRODUCTION</b> .....	1-1
1.1 Scope of Work .....	1-1
1.2 Format of Report .....	1-3
<b>2.0 DOCUMENT REVIEW</b> .....	2-1
2.1 Initial Assessment Study .....	2-1
2.2 Site Summary Report .....	2-1
2.3 Site Management Plan .....	2-2
2.4 Other .....	2-2
<b>3.0 DEVELOPMENT OF POSSIBLE OPERABLE UNITS</b> .....	3-1
3.1 Geography Based Operable Units .....	3-1
3.1.1 Advantages of Geography Based Operable Units .....	3-1
3.1.2 Disadvantages of Geography Based Operable Units .....	3-4
3.2 Disposed Material and Detected Contaminants Operable Units .....	3-4
3.2.1 Advantages of Operable Units Based on Material Disposed and Contaminants Detected .....	3-7
3.2.2 Disadvantages of Operable Units Based on Material Disposed and Contaminants Detected .....	3-7
3.3 Individual Site Operable Units .....	3-7
3.3.1 Advantages of Individual Site Operable Units .....	3-8
3.3.2 Disadvantages of Individual Site Operable Units .....	3-8
3.4 Watershed Based Operable Units .....	3-8
3.4.1 Advantages of Watershed Based Operable Units .....	3-11
3.4.2 Disadvantages of Watershed Based Operable Units .....	3-11
<b>4.0 SUMMARY OF SELECTED OPERABLE UNITS</b> .....	4-1
<b>5.0 REFERENCES</b> .....	5-1
<b>APPENDIX</b>	
<b>A Disposed Materials and Contaminant Detected Matrices</b>	
A-1 Materials Disposed at Each Site .....	A-1
A-2 Groundwater Contaminants Detected .....	A-2
A-3 Surface Water Contaminants Detected .....	A-3
A-4 Sediment Contaminants Detected .....	A-4
A-5 Soil Contaminants Detected .....	A-5

## LIST OF TABLES

<u>Number</u>		<u>Page</u>
2-1	Disposal Sites Requiring RI/FS Activities, Marine Corps Base, Camp Lejeune, North Carolina .....	2-3
3-1	Potential Operable Units Based on Geography .....	3-2
3-2	Potential Operable Units Based on Materials Disposed and Contaminants Detected at Sites .....	3-5
3-3	Potential Individual Site Operable Units .....	3-9
3-4	Potential Watershed Based Operable Units .....	3-12
4-1	Recommended Operable Units for Marine Corps Base, Camp Lejeune, North Carolina .....	4-3

## LIST OF FIGURES

<u>Number</u>		<u>Page</u>
1-1	Disposal Sites Requiring RI/FS Activities, Marine Corps Base, Camp Lejeune, North Carolina .....	1-2
3-1	Potential Operable Units Based on Geography .....	3-3
3-2	Potential Operable Units Based on Materials Disposed and Contaminants Detected at Sites .....	3-6
3-3	Potential Individual Site Operable Units .....	3-10
3-4	Potential Watershed Based Operable Units .....	3-13
4-1	Recommended Operable Units for Marine Corps Base, Camp Lejeune, North Carolina .....	4-4

## 1.0 INTRODUCTION

This report presents the results of the prioritization of 18 current sites at Marine Corps Base, Camp Lejeune, North Carolina into Operable Units (OU). Remedial Investigations and Feasibility Studies are currently, or will be performed at these 18 sites under the Department of Navy's Installation Restoration Program. This report has been prepared by Baker Environmental, Inc. (Baker) in response to the Request for Proposal for Contract Task Order 0086 (CTO 0086) by the Atlantic Division, Naval Facilities Engineering Command (LANTDIV), dated November 21, 1991.

The 18 current RI/FS sites are identified in the "Final Site Management Plan For Marine Corps Base Camp Lejeune, North Carolina, Fiscal Year 1993" prepared for LANTDIV in September 1992 by Baker. Figure 1-1 shows the locations of the sites.

As defined in the National Contingency Plan (NCP), an "Operable Unit means a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site. Operable units may address geographical portions of a site, specific site problems, or initial phases of an action, or may consist of any set of actions performed over time or any actions that are concurrent but located in different parts of a site."

Site No. 78, the Hadnot Point Industrial Area (HPIA), has already been designated as Operable Unit No. 1, and an Interim Remedial Action (IRA) RI/FS for the shallow aquifer is being conducted at present. The remaining RI/FS sites have not been prioritized into OUs. The objective of this task is to evaluate these remaining sites and determine the most appropriate methods to determine the OUs.

### 1.1 Scope of Work

In order to complete the task objective, the following activities were conducted:

- Discussions were held with EPA Region IV, N.C. DEHNR and LANTDIV to review possible methods of categorizing sites into OUs.

Figure 1-1

- Previous documents prepared as a result of site investigations were reviewed to determine the types of wastes disposed at each site and the types of contaminants detected at the site. These documents are referenced at the end of this report.
- Site locations were plotted and evaluated to determine any geographical relationships (i.e., sites within a common area) between the sites.
- Matrices were developed to compare the various sites to the types of wastes disposed and the contaminants detected. These matrices were used to determine if there were any similarities among the sites in terms of materials and contaminants.
- Sites were evaluated to determine any common watershed/drainage patterns/ ecological relationships between the sites.

Based on the above activities, preliminary OUs were developed based on common components observed in the matrices, site locations, or noted in the previous site investigations.

The preliminary list of OUs was reviewed to determine if there needed to be any modifications based on the geographic location of the sites.

## **1.2 Format of Report**

The remainder of this report is divided into four sections. Section 2 reviews previous documents which have been prepared addressing hazardous waste disposal practices at the base. In Section 3, four different methods of grouping the sites into OUs are presented. Section 4 prioritizes the sites into the recommended OUs. Section 5 lists the references used in this report.

## **2.0 DOCUMENT REVIEW**

In order to determine the characteristics of the current RI/FS sites, Baker reviewed site assessment documents of Camp Lejeune which were completed in 1983 by Water and Air Research, Inc. (Initial Assessment Study) and in 1990 by Environmental Science & Engineering, Inc. (Site Summary Report). In addition, the Fiscal Year 1992 Site Management Plan prepared by Halliburton NUS was reviewed. This section summarizes the information gathered during the document review.

### **2.1 Initial Assessment Study**

The Initial Assessment Study (IAS) completed in 1983 identified 22 sites that were recommended for further investigation. The IAS determined that Petroleum, Oil and Lubricants (POL) were used or disposed at 10 of the 22 sites. The IAS briefly described the history of each of the sites, and listed the materials or wastes that were understood to be disposed at each site.

In addition, the IAS noted that although there were sites located throughout the base, three areas, Hadnot Point Industrial Area, Camp Geiger, and the Marine Corps Air Station at New River (MCAS New River) had the highest number of sites.

Finally, the IAS noted particular sites where contaminants might pose a threat to public health, including Site Nos. 69 and 41. Site No. 69, the Rifle Range Chemical Dump, was used to dispose chemical wastes. Site No. 41, the Camp Geiger Dump, had evidence suggesting that ordnance had been disposed at the site.

### **2.2 Site Summary Report**

The Site Summary Report completed in 1990 presented the results of sampling conducted at the 22 sites. Sampling of groundwater monitoring wells, soils, surface water and sediments was started in 1984. Additional sampling events took place in 1986 and 1987. The data collected from the site sampling was used to make a preliminary determination of the rate and direction of groundwater flow and the extent of environmental contamination at the 22 sites.

The Site Summary Report included a description of each site and a history of the disposal activities conducted at the site.

### **2.3 Site Management Plan**

The Fiscal Year 1992 Site Management Plan (SMP) was developed in response to the Federal Facility Agreement (FFA), dated February 13, 1991. The FFA listed 23 sites that were required to complete a site investigation. The HPIA, which was not noted as a site in the FFA, was designated in the SMP as Site No.78 (and also as Operable Unit No. 1). Five of these sites have been dropped from the FFA list, leaving 17 sites in the SMP. Table 2-1 lists the 17 sites, the dates they were in use, and the material deposited at each site. Figure 1-1 shows the location of the sites.

### **2.4 Other**

Site 86 (Tank Area AS419 - AS421 at Marine Corps Air Station) was added by the Navy/Marine Corps to the IRP Program in August 1992. This site, which is newly-identified, is not included in any of the studies/reports mentioned previously in this section.

TABLE 2-1

DISPOSAL SITES REQUIRING RI/FS ACTIVITIES  
MARINE CORP BASE CAMP LEJEUNE, NORTH CAROLINA

Site No.	Site Description	Dates Used	Material Deposited
1	French Creek Liquids Disposal Area	Late 1940s to mid-1970s	Waste battery acid, POL
2	Former Nursery/Day-Care Center	1945 - 1958	Various pesticides
6	Storage Lots 201 and 203	1940s - Present	Metals, DDT, PCBs
9	Firefighting Training Pit at Piney Green Road	1960s - Present	JP-4, JP-5, solvents
16	Montford Point Burn Dump (1958-1972)	1958 - 1972	Garbage, waste oils, asbestos
21	Transformer Storage Lot 140	1950 - 1977	PCB spill, DDT, transformer oil
24	Industrial Area Fly Ash Dump	1940s - 1980	Fly ash and cinders, WTP sludge, STP sludge, construction debris
28	Hadnot Point Burn Dump	1946 - 1971	Solid wastes, industrial wastes, garbage, trash, oil-based paint
30	Sneads Ferry Road - Fuel Tank Sludge Area	1970	Sludge from fuel storage tank, tetraethyl lead and related compounds
35	Camp Geiger Area Fuel Farm	1957 - 1958	MOGAS (Spill)
36	Camp Geiger Area Dump Near Sewage Treatment Plant	Late 1940s - late 1950s	Mixed industrial and municipal solid waste
41	Camp Geiger Dump Near Former Trailer Park	Approximately 1946 - 1970	Mixed industrial and municipal wastes, POL, solvents, old batteries, Mirex, ordnance
48	MCAS New River Mercury Dump Site	1956 - 1966	Dumping of approximately 1 gallon mercury yearly for approximately 10 years
69	Rifle Range Chemical Dump	Mid 1950s - 1976	Chemical agent test kits, Malathion, DDT, PCBs
73	Courthouse Bay Liquids Disposal Area	1946 - 1977	Waste battery acid, POL
74	Mess Hall Grease Disposal Area	Early 1950s - 1960s	Pesticides, PCBs
78 <sup>(1)</sup>	Hadnot Point (Industrial Area)	1940s - 1981	Fuel, solvents
86	Tank Area AS419 - AS421 at Marine Corps Air Station	1970s - 1980s	Former above-ground storage tank area for petroleum product and wastes. Groundwater is contaminated with TCE.

(1) Operable Unit No. 1 - Not specifically mentioned as a site in the IAS, but included for completeness.

Source: Fiscal Year 1992 Site Management Plan, Halliburton NUS, 1992.

### **3.0 DEVELOPMENT OF POSSIBLE OPERABLE UNITS**

After reviewing the documents noted in Section 2, Baker considered four methods of prioritizing the 18 RI/FS sites into OUs: geography, materials disposed and contaminants detected, individual sites, and common watersheds. This section presents these prioritizing methods.

#### **3.1 Geography Based Operable Units**

The first proposed method of determining OUs for the 17 RI/FS sites is based on the locations of the sites. Sites located near each other have been grouped together into an OU. This method of grouping resulted in the 17 sites being arranged into 8 OUs.

Table 3-1 lists the 8 proposed OUs. Note that Site Nos. 21, 24, and 78 have already been designated as OU No.1. Figure 3-1 shows the location of the 8 proposed OUs.

##### **3.1.1 Advantages of Geography Based Operable Units**

The following items are considered as advantages to geography based OUs:

- The RI/FS process would address definitive geographic portions of the base for remediation and cleanup. For example, all sites in the Camp Geiger area may be investigated as a group.
- Sites impacting a common watershed are more likely to be considered for remediation as a group.
- Work performed at the sites, such as field investigations, sampling, and remediation activities, may be managed and coordinated easier if the sites are located relatively near each other.

**TABLE 3-1**  
**POTENTIAL OPERABLE UNITS BASED ON GEOGRAPHY**

Operable Unit No.	Site No(s).	Name
1*	21	Transformer Storage Lot 140
	24	Industrial Area Fly Ash Dump
	78	Hadnot Point Industrial Area
2	6	Storage Lots 201 and 203
	9	Firefighting Training Pit at Piney Green Road
3	69	Rifle Range Chemical Dump
4	1	French Creek Liquids Disposal Area
	28	Hadnot Point Burn Dump
5	2	Former Nursery/Day Care Center
	74	Mess Hall Grease Disposal Area
6	16	Montford Point Burn Dump
	35	Camp Geiger Area Fuel Farm
	36	Camp Geiger Area Dump Near Sewage Treatment Plant
	41	Camp Geiger Dump Near Former Trailer Park
	48	MCAS New River Mercury Dump Site
	86	Tank Area AS419 - AS421
7	30	Sneads Ferry Road Fuel Tank Sludge Area
8	73	Courthouse Bay Liquids Disposal Area

\* Previously designated as Operable Unit No. 1

Figure 3-1

### **3.1.2 Disadvantages of Geography Based Operable Units**

The following items are considered as disadvantages to geography based OUs:

- Some sites within an area may not have common waste or contaminant characteristics with other sites. For example, Site 48, MCAS New River Mercury Dump Site, does not have common waste or contaminant characteristics with the other sites in the area (proposed OU No. 6).
- Although some sites are in the same general area, they may still be a mile or more away from each other, such as Site Nos. 1 and 28 (see Figure 3-1). Site problems would not likely overlap from a geographical standpoint.

### **3.2 Disposed Material and Detected Contaminants Operable Units**

The second proposed method of determining OUs for the 18 RI/FS sites is based on comparing the materials disposed and the contaminants detected at each site. Baker developed a series of matrices (Appendix A) which compared the characteristics of the wastes and detected contaminants at the 18 sites. Appendix A-1 shows that the most common materials disposed at the base included POL, waste oils, and solvents. Most of this waste material was the result of the use and maintenance of vehicles around the base. According to the Site Summary Report, it was common procedure to dispose of these materials by dumping them on the ground, burying them, or pouring them down the storm drains.

Appendices A-2 through A-5 show that most of the sites show evidence of groundwater contamination, and at least 12 of the sites have signs of surface water and sediment contamination.

Based on these matrices, Baker developed a list of 5 potential OUs, which are presented in Table 3-2. Figure 3-2 shows the locations of these potential OUs.

TABLE 3-2

## POTENTIAL OPERABLE UNITS BASED ON MATERIALS DISPOSED AND CONTAMINANTS DETECTED AT SITES

Operable Unit No.	Site No(s).	Name	Materials Disposed	Contaminants Detected			
				Groundwater	Surface Water	Soil	Sediment
1*	21	Transformer Storage Lot 140	Pesticides, PCBs, Transformer Oil	O&G, Herbicides	--	Pesticides, Herbicides	--
	24	Industrial Area Fly Ash Dump	Solvents, WTP-STP Sludge	Cr, Pb, Benzene, Chloroform	Pb	--	As, Cd, Cr, Cu, Pb, Ni, Zn
	78	Hadnot Point Industrial Area	Solvents	Benzene, VOC, Toluene, Cr, Fe, Pb, Mn O&G	--	--	--
2	1	French Creek Liquids Disposal Area	Waste Battery Acid, POL	Cd, Cr, Pb, O&G	Cr, O&G, Phenol	--	Cr, O&G, Phenol
	73	Courthouse Bay Liquids Disposal Area	Waste Battery Acid, POL, Waste Oils	Cd, Cr, Pb, O&G, Phenol	Cu	--	Cd, Cr, Pb
3	2	Former Nursery/Day Care Center	Pesticides, DDT	VOC, Pesticides	Pesticides	Pesticides	Pesticides
	6	Storage Lots 201 and 203	DDT, PCBs	VOC	--	Pesticides	Pesticides
	69	Rifle Range Chemical Dump	Pesticides, DDT, PCBs	VOC	VOC, BHC	--	Pesticides
	74	Mess Hall Grease Disposal Area	Pesticides, PCBs	Aldrin	--	Pesticides	--
4	9	Firefighting Training Pit at Piney Green Road	JP-4, JP-5, Waste Oils	Cr, Pb	--	--	--
	16	Montford Point Burn Dump	Waste Oils, Solid Waste	--	--	--	--
	28	Hadnot Point Burn Dump	Solid Waste, Industrial Waste	As, Cr (+6), Cr, Pb, Ni, VOC, Pesticides, O&G	BHC	--	As, Cd, Cr, Ni, Se, Zn, Pesticides, O&G
	30	Sneads Ferry Road Fuel Tank Sludge Area	POL, Solvents, Fuel Tank Sludges	Pb, O&G	--	--	O&G
	35	Camp Geiger Area Fuel Farm	POL, Mogas	Pb, VOC, O&G, TCE	--	Pb, O&G	Pb, O&G
	36	Camp Geiger Area Dump Near Sewage Treatment Plant	Waste Oils, Solvents, Industrial Waste	Cd, Cr, Pb, O&G, Phenol	Pb	--	Cr, Pb, O&G, Phenol
	41	Camp Geiger Dump Near Former Trailer Park	POL, Waste Oils, Solvents, Solid Waste, Industrial Waste	Cd, Cr(+6), Cr, Pb, O&G, Phenol	VOC, Aldrin, O&G, Phenol	--	Cr(+6), Cr, Pb, 2,4,6-TNT, O&G, Phenol
86	Tank Area AS419 - AS421	POL, Waste Oils, Solvents	TCE	--	--	--	
5	48	MCAS New River Mercury Dump Site	Mercury	--	--	Mercury	--

\*Previously designated as Operable Unit No. 1.

Figure 3-2

### **3.2.1 Advantages of Operable Units Based on Material Disposed and Contaminants Detected**

Operable units based on this method would have the following advantages:

- Sites with potentially similar waste/contaminant characteristics could be investigated concurrently.
- Sites could be remediated concurrently.
- Sites could potentially be remediated with similar treatment technologies.

### **3.2.2 Disadvantages of Operable Units Based on Material Disposed and Contaminants Detected**

Operable units based on this method would have the following disadvantages:

- Sites could be located far from each other and in different drainage basins. For example, Site Nos. 1 and 73, which were used for similar disposal activities, and have similar contaminants, are located approximately five miles apart.
- The determination of the OUs would be based on available information on waste and contaminant characteristics which may not be entirely accurate. It is possible that two or more sites do not exhibit similar types of environmental problems even though they are reported to have similar waste histories. This could defeat the purpose of studying these sites together in an attempt to use similar treatment methods and technologies.

### **3.3 Individual Site Operable Units**

The third proposed method of determining OUs for the 18 RI/FS sites is based on assigning each site as an individual OU. Using this method, each site would be designated as a separate OU, with the exception of Site Nos. 21, 24 and 78, which have already been designated as OU No. 1, and Site Nos. 6 and 9, which are being studied together at present.

This proposed method of determining OUs resulted in a list of 15 potential OUs, which are presented in Table 3-3. Figure 3-3 shows the location of these potential OUs.

### **3.3.1 Advantages of Individual Site Operable Units**

Operable units based on this method would have the following advantages:

- Separate RODs could be issued for each site, resulting in remedial action being implemented at more sensitive or problematic sites on a fast-track basis.
- It may be easier to prioritize the sites in terms of specific requirements, such as environmental impacts, budget constraints, etc.
- Concurrent RI/FS activities could be conducted at multiple sites, even though they are considered or listed as two separate OUs.

### **3.3.2 Disadvantages of Individual Site Operable Units**

Operable units based on this method would have the following disadvantage:

- The larger number of OUs, when compared to other proposed prioritization methods, may result in increased engineering and program administration costs associated with the greater number of documents which would be required (RI/FS studies, RODs, remedial design packages), and the amount of coordination, number of meetings, etc. that would be required.
- Site Nos. 21, 24, and 78 have already been grouped together and designated as OU No. 1.

### **3.4 Watershed Based Operable Units**

The last proposed method of determining OUs for the 18 RI/FS sites is based on determining common watersheds. Sites on which surface water drainage discharges to the same drainage basin or stream would be grouped together as on OU.

**TABLE 3-3****POTENTIAL INDIVIDUAL SITE OPERABLE UNITS**

Operable Unit No.	Site No.	Site Description
1*	21	Transformer Storage Lot 140
	24	Industrial Area Fly Ash Dump
	78	Hadnot Point Industrial Area
2	6	Storage Lots 201 and 203
	9	Firefighting Training Pit at Piney Green Road
3	1	French Creek Liquids Disposal Area
4	2	Former Nursery/Day-care Center
5	16	Montford Point Burn Dump (1958-1972)
6	28	Hadnot Point Burn Dump
7	30	Sneads Ferry Road - Fuel Tank Sludge Area
8	35	Camp Geiger Area Fuel Farm
9	36	Camp Geiger Area Dump Near Sewage Treatment Plant
10	41	Camp Geiger Dump Near Former Trailer Park
11	48	MCAS New River Mercury Dump Site
12	69	Rifle Range Chemical Dump
13	73	Courthouse Bay Liquids Disposal Area
14	74	Mess Hall Grease Disposal Area
15	86	Tank Area AS419 - AS421

\* Previously designated as Operable Unit No. 1

Figure 3-3

Using this proposed method to determine OUs, a list of nine potential OUs was developed, which are presented in Table 3-4. Figure 3-4 shows the locations of these potential OUs.

#### **3.4.1 Advantages of Watershed Based Operable Units**

Operable units based on this method would have the following advantages:

- Sites could be investigated concurrently, since contaminant migration may impact common aquifers or surface waters.
- Sites with contamination affecting the same local groundwater aquifer or stream could potentially be remediated together, thereby potentially minimizing costs and time.

#### **3.4.2 Disadvantages of Watershed Based Operable Units**

Operable units based on this method would have the following disadvantages:

- Some sites within the same drainage basin may not have common waste or contaminant characteristics with other sites. This may make it more difficult to remediate the OU because multiple remediation techniques may be necessary.
- Sites within the same drainage basin could still be located far from each other, which may make remediation activities more difficult to plan and implement. For example, Site Nos. 16 and 48, which are both located near the New River, are separated by the river and are more than four miles apart by road.

**TABLE 3-4**

**POTENTIAL WATERSHED BASED OPERABLE UNITS**

Operable Unit No.	Site No(s).	Name	Watershed
1	21 24 78	Transformer Storage Lot 140 Industrial Area Fly Ash Dump Hadnot Point Industrial Area	Gogdels Creek to French Creek to New River
2	1 28	French Creek Liquids Disposal Area Hadnot Point Burn Dump	Gogdels Creek to French Creek to New River
3	2	Former Nursery/Day Care Center	Overs Creek to Northeast Creek
4	6 9 74	Storage Lots 201 & 203 Firefighting Training Pit at Piney Green Road Mess Hall Grease Disposal Area	Wallace Creek Bearhead Creek
5	16 48	Montford Point Burn Dump MCAS New River Mercury Dump Site	New River
6	35 36 41 86	Camp Geiger Area Fuel Farm Camp Geiger Area Dump near Sewage Treatment Plant Camp Geiger Dump near Former Trailer Park Tank Areas AS419 - AS421	Brinson Creek Tank Creek
7	30	Sneads Ferry Road Fuel Tank Sludge Area	French Creek
8	69	Rifle Range Chemical Dump	New River
9	73	Courthouse Bay Liquids Disposal Area	New River

Figure 3-4

#### **4.0 SUMMARY OF SELECTED OF OPERABLE UNITS**

In accordance with Task 8 of CTO 0086, issued by LANTDIV, Baker has made a preliminary prioritization of the OUs for the 18 RI/FS sites at Marine Corps Base Camp Lejeune, North Carolina. This prioritization was based on a review of existing information on the sites and is intended to fulfill USEPA's requirements for remediating sites in terms of Operable Units.

Baker accomplished this task by initially considering four options for prioritizing the sites: 1) geography (relative locations of the sites), 2) materials disposed and contaminants detected at the sites, 3) separate OU for each site, and 4) sites in common drainage areas.

After developing and reviewing the various matrices and tables developed by examining the four proposed prioritizing options, Baker has determined that there are significant disadvantages associated with each of the options which precludes any one of them as being the clearly superior prioritization option. However, we did note some similarities in the four potential prioritization methods. Most obvious is that some of the sites which are located near each other are also in the same drainage basin, and in one case (Site Nos. 35, 36, 41, and 86) have common waste and contaminant characteristics. In addition, this prioritization method confirmed that a number of the sites have unique waste characteristics, or other factors, which warrant individual investigation. Finally, Site Nos. 21, 24, and 78 have already been designed as OU No. 1, and RI/FS Project Plans are being developed for Site Nos. 6, 9, 48, and 69.

Based on our review of these items, Baker has concluded that a more viable alternative is to base the OU prioritization on a set of criteria which take into account the similarities of some of the sites, and the unique characteristics of other sites. This method of prioritization would allow more flexibility in defining the OU's based on a number of criteria, as opposed to trying to group sites according to one criteria.

Therefore, the recommended OUs are based on prioritizing the sites according to the following criteria:

- Sites previously designated as OUs by LANTDIV and/or USEPA.
- Sites which are currently being considered for immediate RI/FS activities.
- Sites which are remotely located and/or have unique site characteristics.

- Sites which are located near each other and have one or more common waste or contaminant characteristics.
- Sites which are located in the same watershed and/or have the same ecology.

Table 4-1 presents the recommended OUs based the above criteria. The prioritization resulted in nine potential OUs. As additional information on the sites becomes available, the listed criteria for determining the OUs can be modified. The recommended OUs are shown on Figure 4-1.

TABLE 4-1

**RECOMMENDED OPERABLE UNITS FOR  
MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA**

Operable Unit No.	Site No(s).	Name	Primary Reasons for OU Selection
1	21, 24, 78	Hadnot Point Industrial Area	Previously designated as Operable Unit No. 1.
2	6	Storage Lots 201 and 203	Sites are located near each other.
	9	Firefighting Training Pit at Piney Green Road	Sites are currently undergoing RI/FS activities (development of RI/FS Project Plans).
3	48	MCAS New River Mercury Dump Site	Unique characteristics of the site involving the disposal of mercury, which is highly toxic and bioaccumulates.
4	69	Rifle Range Chemical Dump	Unique characteristics of the site involving the disposal of chemical wastes generated on the base.
5	2	Former Nursery/Day Care Center	Similar characteristics of materials disposed (pesticides).
	74	Mess Hall Grease Disposal Area	Sites are located near each other.
6	35	Camp Geiger Area Fuel Farm	Similar characteristics of materials disposed (POL, waste oils, solvents) and contaminants detected (metals, VOCs, O&G). Sites are located in the Brinson Creek and Tank Creek watershed.
	36	Camp Geiger Area Dump near Sewage Treatment Plant	
	41	Camp Geiger Dump near Former Trailer Park	
	86	Tank Area AS419 - AS421	
7	1	French Creek Liquids Disposal Area	Sites are located near each other and are located in the French Creek watershed. Similar contaminants detected (metals, O&G).
	28	Hadnot Point Burn Dump	
	30	Sneads Ferry Road Fuel Tank Sludge Area	
8	16	Montford Point Burn Dump	Isolated site which requires additional site investigation.
9	73	Courthouse Bay Liquids Disposal Area	Isolated site.

Figure 4-1

## 5.0 REFERENCES

"Initial Assessment Study of Marine Corps Base Camp Lejeune, North Carolina," UIC-M67001, Water and Air Research, Inc., April, 1983.

"Site Summary Report - Final, Marine Corps Base Camp Lejeune, North Carolina," Contract No. N62470-83-B-6101, Environmental Science and Engineering, Inc., September, 1990.

"Final Site Management Plan for Marine Corps Base Camp Lejeune, North Carolina, Fiscal Year 1992," Contract No. N62470-90-B-7629, Halliburton NUS, January, 1992.

"Federal Facilities Agreement Between USEPA, Region IV, DEHNR, and United States Department of the Navy for Marine Corps Base, Camp Lejeune and Marine Corps Base, New River, North Carolina," December 6, 1989.

**Appendix A**  
**Disposed Materials and**  
**Contaminant Detected Matrices**

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S.O. No. 19086

Subject: CAMP LeJEUNE - OPERABLE UNITS

MATERIALS DISPOSED AT

EACH SITE

Computed by DPJ

Checked By RPW

Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Drawing No. \_\_\_\_\_

Date 3.16.92

**Baker**

S.O. No. \_\_\_\_\_

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**Baker**

APPENDIX A-1

SITE		LOCATION		MATERIALS DISPOSED																					
No.	DESCRIPTION	SE	WE	WASTE BATTERY ACID	POL	PESTICIDES	ME-TALS	DDT	PCB	JP-4 JP-5	WASTE OILS	ASBESTOS	TRANS-FORMER OIL	SOL VENTS	WTP STP SLUDGE	SOLID WASTE GARBAGE	INDUST. WASTE	FUEL TANK SLUDGES	MOGAS	MIREX	ORID-NANCE	MERCURY	CHEM-AGENT TEST KITS	FLY ASH CINDER	MALA-THION
1	FRENCH CREEK LIQUIDS DISPOSAL AREA	37	87	X	X		X																		
2	FORMER NURSEERY DAY-CARE CENTER	44	85			X		X																	X
6	STORAGE LOTS 201 & 203	41	87				X	X	X																
9	FIRE FIGHTING TRAINING PIT AT PINEY GREEN RD	40	87				X			X	X			X											
16	MONTFORD POINT BURN DUMP	45	79								X	X				X									
21	TRANSFORMER STORAGE LOT 140	39	86					X	X				X												
24	INDUSTRIAL AREA FLY ASH DUMP	38	87				X							X	X									X	
28	HADNOT POINT BURN DUMP	36	85				X									X	X								
30	SNEADS FERRY ROAD - FUEL TANK SLUDGE AREA	32	90		X									X				X							
35	CAMP GEIGER AREA FUEL FARM	46	76		X														X						
36	CAMP GEIGER AREA DUMP NEAR STP	46	76								X			X	X	X	X								
41	CAMP GEIGER DUMP NEAR FORMER TRAILER PK	44	73		X						X			X		X	X			X	X				
48	MCAS NEW RIVER MERCURY DUMP SITE	44	77																			X			
69	RIFLE RANGE CHEMICAL DUMP	29	77			X		X	X					X									X		X
73	COURTHOUSE BAY LIQUIDS DISPOSAL	30	82	X	X						X														
74	MESS HALL GREASE DISPOSAL AREA	43	86			X			X							X									
78	HADNOT POINT INDUSTRIAL AREA 19, 21, 24	39	86											X											

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S.O. No. 19086-56

Subject: CAMP LEJEUNE - OPERABLE UNITS

SEDIMENT Sheet No. \_\_\_\_\_ of \_\_\_\_\_

CONTAMINANTS DETECTED Drawing No. \_\_\_\_\_

Computed by DPS Checked By RPW Date 3.18.92

**Baker**

S.O. No. \_\_\_\_\_

Subject: \_\_\_\_\_

Sheet No. \_\_\_\_\_ of \_\_\_\_\_

Drawing No. \_\_\_\_\_

Computed by \_\_\_\_\_ Checked By \_\_\_\_\_ Date \_\_\_\_\_

**Baker**

APPENDIX A-4

NO.	SITE DESCRIPTION	METALS										VOC						ORGANOCHLORINE PESTICIDES (OCP)													TOTAL PHE-NOLS	ORGANOCHLORINE HERBICIDES (OCI)					
		As	Cd	Cr <sup>6</sup>	Cr <sup>T</sup>	Cu	Pb	Ni	Se	Zn	ACRO-LEIN	PARA-ZENE	CHLORO BENZENE	CHLORO FORM	1,2 DCE	1,1 DCE	T,1,2 DCE	1,2 DCP	ETHYL B	Methylene Chloride	1,1,1 TCE	TOLUENE	ALD ZIN	BHC	CHLOR DANE	DDD	DDE	DDT	DIEL DRIN	ENDRIN		HEP TA CHLOR	D,GT	2,4-D	2,4,5-T		
1	FRENCH CREEK LIQUIDS DISPOSAL AREA				X																												X	X			
2	FORMER NURSERY DAY-CARE CENTER																										X	X	X								
6	STORAGE LOTS 201 & 203																										X	X									
9	FIREFIGHTING TRAINING PIT AT PINEY GREEN RD.																																				
16	MONTFORD POINT BURN DUMP																																				
21	TRANSFORMER STORAGE LOT 140																																				
24	INDUSTRIAL AREA FLY ASH DUMP	X	X		X	X	X	X		X																											
28	HADNOT POINT BURN DUMP	X	X		X			X	X	X																X	X	X						X			
30	SNEADS FERRY RD FUEL TANK SLUDGE AREA																																	X			
35	CAMP GEIGER AREA FUEL FARM									X																								X			
36	CAMP GEIGER AREA DUMP NEAR STP				X		X																											X	X		
41	CAMP GEIGER DUMP NEAR FORMER TRAILER PK			X	X		X																											X	X		
48	MLAS NEW RIVER MERCURY DUMP SITE																																				
69	RIFLE RANGE CHEMICAL DUMP																									X	X										
73	COURTHOUSE BAY LIQUIDS DISPOSAL		X		X		X																											X	X		
74	MESS HALL GREASE DISPOSAL AREA																																				
78	HADNOT POINT INDUSTRIAL AREA (9, 21, 24)																																				

- ① 1,2 DICHLOROETHANE
- ② 1,1 DICHLOROETHYLENE
- ③ T-1,2 DICHLOROETHENE
- ④ 1,2 DICHLOROPROPANE
- ⑤ ETHYLBENZENE
- ⑥ 1,1,1 TRICHLOROETHANE

