03.05-11/23/93-02259

FINAL

INTERIM REMEDIAL ACTION REMEDIAL INVESTIGATION/ FEASIBILITY STUDY PROJECT PLAN

OPERABLE UNIT NO. 10
(SITE 35 - CAMP GEIGER AREA FUEL FARM)

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0160

Prepared for:

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

Under:

LANTDIV CLEAN Program
Contract N62470-89-D-4814

Prepared by:

BAKER ENVIRONMENTAL, INC.
Coraopolis, Pennsylvania

NOVEMBER 23, 1993

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

This document is the Interim Remedial Action Remedial Investigation/Feasibility Study (Interim Remedial Action RI/FS) Project Plan for the investigation and evaluation of impacted soil at Operable Unit No. 10, Site 35 - Camp Geiger Area Fuel Farm (Site 35), Marine Corps Base (MCB), Camp Lejeune, North Carolina. The Interim Remedial Action RI/FS Project Plan has been prepared by Baker Environmental, Inc. (Baker) for presentation to the Department of the Navy (DoN), Naval Facilities Engineering Command, Atlantic Division (LANTDIV) under Navy CLEAN Contract Number N62470-89-D-4814, Contract Task Order (CTO) 0160. This Interim Remedial Action RI/FS Project Plan includes the Work Plan, Health and Safety Plan (HASP), Sampling and Analysis Plan (SAP), and the Quality Assurance Project Plan (QAPP).

This Interim Remedial Action RI/FS Project Plan has been prepared in accordance with the requirements delineated in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for remedial investigation/feasibility study and selection of remedy (40 CFR 300.430). The NCP regulations were promulgated under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) commonly referred to as Superfund, and amended by the Superfund Amendments and Reauthorization Act (SARA) signed into law on October 17, 1986. The United States Environmental Protection Agency's (USEPA's) reference entitled Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988) has been utilized to prepare this document.

1.1 Purpose of the Interim Remedial Action RI/FS

The purpose of the Interim Remedial Action RI/FS is to gather data to support an Interim Remedial Action on petroleum hydrocarbon impacted soil at Site 35. A full RI/FS at Site 35 will be executed as a separate study to evaluate conditions of other site media including groundwater, surface water, as well as soil that may be found to be impacted by contaminants other than petroleum hydrocarbons. Draft and Draft Final versions of the full RI/FS Project Plans have been prepared (Baker, 1993). According to the proposed schedule, it is anticipated that field activities for the full RI/FS at Site 35 will begin in late February 1994.

An Interim Remedial Action RI/FS that is focused on petroleum hydrocarbon impacted soil at the site was deemed necessary by LANTDIV because:

- The existing site conditions potentially expose nearby human populations, animals, or food chains to toxic substances, pollutants, or contaminants.

- High levels of toxic substances or pollutants or contaminants in soils are largely at or near the surface that may migrate.

The above factors are especially prevalent in the topographically lower lying areas along Brinson Creek and the drainage channels, located off "F" Street and north of the Fuel Farm, which discharge to Brinson Creek. The history of the site includes references to a petroleum product spill and underground conduit leak across the site and observations of free product along these drainage channels. Near surface contamination in this area is suspected based on observations from recent site visits by LANTDIV and Baker staff. These observations included noticeable fuel odors and a visible fuel sheen on the Brinson Creek water surface when sediments were disturbed.

In addition to the above factors, a portion of Site 35 west of Brinson Creek has been identified by the North Carolina Department of Transportation (NCDOT) as right-of-way for a proposed highway. Construction of the highway is tentatively scheduled to commence following remediation of contaminated soils. The highway construction would reportedly involve excavation and work in areas identified as containing contaminated soils, and therefore, require remediation prior to construction.

1.2 Objective of the Interim Remedial Action RI/FS Project Plan

The objective of the Interim Remedial Action RI/FS Project Plan is to identify and describe the tasks required to implement the Interim RI/FS for Operable Unit No. 10 (Site 35). The activities and field investigations designed to obtain the additional data needed to evaluate the feasibility of various alternatives for the remediation of petroleum hydrocarbon impacted soils and to support a qualitative Risk Assessment (RA) of existing petroleum hydrocarbon impacted soil conditions at Site 35 are also described. A full RI/FS at Site 35 is scheduled to be initiated in the field in late February 1994.

2.0 BACKGROUND

This section provides a brief overview of pertinent MCB, Camp Lejeune (also referred to as "the Activity") and Site 35 background information. A more complete review of background information is provided in the Final RI/FS Work Plan for Site 35 (Baker, 1993).

2.1 Location and Setting

MCB, Camp Lejeune is located in Onslow County, North Carolina. The Activity covers approximately 170 square miles and is bordered to the east by the Atlantic Ocean, to the west by U.S. Route 17 and to the north by North Carolina Route 24. The City of Jacksonville, North Carolina is located north of the Base (see Figure 2-1).

Camp Geiger is located in the extreme northeast corner of the Activity. Its main entrance is off U.S. Route 17 about 3.5 miles southeast of the City of Jacksonville, North Carolina. Site 35, the Camp Geiger Area Fuel Farm refers primarily to five, 15,000-gallon aboveground storage tanks (ASTs), a pump house, and a fuel unloading pad at the corner of Fourth and "G" Streets (see Figure 2-2).

2.2 History

Construction of MCB, Camp Lejeune, including Camp Geiger dates to the early 1940's. MCB, Camp Lejeune has been designated as the "Worlds Most Complete Amphibious Training Base". Site 35 remains active as a fuel depot, primarily serving the nearby New River Marine Corps Air Station. Over the years, Site 35 has dispensed gasoline, kerosene, diesel, and No. 6 oil.

Reports of a gasoline leak in an underground distribution line at Site 35 date back to 1957-58 (ESE, 1990). The leak resulted in an estimated loss of thousands of gallons of product which migrated toward Brinson Creek. Interceptor trenches were excavated and the captured fuel was ignited and burned as was the product which discharged into Brinson Creek.

Another reported leak apparently occurred more recently (dates unknown) and involved a buried distribution line. The leaking line, which was subsequently sealed and replaced, reportedly resulted in a loss of over 30 gallons per day over an unspecified period (Law, 1993).

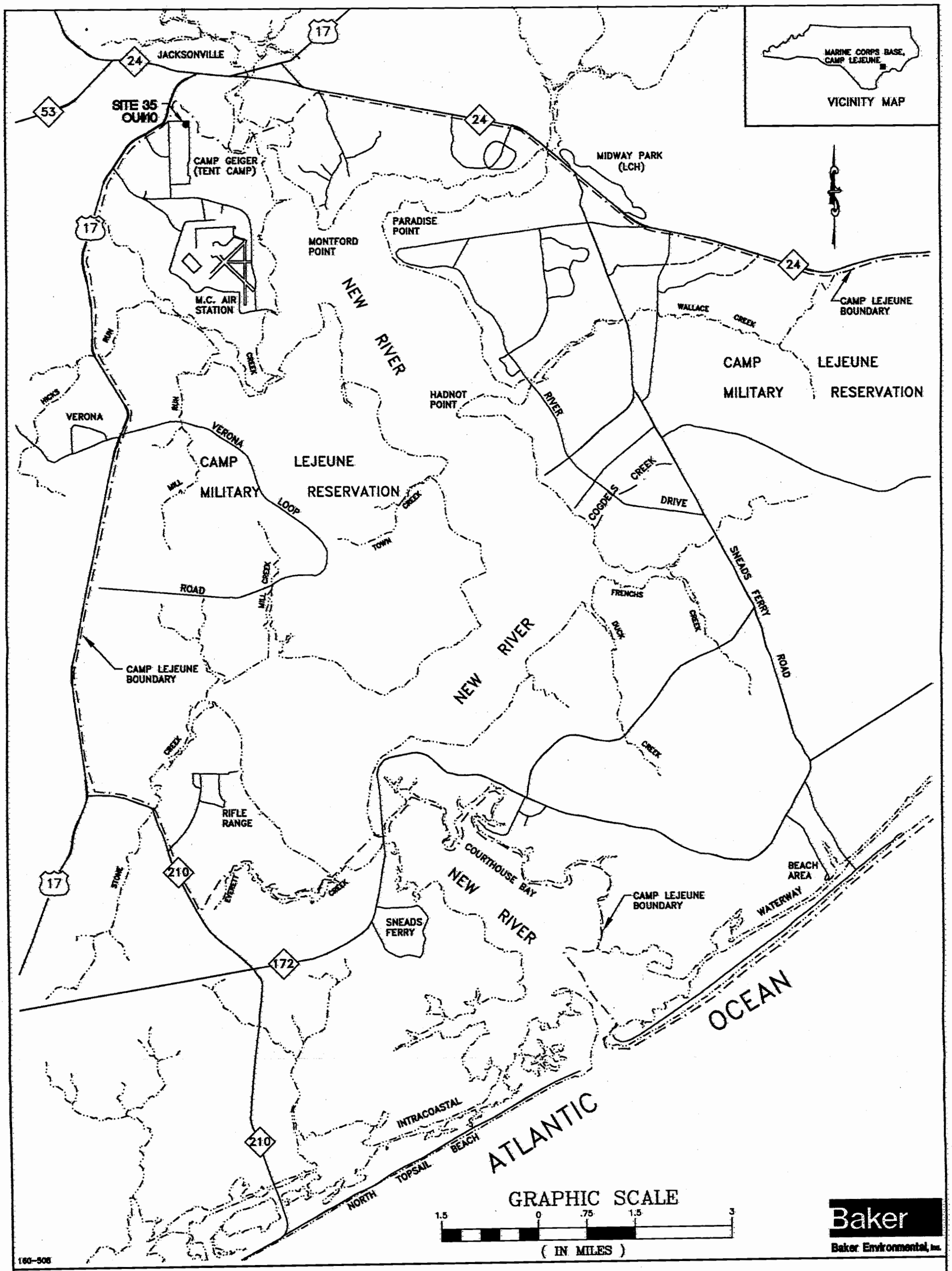
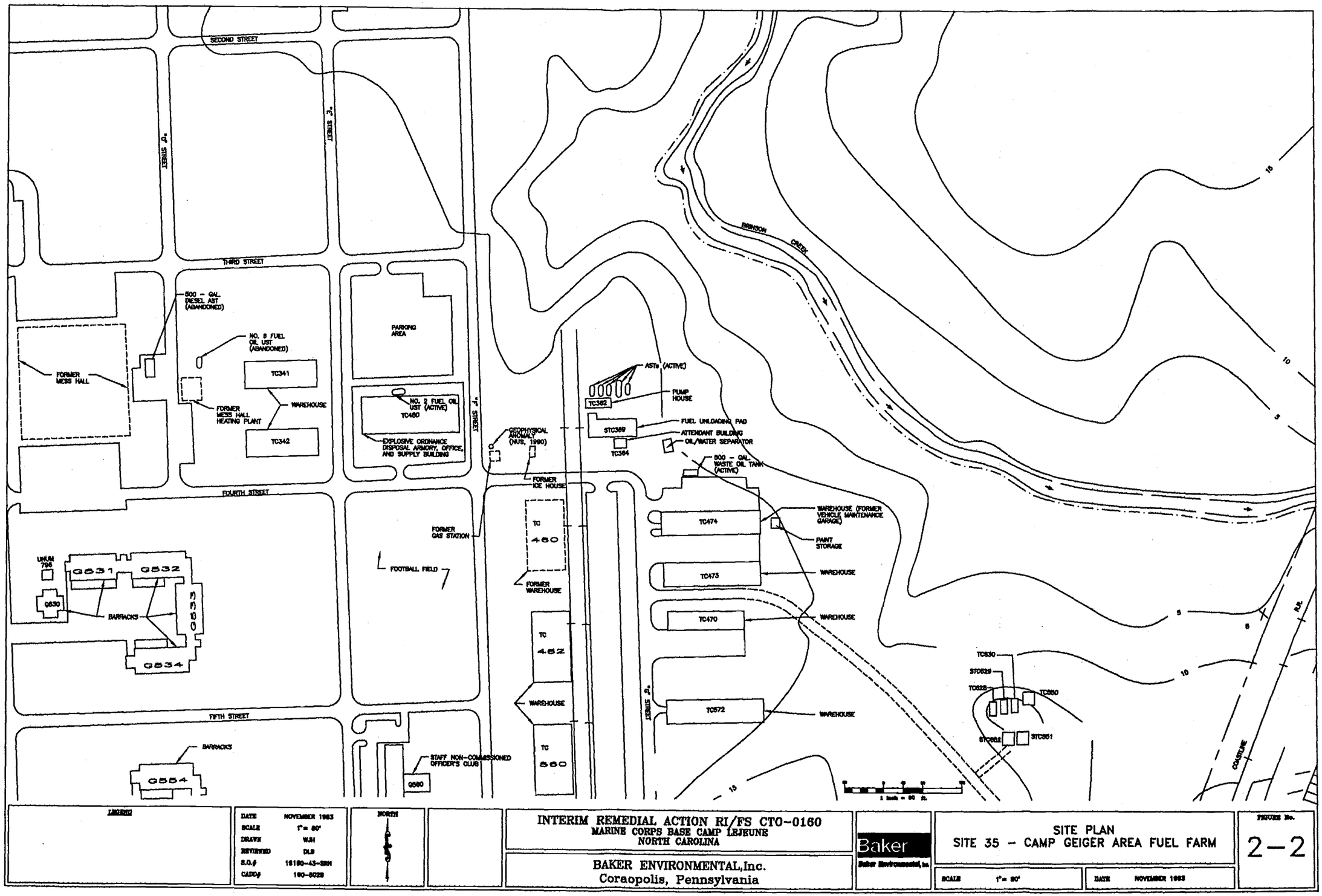


FIGURE 2-1
CAMP LEJEUNE AND SITE 35
LOCATION MAP

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

022595012


SECOND STREET
"D" STREET
"E" STREET
"F" STREET
THIRD STREET
FOURTH STREET
FIFTH STREET
500 - GAL. DIESEL AST (ABANDONED)
NO. 8 FUEL OIL UST (ABANDONED)
FORMER MESS HALL
TC341
WAREHOUSE
FORMER MESS HALL HEATING PLANT
TC342
PARKING AREA
NO. 2 FUEL OIL UST (ACTIVE)
TC480
EXPLOSIVE ORDNANCE DISPOSAL ARMORY, OFFICE, AND SUPPLY BUILDING
GEOPHYSICAL ANOMALY (NUS, 1990)
FORMER ICE HOUSE
FORMER GAS STATION
FOOTBALL FIELD
TC 460
FORMER WAREHOUSE
TC 462
WAREHOUSE
TC 560
BARRACKS
G554
STAFF NON-COMMISSIONED OFFICER'S CLUB
G560
UNUM 796
G531
G532
G533
G534
G530
BARRACKS
ASTs (ACTIVE)
PUMP HOUSE
TC382
FUEL UNLOADING PAD
ATTENDANT BUILDING
OIL/WATER SEPARATOR
STC369
TC384
500 - GAL. WASTE OIL TANK (ACTIVE)
TC474
WAREHOUSE (FORMER VEHICLE MAINTENANCE GARAGE)
PAINT STORAGE
TC473
WAREHOUSE
TC470
WAREHOUSE
TC572
WAREHOUSE
BRINSON CREEK
TC630
STC629
TC628
TC650
STC652
STC651
COASTLINE
1 inch = 80 ft.
LEGEND
DATE NOVEMBER 1993
SCALE 1" = 80'
DRAWN W.H
REVIEWED DLB
S.O.# 1816O-43-SRH
CADD# 160-5028
NORTH
INTERIM REMEDIAL ACTION RI/FS CTO-0160
MARINE CORPS BASE CAMP LEJEUNE
NORTH CAROLINA
BAKER ENVIRONMENTAL,Inc.
Coraopolis, Pennsylvania
Baker
Baker Environmental, Inc.
SITE PLAN
SITE 35 - CAMP GEIGER AREA FUEL FARM
SCALE 1" = 80'
DATE NOVEMBER 1993
FIGURE No.
2-2

02259022

In April 1990, a fuel spill occurred at Site 35 that required the excavation and disposal of over 20 cubic yards of soil. It was speculated at the time that the spill resulted from an unauthorized dumping of an undetermined volume of diesel or jet fuel (Wilmington Morning Star, 1990).

2.3 Site Geology and Hydrogeology

Site 35 is underlain by layers of silty sand with interbedded layers of clayey sand, coarse sand and gravel. Site investigations to date have provided subsurface stratigraphic data to a depth of 44.5 feet. Shallow groundwater generally occurs at 8 to 10 feet below ground surface (bgs) across most of the site and at lesser depths where the topography slopes towards Brinson Creek. A low permeability zone of soil occurs at roughly 35 to 44 feet bgs. This zone has been reported (Law, 1992) to be a confining zone between the water table aquifer and the underlying Castle Hayne aquifer. The Castle Hayne aquifer is the principle water supply aquifer in the region.

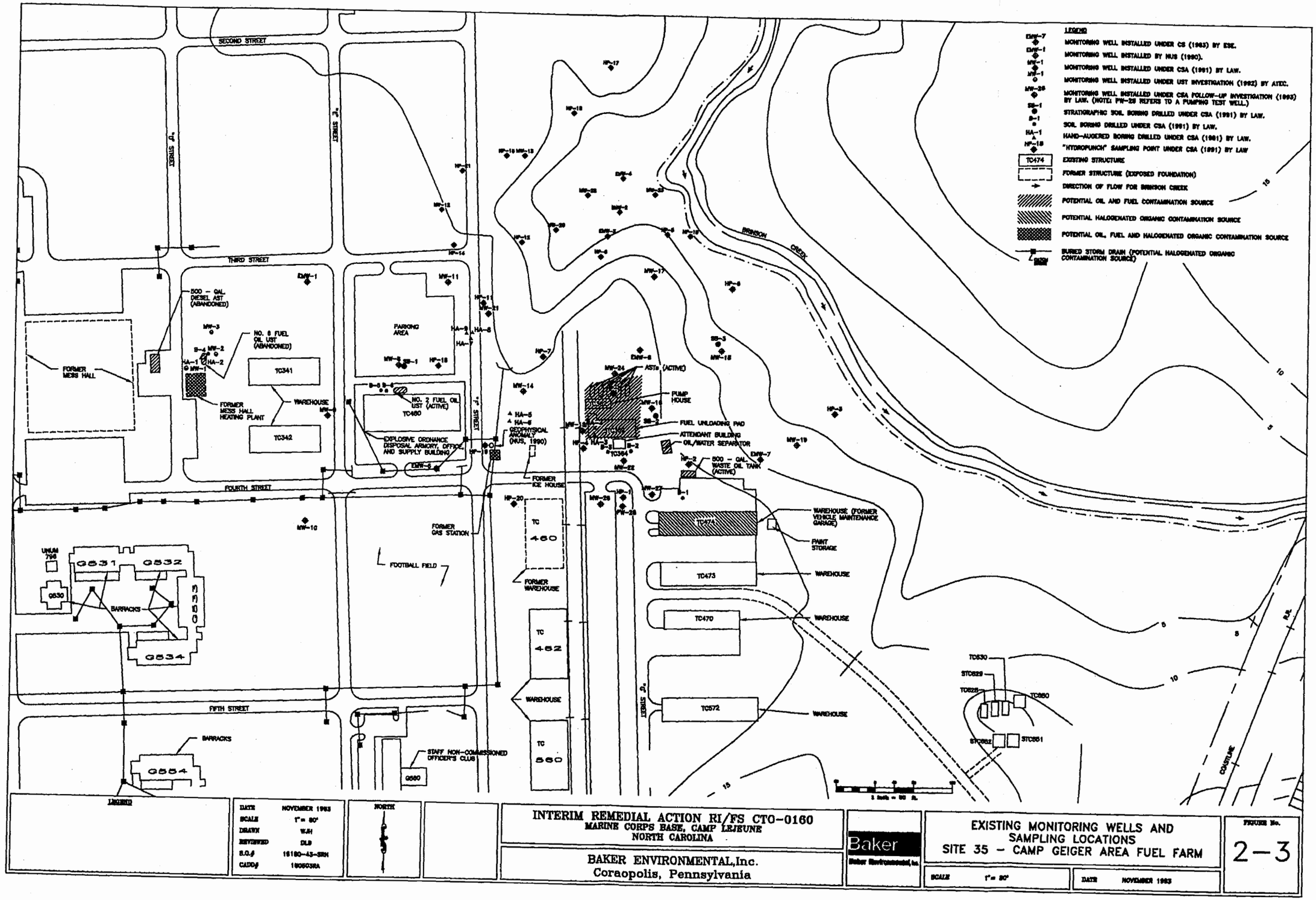
2.4 Results of Previous Investigations

Previous investigations performed at Site 35 include the following:

- Initial Assessment Study (IAS) by Water and Air Research, Inc. (WAR), dated 1983;
- Confirmation Study (CS) by Engineering Science and Environmental, Inc. (ESE), dated 1990;
- Focused Feasibility Study (FFS) by NUS Corporation (NUS), dated 1990;
- Comprehensive Site Assessment (CSA) by Law Engineering, Inc. (LAW), dated 1992; and,
- Addendum to the CSA by Law, dated 1993.

The locations of various data points (i.e., monitoring wells, soil borings, etc.) from previous investigations are depicted in Figure 2-3.

The results of the investigations performed to date identify areas of elevated petroleum hydrocarbon constituents in both soil and groundwater at Site 35. The petroleum hydrocarbons encountered in these


LEGEND
MONITORING WELL INSTALLED UNDER CS (1983) BY ESE.
MONITORING WELL INSTALLED BY NUS (1990).
MONITORING WELL INSTALLED UNDER CSA (1991) BY LAW.
MONITORING WELL INSTALLED UNDER UST INVESTIGATION (1992) BY ATEC.
MONITORING WELL INSTALLED UNDER CSA FOLLOW-UP INVESTIGATION (1993) BY LAW. (NOTE: PW-2S REFERS TO A PUMPING TEST WELL.)
STRATIGRAPHIC SOIL BORING DRILLED UNDER CSA (1991) BY LAW.
SOIL BORING DRILLED UNDER CSA (1991) BY LAW.
HAND-AUGERED BORING DRILLED UNDER CSA (1991) BY LAW.
"HYDROPUNCH" SAMPLING POINT UNDER CSA (1991) BY LAW
EXISTING STRUCTURE
FORMER STRUCTURE (EXPOSED FOUNDATION)
DIRECTION OF FLOW FOR BRINSON CREEK
POTENTIAL OIL AND FUEL CONTAMINATION SOURCE
POTENTIAL HALOGENATED ORGANIC CONTAMINATION SOURCE
POTENTIAL OIL, FUEL AND HALOGENATED ORGANIC CONTAMINATION SOURCE
BURIED STORM DRAIN (POTENTIAL HALOGENATED ORGANIC CONTAMINATION SOURCE)
SECOND STREET
"J" STREET
"E" STREET
THIRD STREET
FOURTH STREET
FIFTH STREET
"F" STREET
BRINSON CREEK
500 - GAL. DIESEL AST (ABANDONED)
NO. 8 FUEL OIL UST (ABANDONED)
FORMER MESS HALL
FORMER MESS HALL HEATING PLANT
TC341
WAREHOUSE
TC342
PARKING AREA
NO. 2 FUEL OIL UST (ACTIVE) TC480
EXPLOSIVE ORDNANCE DISPOSAL ARMORY, OFFICE AND SUPPLY BUILDING
GEOPHYSICAL ANOMALY (NUS, 1990)
ASTs (ACTIVE)
PUMP HOUSE
FUEL UNLOADING PAD
ATTENDANT BUILDING
OIL/WATER SEPARATOR
TC364
500 - GAL. WASTE OIL TANK (ACTIVE)
FORMER ICE HOUSE
FORMER GAS STATION
FOOTBALL FIELD
FORMER WAREHOUSE
TC 460
TC 462
TC 560
WAREHOUSE (FORMER VEHICLE MAINTENANCE GARAGE)
PAINT STORAGE
TC474
TC473
TC470
TC572
WAREHOUSE
UNUM 798
Q531
Q532
Q533
Q534
Q530
BARRACKS
Q554
Q560
STAFF NON-COMMISSIONED OFFICER'S CLUB
TC630
STC629
TC628
TC660
STC652
STC651
CONTOUR
DATE NOVEMBER 1993
SCALE 1" = 80'
DRAWN WJH
REVIEWED DLB
B.O.# 16180-43-SRH
CADD# 18050SRA
NORTH
INTERIM REMEDIAL ACTION RI/FS CTO-0160
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA
BAKER ENVIRONMENTAL, Inc.
Coraopolis, Pennsylvania
Baker
Baker Environmental, Inc.
EXISTING MONITORING WELLS AND SAMPLING LOCATIONS
SITE 35 - CAMP GEIGER AREA FUEL FARM
SCALE 1" = 80'
DATE NOVEMBER 1993
FIGURE No.
2-3

02259S03Z

media are the result of past operations and uncontrolled releases of oil and fuel at the site. The extent of contaminated soil was identified in the CSA (Law, 1992). The extent of reported unsaturated zone soil contamination is depicted in Figure 2-4.

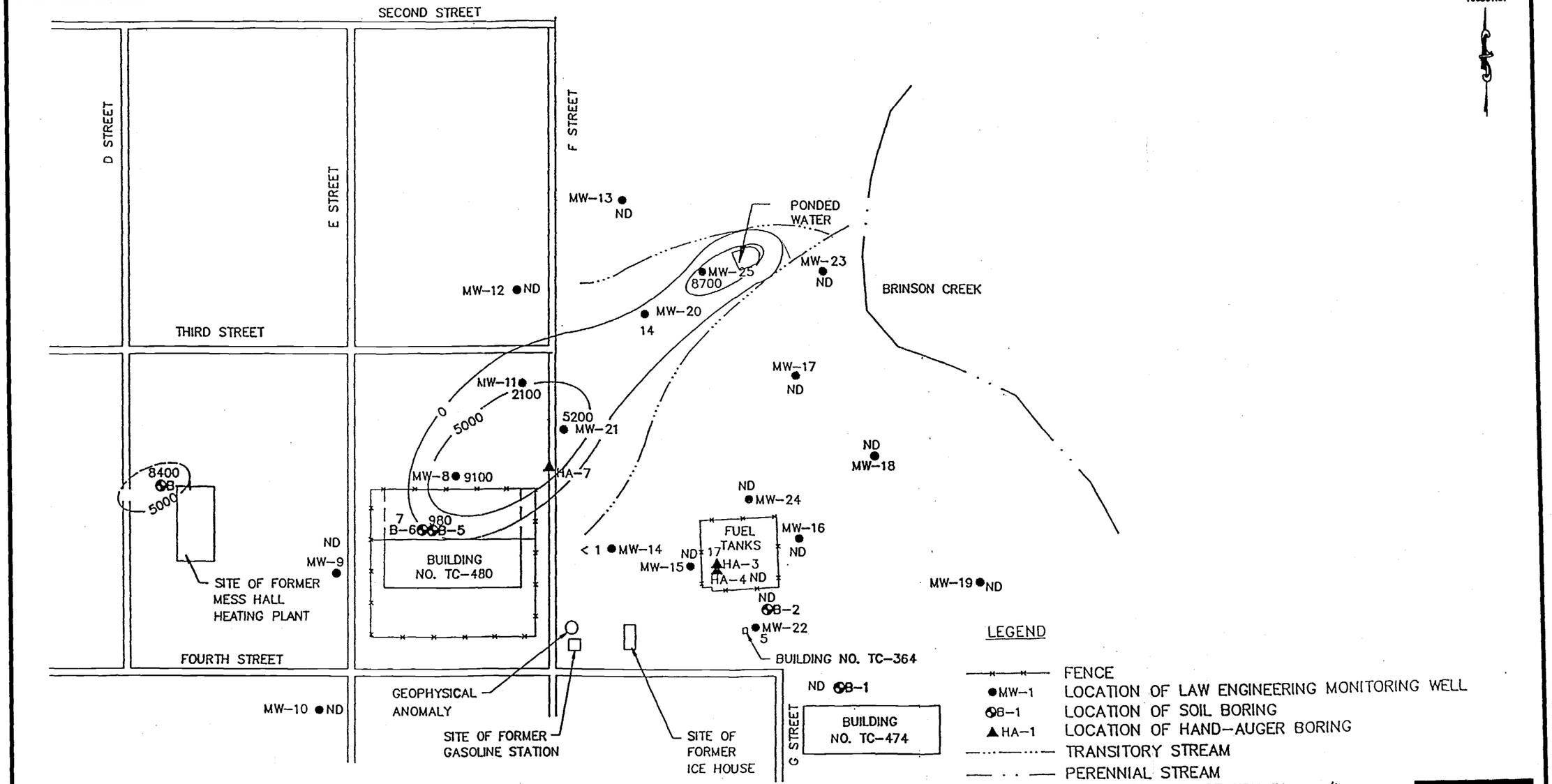
In addition to petroleum hydrocarbons, elevated levels of halogenated organics were encountered in shallow groundwater samples at the site. The origin of these contaminants has not been determined to date. Soil samples from Site 35 were not analyzed for halogenated organic constituents under any of the previous investigations.

2.5 Evaluation of Existing Soil Data

Sufficient data appears to be available to afford an approximate delineation of the horizontal and vertical extent of petroleum hydrocarbon impacted soil at Site 35. Additional data along the drainage channels north of the active aboveground storage tanks (ASTs) and the topographically low Brinson Creek floodplain would be useful. Recent site walks in these areas by Baker and Camp Lejeune staff have resulted in reports of strong fuel odors which could be indicative of excessive contamination at levels in excess of those identified under previous investigations. The maximum total petroleum hydrocarbon (TPH) level reported in soil to date was 9,100 ppm which occurred in a sample obtained from 7.5 to 8 feet bgs from boring MW-8 (Law, 1992). Soils with TPH content at levels in the range of five to 10 percent by volume (50,000 to 100,000 ppm) may adversely impact the cost and/or applicability of various remedial alternatives. That is, in these ranges cost premiums are sometimes applied by technology vendors (i.e., thermal desorption, biotreatment) because treatment periods are required to be extended. Detected levels of TPH encountered to date have been well below the five percent lower bound. Additional soil samples need to be obtained in the lower reaches of the site near Brinson Creek to ensure that higher levels of TPH impacted soil are not present in this area where spilled materials are likely to have drained and possibly accumulated.

As indicated previously, the analysis of soil samples obtained to date under previous investigations performed at Site 35 were limited to TPH (via EPA Methods 5030, 3550, and 9071) and lead via TCLP (Toxicity Characteristic Leaching Procedure). Analytical data pertaining to the possible presence of halogenated organic compounds such as TCE is needed particularly since these compounds have been identified in shallow groundwater samples previously obtained at the site. The presence of elevated levels of halogenated organic compounds or other metals, particularly heavy metals, can result in the technical elimination of different remedial options.

160501RA



Baker
Baker Environmental, Inc.

LEGEND

SOURCE: LAW ENGINEERING INC., NOV. 1991

150 0 75 150 300

1 inch = 150 ft.

FIGURE 2-4
EXISTING TPH SOIL CONTAMINATION
SITE 35 – CAMP GEIGER AREA FUEL FARM
INTERIM REMEDIAL ACTION RI/FS
CTO-0160
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

02259S04Z

Additionally, soil samples need to be obtained for analysis of RCRA characteristics (i.e., ignitability, corrosivity, reactivity, and full TCLP) so as to provide for the classification of the impacted soil as either hazardous or nonhazardous.

3.0 INTERIM REMEDIAL ACTION RI/FS WORK PLAN

The scope of work to be performed to execute the Interim Remedial Action RI/FS is presented in this section.

3.1 Task 1 - Project Management

The Interim Remedial Action RI/FS will be managed and staffed by the personnel identified in the full RI/FS Work Plan.

Mr. Daniel L. Bonk, P.E., will be responsible for the overall management of the project. Project management activities include daily technical support and guidance; budget and schedule review and tracking; preparation and review of invoices; personnel resources planning and allocation; and communication with LANTDIV and the Activity.

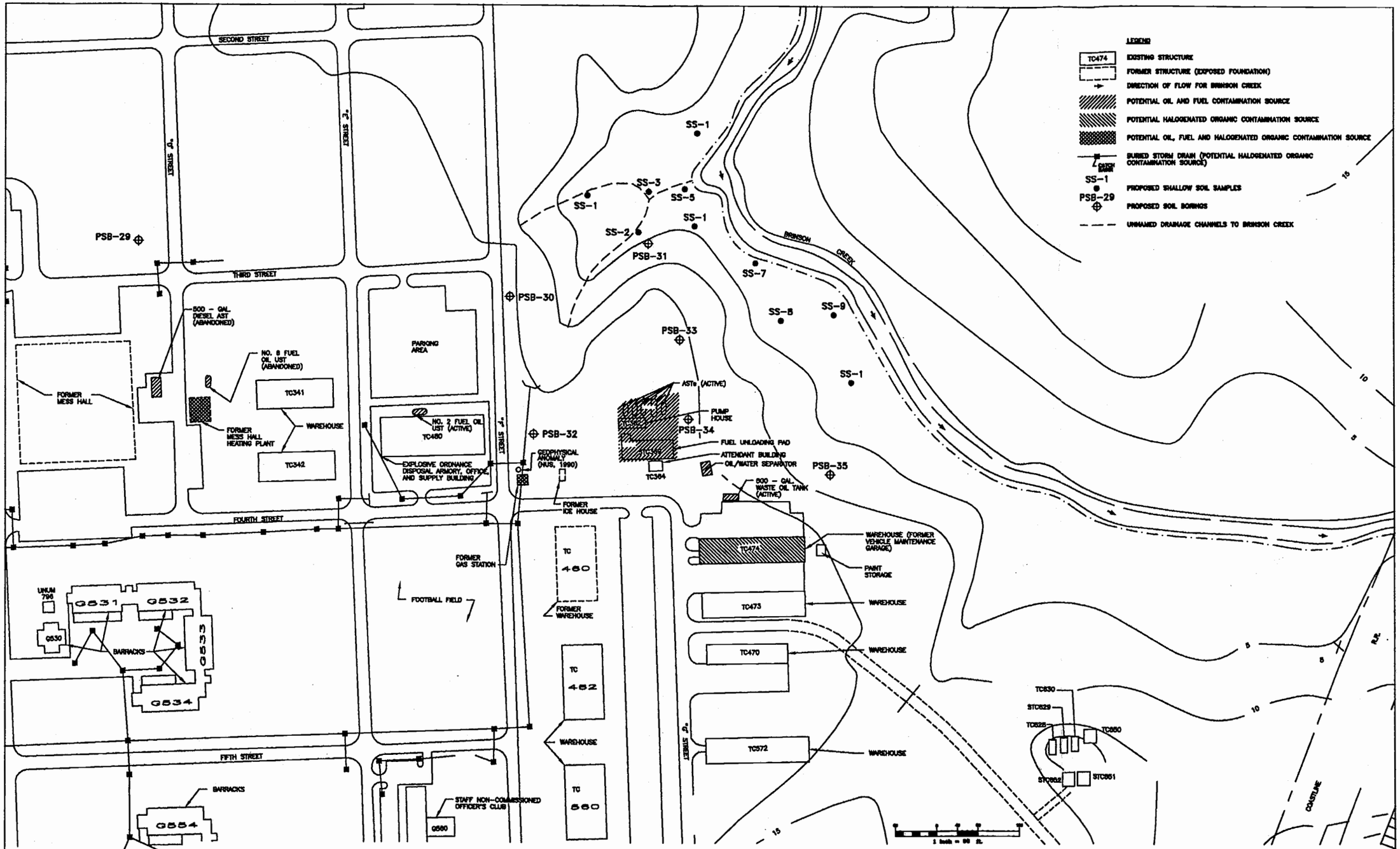
3.2 Task 2 - Subcontract Procurement

Task 2 involves the procurement of subcontractor services which, under the Interim Remedial Action RI/FS, are anticipated to include drilling, laboratory, and data validation services. In addition, subcontractors may be procured to execute laboratory bench-scale treatability studies, if it is determined that such studies are needed to evaluate the effectiveness of proposed treatment technologies.

3.3 Task 3 - Field Investigations

The field investigation activities included under the Interim Remedial Action RI/FS include soil boring and sampling. These activities are designed to provide data to augment the existing base of Site 35 soil data. Specific activities include:

- Installation of seven shallow soil borings (PSB-29 through PSB-35; see Figure 3-1) throughout the site to provide chemical analytical data regarding the presence, if any, of non-petroleum based organics and inorganics in the unsaturated soil zone (assumed to be 0 to 10 feet bgs approximately). The borings shall be advanced through the unsaturated soil zone to a depth of approximately 10 feet via hollow stem augers and sampled continuously via split-spoon. The soil samples shall be screened in the field via head-



DATE	NOVEMBER 1993
SCALE	1"= 60'
DRAWN	WJH
REVIEWED	DLB
B.O.#	10160-43-SSN
CADD#	180600RA

NORTH

INTERIM REMEDIAL ACTION RI/FS CTO-0160
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

BAKER ENVIRONMENTAL, Inc.
Coraopolis, Pennsylvania

Baker
Baker Environmental, Inc.

PROPOSED SAMPLING LOCATIONS
SITE 35 - CAMP GEIGER AREA FUEL FARM

SCALE 1"= 60' | DATE NOVEMBER 1993

FIGURE No.
3-1

02259505Z

space analysis using a photoionization detector (PID). The individual unsaturated zone sample with the highest PID reading and/or that is visually the most contaminated shall be packaged and shipped to an off-site laboratory for analysis (see Section 6.1 for detailed procedures).

- Obtaining shallow (6 to 12 inches bgs) soil samples (SS-1 through SS-10; see Figure 3-1) from along the topographically low areas west of Brinson Creek and from along the drainage channels located north of the active ASTs. The samples shall be obtained with shovels and hand trowels.

- Visually assess subsurface soil conditions in the lower lying area near Brinson Creek by excavating shallow trenches with a backhoe.

The above field investigations will result in a total of 17 soil samples (not including QA/QC samples) under the Interim Remedial Action RI/FS. All of the samples identified for shipment to an off-site laboratory shall be analyzed for TCL volatile and semi-volatile organics (Level III data quality), TAL inorganics (Level III data quality), and TPH (via EPA Methods 5030, 3550, 8015, and 9071 as per North Carolina guidelines). In addition, two samples will be obtained for analysis of RCRA hazardous waste characteristics (e.g., corrosivity, ignitability, and reactivity and full TCLP).

3.4 Task 4 - Sample Analysis and Validation

Task 4 involves efforts relating to the following post-field sampling activities:

- Sample management
- Laboratory analysis
- Data validation

The data package to be provided by the laboratory will be Level III. This level of QA/QC is appropriate in this case because this data is needed primarily to aid in the evaluation of remedial alternatives. Level IV data will be obtained under the full RI/FS and, when combined with the data obtained under previous

investigations, will be sufficient to characterize the nature and extent of contamination at the site and to evaluate the risk to human health and the environment. Level III data will be validated per the CLP criteria as outlined in the following documents:

- National Functional Guidelines for Organic Data Review, USEPA, 1991.
- National Validation Functional Guidelines for Inorganic Data Review, USEPA, 1988.

3.5 Task 5 - Data Evaluation

The additional data obtained under the Interim Remedial Action RI/FS will be combined with the existing soil data obtained under previous investigations and evaluated in total. It is not anticipated that data will be available from the full RI/FS for inclusion under this task.

3.6 Task 6 - Risk Assessment

Under the Interim Remedial Action RI/FS, a qualitative risk assessment will be performed to identify receptors and approximate the level of environmental risk posed by soil contamination at Site 35. It is anticipated that acceptable soil clean-up action levels for TPH contamination can be established using recently published North Carolina guidelines (NCDEHNR, 1993). A quantitative risk assessment will be performed under the full RI/FS that will be used in conjunction with EPA and NCDEHNR input as a basis for establishing soil clean-up action levels for any non-TPH contamination, if encountered in the soil.

3.7 Task 7 - Treatability Study/Pilot Testing

Under the Interim Remedial Action RI/FS, Baker will conduct a thorough survey of landfill operators and technology vendors, particularly those local to the site, to determine whether the data available is sufficient to afford the technical and cost evaluation of various remedial alternatives. It is anticipated that the survey will include multiple (3 to 10) landfill operators including industrial (i.e., RCRA Subtitle C) and hazardous waste (RCRA Subtitle D) landfills; biological treatment contractors; low temperature thermal treatment contractors; incineration contractors; and soil recyclers. Based on the feedback provided by the survey participants, it will be determined whether or not a treatability study(s) is needed to provide data for the

evaluation of a specific technology(s). In addition, this feedback will provide data to afford a determination as to whether such a treatability study(s) can be performed at contractors' cost by contractors who are interested in demonstrating their technology or whether the treatability study(s) needs to be performed independently under Task 7.

3.8 Task 8 - Interim Remedial Action RI Report

Baker will prepare an Interim Remedial Action RI Report using all relevant existing data/information as well as the information collected as part of this interim field investigation. A Draft, Draft Final, and Final version of the Interim Remedial Action RI Report will be submitted.

3.9 Task 9 - Remedial Alternatives Screening

This task includes the efforts necessary to select the remedial alternatives that appear feasible and require full evaluation. This task begins during data evaluation when sufficient data are available to initiate the screening of potential technologies. For reporting and tracking purposes, this task is defined as complete when a final set of alternatives is chosen for detailed evaluation.

3.10 Task 10 - Remedial Alternatives Evaluation

This task involves the detailed analysis and comparison of alternatives using the following criteria:

- Threshold Criteria:
  - Overall Protection of Human Health and the Environment
  - Compliance with ARARs
- Primary Balancing Criteria:
  - Long-Term Effectiveness and Permanence
  - Reduction of Toxicity, Mobility, and Volume Through Treatment
  - Short-Term Effectiveness
  - Implementability
  - Cost

- Modifying Criteria: State and EPA Acceptance

  Community Acceptance

3.11 Task 11 - Interim Remedial Action FS Report

This task covers the preparation of Draft, Draft Final, and Final Interim Remedial Action FS Reports. This task ends when the Final Interim Remedial Action FS Report is submitted.

3.12 Task 12 - Post Interim Remedial Action RI/FS Support

This task involves the technical and administrative support to LANTDIV to prepare a Draft, Draft Final, and Final Responsiveness Summary, Proposed Interim Remedial Action Plan, and Interim Remedial Action Record of Decision. These documents will be prepared using applicable EPA guidance.

3.13 Task 13 - Meetings

This task involves providing technical support to LANTDIV during the Interim Remedial Action RI/FS. It is anticipated that the following meetings will be required:

- A meeting at the offices of the North Carolina Department of Transportation (NCDOT) in Raleigh to discuss the proposed Interim Remedial Action RI/FS.
- A TRC meeting to present the findings of the Interim Remedial Action RI/FS.
- A public meeting to present the proposed Interim Remedial Alternative (this meeting will be scheduled to occur on the same day as the TRC meeting).
- A meeting between Baker and LANTDIV to discuss the results of the investigation following the submission of the Draft Interim Remedial Action RI Report.

3.14 Task 14 - Community Relations

This task includes providing support to LANTDIV during the public meetings identified in Task 13. This support includes the preparation of fact sheets, meeting minutes, coordination with Camp Lejeune EMD in contacting local officials and media, and the procurement of a stenographer.

4.0 SCHEDULE

It is estimated that the Interim Remedial Action RI/FS will require approximately 9 months to complete beginning with the final acceptance of this Interim Remedial Action RI/FS Project Plan. The schedule for implementing the Interim Remedial Action RI/FS is provided in Figure 4-1. This schedule is dependent on receiving notice-to-proceed by December 1, 1993.

Figure 4 - 1

Interim Remedial Action RI/FS Schedule
Site 35 (Operable Unit No. 10) - MCB Camp Lejeune, NC

Task	Days	Start	Finish
RI/FS	**258ed**	**12/1/93**	**8/16/94**
Notice to Proceed/Mobilization	14ed	12/1/93	12/15/93
Field Investigation	7ed	12/15/93	12/22/93
Data Analysis/Validation	56ed	12/22/93	2/16/94
Data Evaluation	70ed	12/22/93	3/2/94
Risk Assessment	7ed	3/2/94	3/9/94
Prepare Draft Interim Remdial Action RI/FS and PRAP	35ed	3/2/94	4/6/94
Submit Draft Interim Remedial Action RI/FS and PRAP	0ed	4/6/94	4/6/94
Agency Review	30ed	4/6/94	5/6/94
Prepare Draft Final Interim Remedial Action RI/FS and PRAP	30ed	5/6/94	6/5/94
Submit Draft Final Interim Remedial Action RI/FS and PRAP	0ed	6/5/94	6/5/94
Agency Review	21ed	6/5/94	6/26/94
Prepare Final Interim Remedial Action RI/FS and PRAP	21ed	6/26/94	7/17/94
Submit Final Interim Remedial Action RI/FS and PRAP	0ed	7/17/94	7/17/94
Public Comment Period	30ed	7/17/94	8/16/94

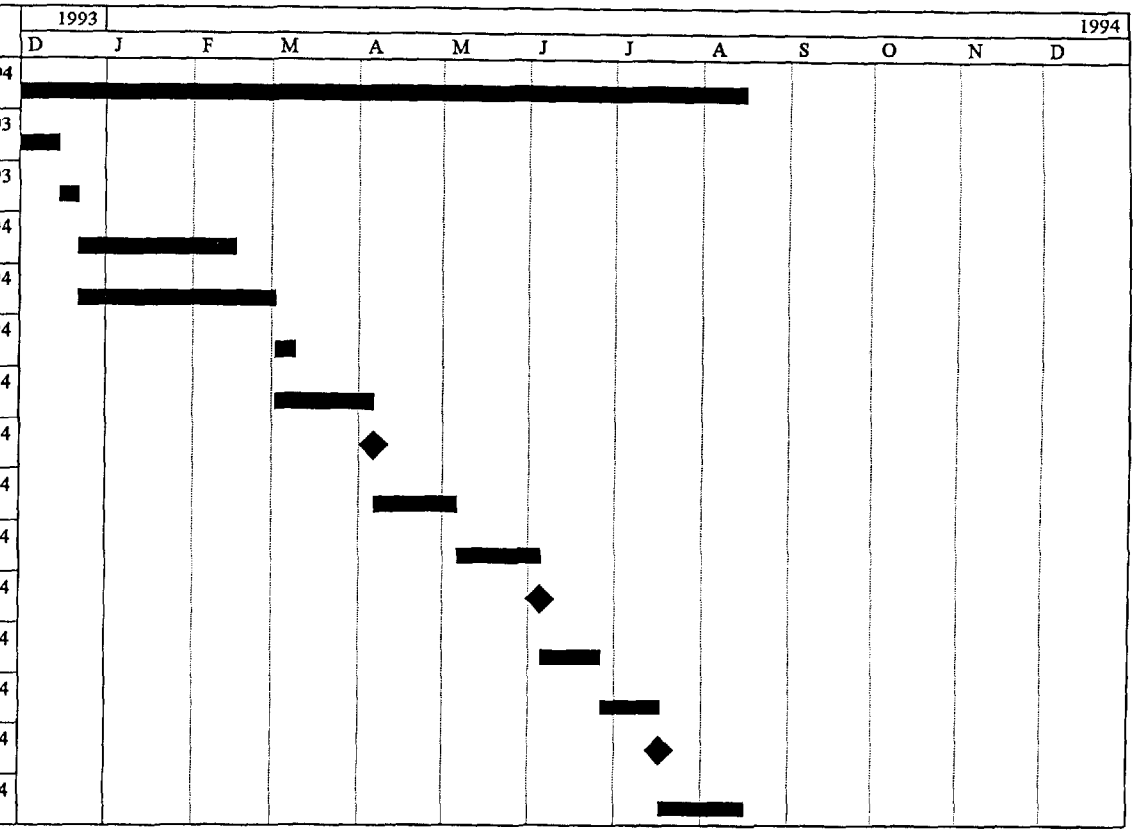
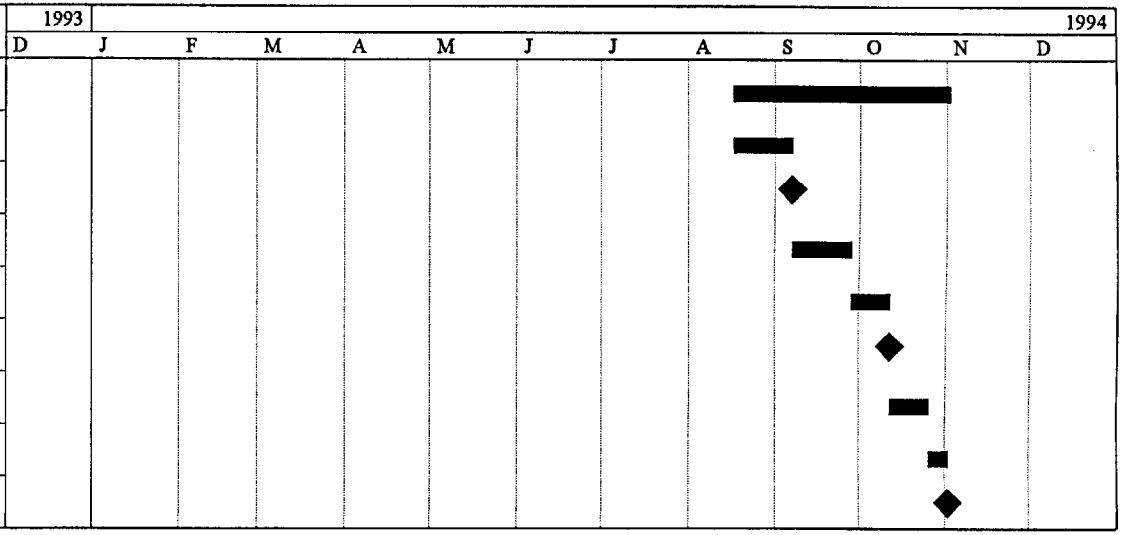


Figure 4 - 1
Interim Remedial Action RI/FS Schedule
Site 35 (Operable Unit No. 10) - MCB Camp Lejeune, NC

Task	Days	Start	Finish
ROD	**77ed**	**8/17/94**	**11/2/94**
Prepare Draft ROD	21ed	8/17/94	9/7/94
Submit Draft ROD	0ed	9/7/94	9/7/94
Agency Review	21ed	9/7/94	9/28/94
Prepare Draft Final ROD	14ed	9/28/94	10/12/94
Submit Draft Final ROD	0ed	10/12/94	10/12/94
Agency Review	14ed	10/12/94	10/26/94
Prepare Final ROD	7ed	10/26/94	11/2/94
Submit Final ROD	0ed	11/2/94	11/2/94



5.0 HEALTH AND SAFETY PLAN

A comprehensive Health and Safety Plan (HASP) was prepared under the full RI/FS (Baker, 1993). The provisions of that HASP are applicable to the field activities proposed under the Interim Remedial Action RI/FS. Consequently, the HASP prepared for the full RI/FS will be utilized for the Interim Remedial Action RI/FS.

6.0 SAMPLING AND ANALYSIS PLAN

This section details the sampling procedures to be followed during the field investigative activities of this Interim Remedial Action RI/FS. These procedures are limited to soil sampling via borings and with shovels and hand trowels

6.1 Soil Borings Advanced by Drilling Rig

Soil samples from borings advanced by a drilling rig will be collected using a split-spoon sampler. The borings will be advanced via 3-1/4-inch inside diameter (I.D.), hollow-stem augers. A 2-inch O.D. [1-3/8-inch inside diameter (I.D.)] standard split-spoon steel sampler will be utilized. The standard spoon is available in two common lengths providing either 20-inch or 26-inch longitudinal clearance for obtaining 18-inch or 24-inch long samples, respectively. Split-spoons capable of obtaining 24-inch long samples will be utilized during this investigation.

The procedures to be followed for soil sampling are as follows:

1. This split-spoon will be driven into unconsolidated materials using a drive weight (140 lbs.) connected to a drilling rig that is allowed to free fall a distance of 30 inches in accordance with ASTM D 1586-84. Each hammer drop is called a blow. The total number of blows required to drive the spoon each 6-inch interval over its 24-inch length will be recorded in a field log book.

2. Once recovered and brought to the ground surface, the sampler will be split open and undergo an initial screening with a photoionization detector (PID) or organic vapor analyzer (OVA). The physical characteristics of the sample will be recorded in a field log book by the site field geologist.

3. The center portion of the sample will be removed from the sampler and divided unequally with one portion equal to roughly 75 percent of the sample and the other portion equal to roughly 25 percent of the sample. The smaller portion will be placed in an 8-ounce glass jar, sealed with aluminum foil and the jar lid. The sample will remain undisturbed for 10 minutes upon which a head-space reading will be obtained via PID or OVA. The reading will be recorded in a field log book. The larger sample portion will be placed in a laboratory-prepared sample jar. The larger portion sample associated with the

smaller portion sample that exhibited the highest head-space reading will be submitted to the laboratory for analysis if no other soil samples obtained from the boring are visibly contaminated. If a sample is obtained that visibly exhibits a gross level of contamination but does not exhibit the highest PID or OVA reading and elevated PID readings are not exhibited by the other samples retrieved from the boring, the site field geologist will select, package, and ship the visibly contaminated sample. If both visibly contaminated soil samples and soil samples with elevated PID readings are encountered in the same boring, the site field geologist will have the discretion to select two samples for laboratory analysis to represent both conditions.

4. The above sampling procedure will be repeated for each sample obtained through the length of the boring which will be suspended upon encountering the saturated zone (8 to 10 feet bgs maximum estimated). Split-spoon samplers shall be decontaminated after each use.

5. All borings will be backfilled with grout upon completion of the borehole to the ground surface.

6.2 Shallow Soil Samples

Shallow soil samples will be obtained using shovels and hand trowels at locations marked on Figure 2-3 as SS-1 through SS-10. Decontaminated shovels will be used to expose the soil at the desired sampling depth (6 inches bgs). Decontaminated hand trowels will be used to obtain discrete soil samples. Samples to be tested for VOAs will be obtained first with every effort made to minimize sample disturbance. Additional soil will be homogenized to ensure sample representativeness. The samples will be transferred directly to the appropriate laboratory-clean sample containers.

6.3 Decontamination Procedures

The following procedures will be followed for decontaminating sampling utensils and large field equipment:

- Sampling Utensils (shovels, split-spoon sampler, hand trowels, and stainless-steel spoons)

  1. Wash utensils thoroughly with laboratory detergent and deionized water using a brush to remove any particulate matter or surface film.

2. Rinse thoroughly with deionized water.

3. Rinse thoroughly (to be applied with a paper towel) twice with solvent (pesticide-grade isopropanol).

4. Allow to air dry. (Note: A sufficient number of extra sampling utensils will be maintained at the site to ensure that sufficient time will be available for air drying.)

As the sampling under this Interim Remedial Action RI/FS may encounter oil, grease, or other hard to remove materials, it may be necessary to rinse the equipment several times with pesticide-grade acetone or hexane to remove the materials before proceeding to Step 1.

- Large Field Equipment

  The large field equipment such as the drilling rig, hollow-stem augers, and drill rods shall be cleaned and decontaminated before entering the designated drill site or between borings. All equipment shall be inspected before entering to ensure that no fluid leaks are present and that all gaskets and seals are intact.

  The drill rig, hollow-stem augers, and drill rods shall be pressure steam cleaned between boreholes to the satisfaction of the attending field geologist. A temporary decontamination pad will be constructed of wood and plastic so that decontamination fluids are not spilled on the ground surface. Further, decontamination fluids will be placed into 55-gallon drums and stored on site at a location designated by Camp Lejeune personnel.

6.4 Documentation

All pertinent sampling information such as soil description, sample depth, sample number, sample location, and time of sample collection shall be recorded in the field logbook.

6.5 Sample Handling

All samples will be label in accordance with Baker SOPs. Chain-of-custody records will be completed and maintained.

6.6 Investigation-Derived Waste (IDW) Handling

It is anticipated that all borehole cuttings and excess soil will be placed in USDOT-approved 55-gallon steel drums upon the completion of drilling. The drums will be sealed and marked with spray paint and a stencil kit to include the following information:

- Date
- Site No.
- Well or soil boring number
- Contaminants of concern (i.e., solvents, PCBs, metals, etc.)
- Type of IDW material (cuttings, drilling mud, purge water, decon fluids, etc.)

All drums will be placed at a central site location subject to the approval of Camp Lejeune personnel.

7.0 QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) addresses the quality assurance and quality control procedures that will be administered for sample collection and analysis for the Interim Remedial Action RI/FS. A comprehensive QAPP has been prepared under the full RI/FS (Baker, 1993). The provisions of the full RI/FS QAPP are applicable to the field activities proposed under this Interim Remedial Action RI/FS. A summary of the soil sampling program for this project is presented in Table 7-1.

7.1 Data Quality Objectives

Data Quality Objectives (DQOs) are quantitative statements developed by the data users to specify the quality of data needed from a particular data collection activity to support a specific decision. All samples for characterizing the site, or selecting remedial alternatives will be analyzed by the laboratory as Level III data.

7.2 Sample Custody Procedures

Sample custody procedures are developed from the publication entitled User's Guide to the Contract Laboratory Program, December 1988, OSWER Directive No. 9240.0-01. These procedures are in accordance with the publication entitled USEPA NEIC Policies and Procedure Manual, May 1978, revised November 1984, USEPA 530-78-001-R and Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, December 1980, QAMS-005/80. The objectives of sample documentation procedures are to: (1) ensure complete analysis of requested parameters within the required turnaround times; and, (2) document the sample from the point of collection to the final data report.

7.3 Analytical Procedures

The samples that will be collected during the investigation will be analyzed for TCL volatile and semi-volatile organics and TPH via EPA Methods 5030, 3550, 8015, and 9071. Compounds and the corresponding method performance limits are listed in the full RI/FS QAPP (Baker, 1993).

7.4 Quality Control Checks

Documentation of the analyses of the following types of QC samples is maintained in the laboratory bench notebooks and/or specific client or project files and includes:

TABLE 7-1

SUMMARY OF SOIL SAMPLING PROGRAM
SITE 35 - CAMP GEIGER AREA FUEL FARM
INTERIM REMEDIAL ACTION RI/FS
MCB CAMP LEJEUNE, NORTH CAROLINA

Sampling Location[1]	Sample Type	Number of Samples	Field Duplicates	MS/MSD	Equipment Rinsate	Field Blanks	Trip Blanks	Analyses	Containers per Sample	Container Type	Laboratory Turnaround
Fuel Farm Area (soil boring nos. PSB-29 through PSB-35)	Grab	7	1	1	1	1	1	TCL Volatiles	1	4 oz. glass	Routine[2]
	Grab	7	1	1	1	1	--	TCL Semivolatiles	1	8 oz. glass	Routine
	Grab	7	1	1	1	1	--	TAL Metals	1	8 oz. glass	Routine
	Composite	1	1	--	--	--	--	Total TCLP[3]	2	8 oz. glass	Routine
	Composite	1	1	--	--	--	--	RCRA Characteristics[4]	1	8 oz. glass	Routine
Floodplain west of Brinson Creek (surface soil sample nos. SS-1 through SS-10)	Grab	10	1	--	1	--	1	TCL Volatiles	1	4 oz. glass	Routine
	Grab	10	1	--	1	--	--	TCL Semivolatiles	1	8 oz. glass	Routine
	Grab	10	1	--	1	--	--	TAL Metals	1	8 oz. glass	Routine
	Composite	1	1	--	--	--	--	Total TCLP	2	8 oz. glass	Routine
	Composite	1	1	--	--	--	--	RCRA Characteristics	1	8 oz. glass	Routine

[1] See Figure 3-1 for proposed sampling locations.
[2] Routine analytical turnaround is 28 days following receipt of sample.
[3] Total TCLP = TCLP Volatiles, TCLP Semivolatiles, TCLP Pesticides/PCBs, and TCLP Metals.
[4] RCRA Hazardous Waste Characteristics of ignitability, corrosivity, and reactivity.

- Field duplicates
- Equipment rinsates
- Field blanks
- Trip blanks
- Method blanks
- Matrix spike/matrix spike duplicates

Frequency of performance for these QC samples is presented in the full RI/FS QAPP (Baker, 1993).

7.5 Laboratory Data Validation

A detailed quality assurance review will be performed by a data validation subcontractor to verify the qualitative and quantitative reliability of the data presented. The primary tools which will be used by the data validation personnel will be USEPA guidance documents, established criteria, and professional judgement.

7.6 Corrective Action

Corrective Action is taken whenever a non-conformance occurs. A non-conformance is defined as an event which is beyond the limits established for a particular operation by the plan. Nonconformances can occur in a number of activities. Such activities include sampling procedures, sample receipt, sample storage, sample analysis, data reporting, and computations.

7.7 Quality Assurance Reporting Procedures

The Project Manager will be responsible for assessing the performance of measurement systems and data quality related to the field investigation. A written record will be maintained of: the results of laboratory QC reports and other periodic assessments of measurement, data accuracy, precision, and completeness; performance and system audits; and any significant QA problems and recommended solutions. Each deliverable will contain a QA/QC assessment section. Also, a QA/QC assessment will be performed any time a significant problem is identified.

The Project Manager will keep in contact with the Navy Technical Representative through informal, verbal reports during the project as well as through monthly progress reports.

8.0 REFERENCES

ATEC, 1992. Underground Storage Tank Site Check, Investigation Report, Former Mess Hall Heating Plant. Marine Corps Base, Camp Lejeune, North Carolina.

Harned, D.A., Lloyd, O.B. Jr., and Treece, M.W. Jr., 1989. Assessment of Hydrologic and Hydrogeologic Data at Camp Lejeune Marine Corps Base, North Carolina. USGS. Water Resources Investigations Report 89–4096.

Law, 1992. Final Report, Underground Fuel Investigation, Camp Geiger Fuel Farm. Volumes I and II. Marine Corps Base, Camp Lejeune, North Carolina.

Law, 1993. Addendum to Report of Underground Fuel Investigation and Comprehensive Site Assessment. Camp Geiger Fuel Farm, Marine Corps Base, Camp Lejeune, North Carolina.

North Carolina Department of Environment, Health, and Natural Resources, 1993. Groundwater Section Guidelines for the Investigation and Remediation of Soils and Groundwater. March 1993.

U.S. Environmental Protection Agency, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Office of Emergency and Remedial Response, OSWER Directive 9355.3–01, October 1988.

Water and Air Research, Inc., 1983. Initial Assessment Study of Marine Corps Base, Camp Lejeune, North Carolina. Prepared for Naval Energy and Environmental Support Activity.

Wilmington Morning Star, 1990. "Fuel Spill Cleaned Up." Article from April 24, 1990, edition. Wilmington, North Carolina.