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FINAL

INTERIM PROPOSED REMEDIAL ACTION PLAN OPERABLE UNIT NO. 10 SITE 35 - CAMP GEIGER AREA FUEL FARM

MARINE CORPS BASE,
CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0160

JULY 20, 1994

Prepared For:

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

Under the:

LANTDIV CLEAN Program
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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR/TBC	applicable or relevant and appropriate requirement/to be considered (criteria)
AST	aboveground storage tank
Baker	Baker Environmental, Inc.
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COPC	contaminants of potential concern
CS	Confirmation Study
CSA	Comprehensive Site Assessment
cy	cubic yard
DON	Department of the Navy
ESE	Environmental Science and Engineering, Inc.
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FS	Feasibility Study
IAS	Initial Assessment Study
ICR	incremental cancer risk
IRP	Installation Restoration Program
MCB	Marine Corps Base
NC DEHNR	North Carolina Department of Environment, Health, and Natural Resources
NCP	National Contingency Plan
NPL	National Priorities List
NUS	Halliburton NUS Environmental Corporation
O&M	operation and maintenance
PRAP	Proposed Remedial Action Plan
RAA	remedial action alternative
RI	Remedial Investigation
ROD	Record of Decision
USEPA	United States Environmental Protection Agency

INTERIM PROPOSED REMEDIAL ACTION PLAN

Introduction

This Interim Proposed Remedial Action Plan (Interim PRAP) is issued to describe the Marine Corps Base (MCB) Camp Lejeune and the Department of the Navy's (DON's) preferred remedial action for petroleum hydrocarbon contaminated soil at Operable Unit No. 10 (Site 35 - Camp Geiger Area Fuel Farm) at MCB, Camp Lejeune, North Carolina.

MCB Camp Lejeune and the DON are issuing this Interim PRAP as part of the public participation responsibility established under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), and the Federal Facilities Agreement (FFA) between the DON, United States Environmental Protection Agency (USEPA) Region IV, and the North Carolina Department of Environment, Health, and Natural Resources (NC DEHNR).

MCB Camp Lejeune and the DON, with the assistance of USEPA Region IV and the NC DEHNR, will select an interim remedy for Operable Unit No. 10 only after the public comment period has ended and the information submitted during this time has been reviewed and considered. The Final Interim Record of Decision (Interim ROD) may recommend a different remedial action than is presented in this plan depending upon new information or public comments.

This Interim PRAP briefly summarizes information that can be found in greater detail in the Interim Remedial Action Remedial Investigation (RI) Report, the Interim Remedial Action Feasibility Study (FS) Report, and other documents referenced in the Interim Remedial Action RI and FS Reports prepared for Operable Unit No. 10. The DON encourages the public to review these other documents in order to gain a more comprehensive understanding of the sites. The administrative record file, which contains information on which the selection of the remedial action will be based, is available for public review at the Onslow County Library and at MCB Camp Lejeune, Building 67. The public is invited to review and comment on the administrative record and this Interim PRAP.

Operable Unit Description

Camp Lejeune is a training base for the U.S. Marine Corps, located in Onslow County, North Carolina. The Base covers approximately 236 square miles and includes 14 miles of coastline. MCB Camp Lejeune is bounded to the southeast by the Atlantic Ocean, to the northeast by State Route 24, and to the west by U.S. Route 17. The town of Jacksonville, North Carolina is located north of the Base (See Figure 1).

The study area, Operable Unit No. 10, is one of 13 operable units within MCB Camp Lejeune. An "operable unit" as defined by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) is a discrete action that comprises an incremental step toward comprehensively addressing site problems. 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. With respect to MCB Camp Lejeune, operable units were developed to combine one or more individual sites where Installation Restoration Program (IRP) activities are or will be implemented.

Camp Geiger is located at the extreme northwest corner of MCB, Camp Lejeune, Onslow County. The main entrance to Camp Geiger is off U.S. Route 17, approximately 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 situated within Camp Geiger just north of the intersection of Fourth and "G" Streets (See Figure 2).

Operable Unit Background History

Construction of Camp Geiger was completed in 1945, four years after construction of MCB, Camp Lejeune was initiated. Originally, the ASTs were used for the storage of No. 6 fuel oil, but, were later converted for storage of other petroleum products including unleaded gasoline, diesel fuel, and kerosene. The date of their conversion is not known. The ASTs currently in use at the site are reported to be the original tanks.

Routinely, the ASTs at Site 35 supply fuel to an adjacent dispensing pump. A leak in the underground line from the ASTs to the dispensing island was reportedly responsible for the

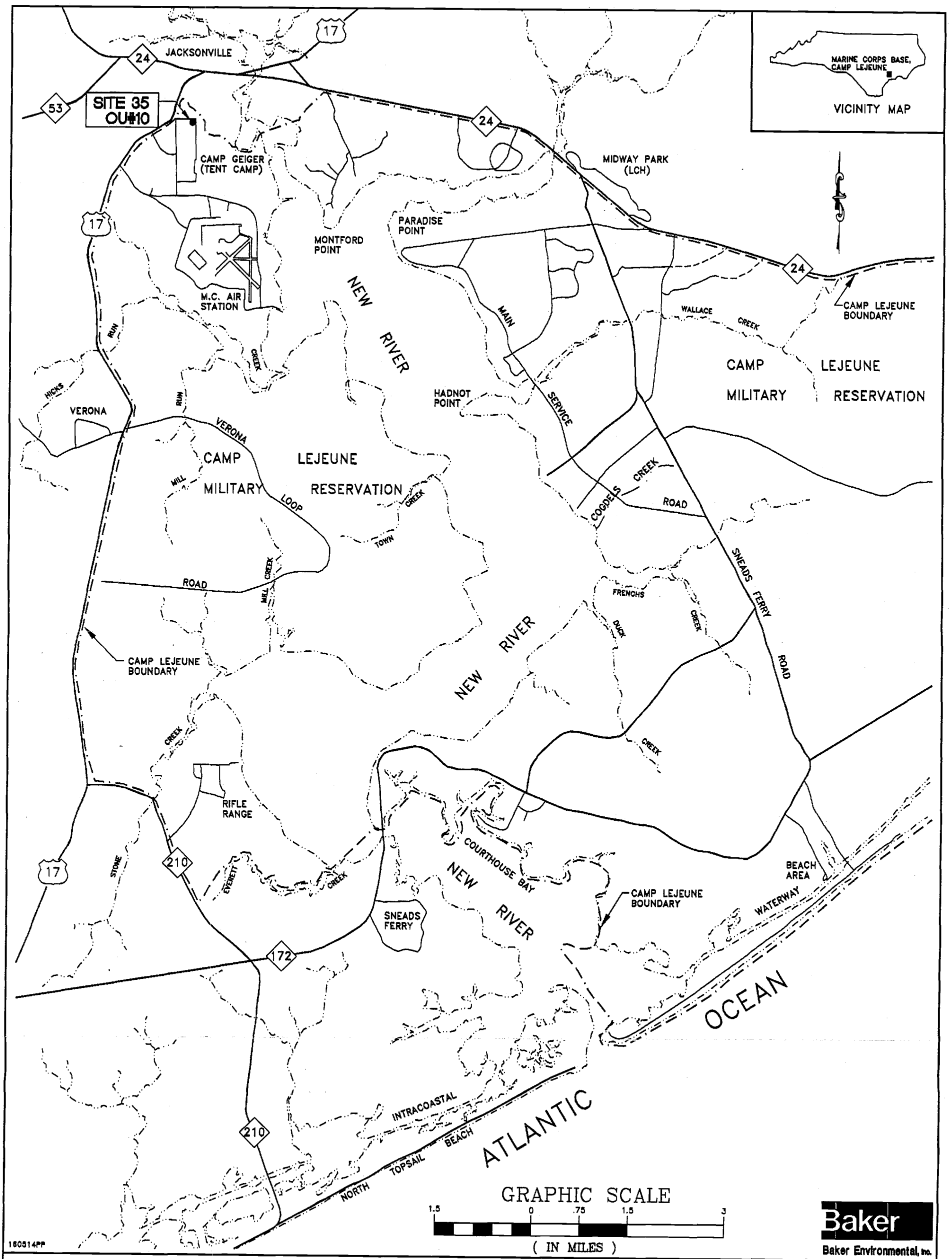

FIGURE 1
CAMP LEJEUNE AND SITE 35
LOCATION MAP

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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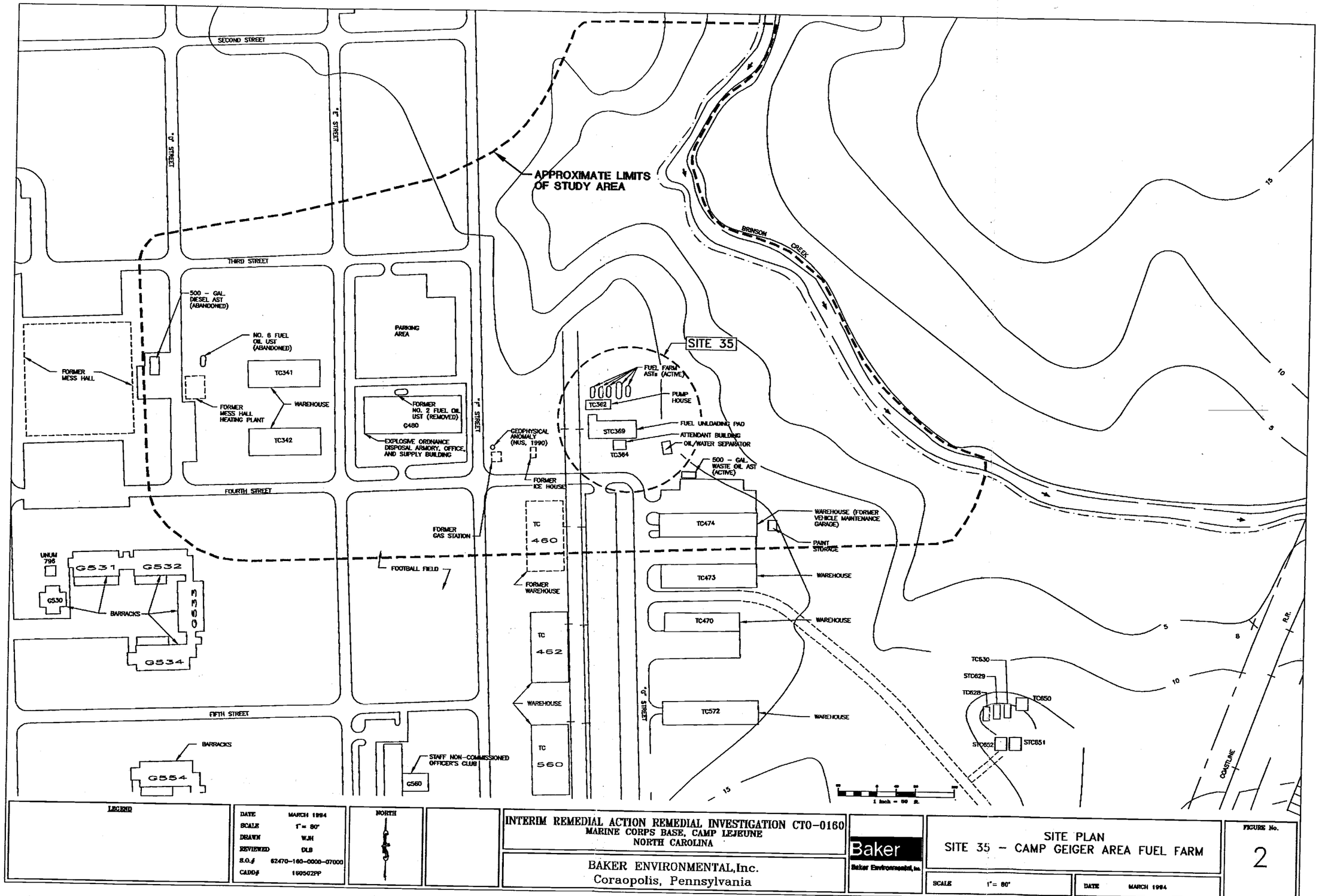


LEGEND

DATE	MARCH 1994
SCALE	1" = 80'
DRAWN	WJH
REVIEWED	DLB
S.O.#	62470-160-0000-07000
CADD#	160502PP

NORTH

INTERIM REMEDIAL ACTION REMEDIAL INVESTIGATION 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 MARCH 1994

FIGURE No. 2

loss of roughly 30 gallons per day of gasoline over an unspecified period (Law, 1992). The leaking line was subsequently sealed and replaced.

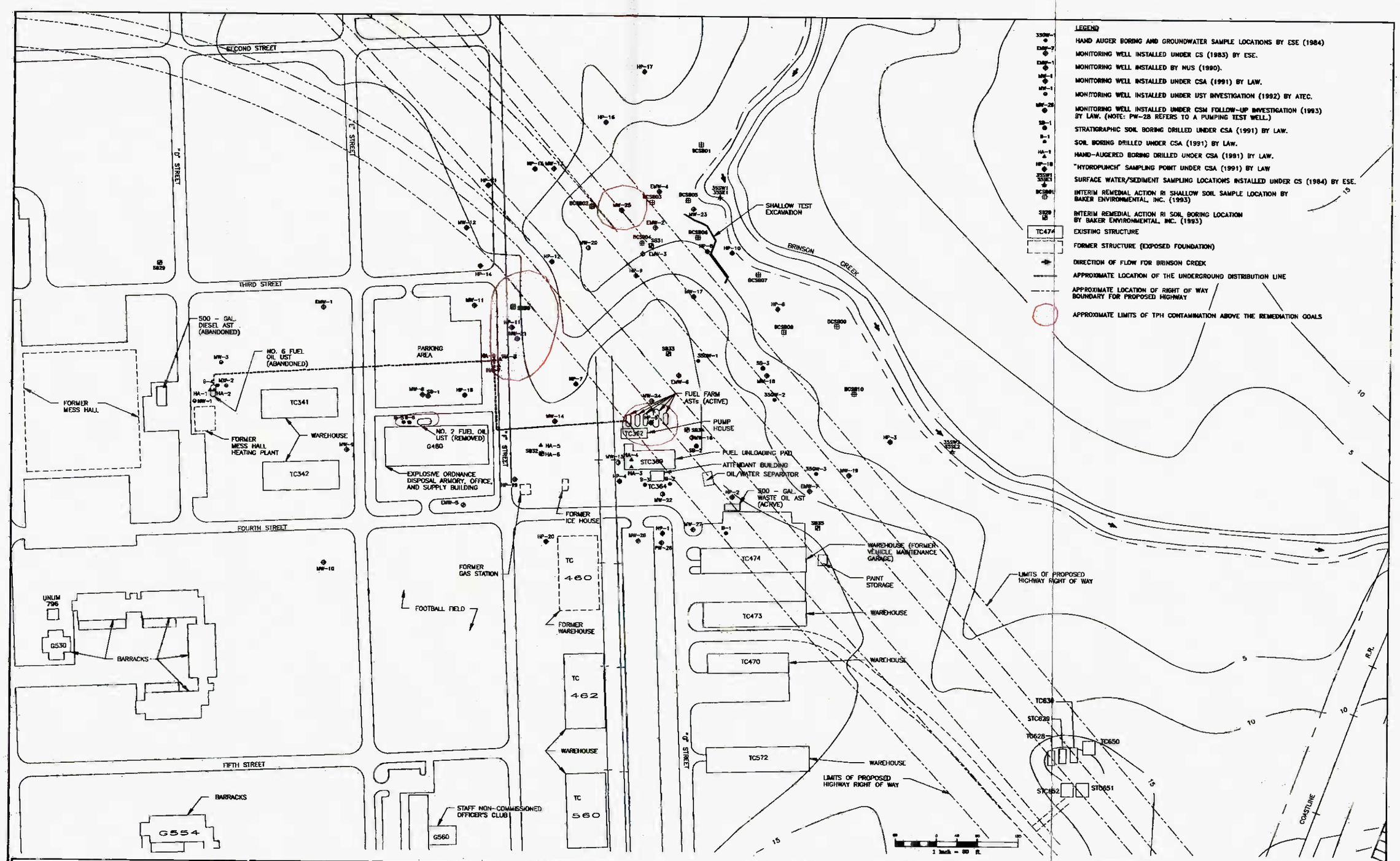
The ASTs at Site 35 are currently used to dispense gasoline, diesel and kerosene to government vehicles and to supply USTs in use at Camp Geiger and the nearby New River Marine Corps Air Station. The ASTs are supplied by commercial carrier trucks which deliver product to fill ports located on the fuel unloading pad at the southern end of the facility. Six, short-run (120 feet maximum), underground fuel lines are currently utilized to distribute the product from the unloading pad to the ASTs. Product is dispensed from the ASTs via trucks and underground piping.

Reports of a release from an underground distribution line near one of the ASTs date back to 1957-58 (ESE, 1990). Apparently, the leak occurred as the result of damage to a dispensing pump. At that time the Camp Lejeune Fire Department estimated that thousands of gallons of fuel were released although records of the incident cannot be located. The fuel reportedly migrated to the east and northeast toward Brinson Creek. Interceptor trenches were excavated and the captured fuel was ignited and burned.

Another abandoned underground distribution line extended from the ASTs to the former Mess Hall Heating Plant, located adjacent to "D" Street, between Third and Fourth Streets. The underground line dispensed No. 6 fuel oil to an UST which fueled the Mess Hall boiler. The Mess Hall, located across "D" Street to the west, is believed to have been demolished along with its Heating Plant in the 1960s.

In April 1990, an undetermined amount of fuel had been discovered by Camp Geiger personnel along the unnamed drainage channels north of the Fuel Farm. Apparently, the source of the fuel, believed to diesel or jet fuel, was an unauthorized discharge from a tanker truck that was never identified. The Activity reportedly initiated an emergency clean-up which included the removal of approximately 20 cubic yards of soil.

The Fuel Farm is scheduled to be decommissioned in 1994. Plans are currently being prepared to empty, clean, dismantle, and remove the ASTs along with all concrete foundations, slabs on grade, berms and associated underground piping. The Fuel Farm is being removed to make way for a four lane divided highway proposed by the North Carolina Department of Transportation (NCDOT) (see Figure 3).



LEGEND	DATE JULY 1994 SCALE 1" = 80' DRAWN WJH REVIEWED DLB S.O.# 62470-232-0000-07000 CADD# 232502RI	NORTH		INTERIM PROPOSED REMEDIAL ACTION PLAN CTO-0160 MARINE CORPS BASE, CAMP LEJEUNE NORTH CAROLINA BAKER ENVIRONMENTAL, Inc. Coraopolis, Pennsylvania	Baker Baker Environmental, Inc.	LIMITS OF TOTAL PETROLUEM HYDROCARBON SOIL CONTAMINATION SITE 35 – CAMP GEIGER AREA FUEL FARM SCALE 1" = 80' DATE JULY 1994	FIGURE No. 3

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Previous Investigations

The following is a summary of the previous investigations performed at Site 35.

Initial Assessment Study

MCB, Camp Lejeune was placed on the National Priority List (NPL) in 1983 after the Initial Assessment Study identified 76 potentially contaminated sites at the base (Water and Air Resources, 1983). Site 35 was identified as one of 23 sites warranting further investigation. Sampling and analysis of environmental media was not conducted during the Initial Assessment Study.

Confirmation Study

ESE performed Confirmation Studies of the 22 sites requiring further investigation and investigated Site 35 between 1984 and 1987 (ESE, 1990). In 1984, ESE advanced three hand-auger borings and collected groundwater and soil samples from each location. Soils were analyzed for lead and oil and grease. Lead was detected in soil samples obtained from hand auger borings at concentrations ranging from 6 to 8 mg/kg. Oil and grease was also detected at concentrations ranging from 40 to 2,200 mg/kg.

Shallow groundwater samples were obtained from the open boreholes and analyzed for lead, oil and grease, and volatile organic compounds (VOCs) including benzene, trans-1,2-dichloroethene (T-1,2-DCE), trichloroethene (TCE), and methylene chloride. Lead was detected in each sample ranging from 3,659 µg/L to 1,063 µg/L. Oil and grease was detected in only one sample at 46,000 µg/L. The only detected VOC was methylene chloride in one sample at 4 µg/L.

In 1986, ESE collected two sediment and two surface water samples from Brinson Creek and installed three permanent monitoring wells: two east of and one west of the Fuel Farm. Surface water and sediment samples were analyzed for lead, oil and grease and ethylene dibromide. Groundwater samples were obtained in December 1986 and again in March 1987 and were analyzed for lead, oil and grease, and VOCs.

No target analytes were detected in either surface water sample. Both sediment samples were reported to contain lead and oil and grease although no data indicating actual levels of

detection were provided in ESE's report. Levels were reported to be higher in the upstream sample, prompting ESE to suggest that the discharge of contaminated groundwater to the creek is occurring at the far northern section of the fuel farm ASTs or that the source of oil and grease and lead may be upstream.

Lead was detected in only one of six samples (33 µg/L) obtained from the three permanent monitoring wells. Oil and grease was detected in all six samples in a range from 200 µg/L to 12,000 µg/L. Detected VOCs included benzene (range: 1.3 µg/L to 30 µg/L), trans-1,2-DCE (range: 3.2 µg/L to 29 µg/L), and TCE (detected at 11 µg/L on both sample dates).

Focused Feasibility Study

A Focused Feasibility Study (FFS) was conducted in 1990 in the area north of the Fuel Farm by NUS Corporation. The investigation included the installation of four groundwater monitoring wells. Results of laboratory analysis revealed that groundwater in one well and soil cuttings from two borings were contaminated with petroleum hydrocarbons although nonaqueous product was not observed.

A geophysical investigation was conducted by NUS as part of the FFS in an attempt to identify underground storage tanks (USTs) at the site of the former gas station. The results indicated the presence of a geophysical anomaly to the north of the former gas station.

Comprehensive Site Assessment

Law Engineering, Inc. (Law) conducted a Comprehensive Site Assessment (CSA) during the fall of 1991 (Law, 1992). The CSA involved the drilling of 18 soil borings to depths ranging from 15 to 44.5 feet. These soil borings were ultimately converted to nested wells that monitor the water table aquifer along two zones. The shallow zone, or water table zone, generally extends from 2.5 to 17.5 feet, below ground surface (bgs). The deeper zone monitored by the nested wells generally ranges from 17.5 to 35 feet bgs. Five additional soil borings were drilled and nine soil borings were hand-augered to provide data regarding soil contamination in the vadose zone. Additional groundwater data was provided via 21 drive-point groundwater or "Hydropunch" samples. A "Tracer" study was also performed to investigate the integrity of the ASTs and underground distribution piping.

Soil and groundwater samples obtained under the CSA were analyzed for both organic and inorganic compounds. Groundwater analyses included purgeable hydrocarbons (EPA 601), purgeable aromatics and methyl-tertiary butyl ether (MTBE) (EPA 602), polynuclear aromatic hydrocarbons (EPA 610), and unfiltered lead (EPA 239.2). Soil analyses were limited to total petroleum hydrocarbons (TPH) (SW846 3rd Edition, 5030/3550: gasoline/diesel fractions) and lead (SW846 3rd Edition, 6010). Ten soil samples were analyzed for ignitability by SW846 3rd Edition, 1010.

The results of the CSA identified areas of impacted soil and groundwater. The nature of the contamination included both halogenated (i.e., chlorinated) organic compounds (e.g., TCE, trans-1,2-DCE, and vinyl chloride) and nonhalogenated, petroleum-based constituents (e.g., TPH, MTBE, benzene, toluene, ethylbenzene, and xylene). The contamination encountered was typically identified in both shallow (2.5 to 17.5 feet bgs) and deep (17.5 to 35 feet bgs) wells.

Law also identified several plumes of shallow groundwater contamination including two plumes comprised primarily of petroleum-based constituents (e.g., BTEX) and two plumes comprised of halogenated organic compounds (e.g., TCE). The plumes are all located north of Fourth Street and east of E Street except for a portion of a TCE plume that extends southwest beyond the corner of Fourth and E Streets.

In general, contaminant concentrations in soil were greatest in those samples taken at or below the water table. Law concluded that soil contamination at Site 35 was likely due to the presence of a dissolved phase groundwater plume and seasonal fluctuations of the water table.

A follow-up to the CSA was conducted by Law in 1992. Reported as an Addendum to the CSA (Law, 1993), it was designed to provide further characterization of the southern extent of the petroleum contamination resulting from historical releases. Three monitoring wells were installed including MW-26, -27, and PW-28. Soil samples were obtained from each of these locations and analyzed for TPH (gasoline and diesel fractions). As part of the follow-up, a pump test was performed to estimate the hydraulic characteristics of the surficial aquifer. This test was designed to determine performance characteristics of a designated pumping well and to estimate hydraulic parameters of the aquifer. An approximate hydraulic conductivity of 100 feet/day was determined for the surficial aquifer.

Interim Remedial Action RI/FS by Baker

Baker conducted an Interim Remedial Action RI in December of 1993. An additional seven soil borings were located within and around groundwater contaminant plume areas identified during the CSA. In addition to the soil borings, thirteen shallow soil samples were taken along Brinson Creek to determine the extent of contamination emanating from Site 35. Two of these shallow soil samples were situated upstream along Brinson Creek to provide background information on TPH and oil and grease.

In addition to soil sampling, a second round of groundwater level measurements were obtained for comparison to those presented in the CSA.

The most prevalent contaminants detected in soil samples taken during the Interim Remedial Action RI were benzene, toluene, ethylbenzene xylenes, naphthalene, and 2-methylnaphthalene. These constituents are commonly associated with fuel contamination. TPH (gasoline and diesel) and oil and grease were also observed, in addition to sporadic occurrences of lead, chromium, vanadium, and arsenic.

Analytical results, in general, confirm the Law findings that contamination in the majority of the identified soil is associated with a dissolved petroleum hydrocarbon contaminant plume in shallow groundwater. Oil and grease results observed in shallow soil samples obtained from the Brinson Creek area are likely influenced by the presence of naturally occurring organics in soils or an upgradient contamination source. This is supported by elevated background concentrations of oil and grease in surface soil samples obtained along the banks of Brinson Creek approximately 1/2-mile upstream of the site.

Comprehensive Remedial Investigation/Feasibility Study

Concurrent with the Interim Remedial Action RI/FS which is focused on contaminated soil at Site 35, Baker is conducting a comprehensive RI/FS as a separate study to evaluate other potentially impacted site media including groundwater, surface water, and sediment. Field activities for the full RI/FS were initiated in April 1994.

Other Investigations

Two USTs located near the Fuel Farm have been the subject of previous investigations conducted under an Activity-wide UST program. The two USTs include a No. 6 fuel oil UST situated adjacent to the former Mess Hall Heating Plant and a No. 2 fuel oil UST situated adjacent to the Explosive Ordnance and Disposal Armory, Office, and Supply Building. The former was abandoned in place years ago (date unknown) and has been the subject of previous environmental investigations performed by ATEC Associates, Inc. and Law. The latter was removed in January 1994 and is reported to be scheduled for an upcoming comprehensive environmental investigation.

Summary of Site Risks

As part of the Interim Remedial Action RI, a human health Risk Assessment was conducted to evaluate the current or future potential risks to human health resulting from the presence of petroleum hydrocarbon contaminants identified in soil located above the seasonal high water table at Operable Unit No. 10. An ecological risk assessment was not conducted as part of the Interim Remedial Action RI for two reasons. First, soil contamination is most prevalent at or below the water table, limiting the potential for direct exposure to ecological receptors. Second, an ecological risk assessment will be performed as part of the comprehensive Site 35 RI/FS which is being conducted concurrently.

Human Health Risk Assessment

A risk assessment was conducted for chemicals of potential concern (COPCs) detected in subsurface soil samples. COPCs are those chemicals detected with sufficient prevalence in an environmental medium retained for quantitative evaluation. COPCs at Site 35 include only benzene and arsenic.

Exposure to subsurface soils was evaluated considering on-site workers (commercial/ industrial) and potential dermal contact, particle inhalation and accidental ingestion scenarios. Future residential exposure pathways were not considered in the risk assessment because contamination was, in general, present at or below the water table. Furthermore, a more comprehensive Site 35 remedial investigation is ongoing.

The incremental lifetime cancer risk (ICR) for on-site workers was estimated to be 3×10^{-6}, which falls within USEPA's generally acceptable target risk range of 1×10^{-6} to 1×10^{-4}. The target risk range means that one to one hundred additional cancer cases per million exposed individuals may be considered acceptable by USEPA depending on site specific factors. An ICR value of 3×10^{-6} means that three additional cancer cases per million exposed individuals may occur.

Noncarcinogenic or systemic health effects are evaluated using a hazard index (HI) value. An HI value equal to, or exceeding 1.0 indicates that the potential for noncarcinogenic health effects exists. HI values less than 1.0 indicate that noncarcinogenic health effects will not occur subsequent to exposure. An HI value of 0.05 was calculated for the on-site Site 35 worker and, therefore, noncarcinogenic health effects will not occur.

Findings of the human health risk assessment conducted for Site 35 soils indicate that cancer risks occurring subsequent to worker-related exposure fall within the generally acceptable target risk range of 10^{-6} to 10^{-4}. Furthermore, noncarcinogenic adverse health effects will not occur subsequent to worker-related exposure.

Scope and Role of the Proposed Remedial Action

The proposed remedial action at Site 35 is focused on contaminated soil located above the seasonal high groundwater table. Based on the data obtained to date, four areas of soil contamination requiring remediation have been identified which are depicted on Figure 3. The first area is located in the vicinity of the Fuel Farm ASTs. The second area is associated with a UST formerly located on the north side of Building G-480. No data obtained to date has identified contaminated soil beneath the fuel farm ASTs, but this area has been included because of the strong likelihood that the ASTs and appurtenant piping are a source of confirmed shallow groundwater contamination in this area. The other two areas are located north of the Fuel Farm and Building G-480. The larger of the other two areas is located along "F" Street and is based primarily on contaminated soil samples located above the seasonal high groundwater table obtained from hand auger boring HA-7, soil boring MW-21, and possibly soil boring SB30. The smaller area is based on contaminated soil samples obtained from soil boring MW-25. Baker has estimated that approximately 3,800 cubic yards (5,000 tons) of contaminated soil is present in these areas.

The analytical data generated as part of the Interim Remedial Action RI and data generated during previous investigations conducted at Site 35 identified the presence of TPH contaminated soil to the north and northwest of the Fuel Farm in a broad area extending from the former UST adjacent to Building G480 to the vicinity of monitoring well MW-25. In general, the analytical data suggests that the majority of the contaminated soil is present along a narrow zone that begins just above the top of the shallow groundwater table. In essence, this contaminated soil is an extension of groundwater contamination which has been identified under the previous investigations and, particularly under the CSA conducted by Law. It can be assumed that seasonal fluctuations in the contaminated groundwater table has resulted in the contamination of soil just above the groundwater table. However, recorded groundwater elevation data obtained to date is insufficient to afford an estimate of the range of groundwater fluctuation at Site 35. This is supported by data which shows very little contamination present in soil located more than a foot or two above the shallow groundwater table as measured on two separate dates by Law and Baker. Contaminated soil was encountered in soil samples obtained about two or more feet above the measured groundwater surface at well MW-21 and MW-25 and at Borings B-5 and B-6.

The baseline risk assessment conducted at Site 35 examined the potential for adverse human health effects to occur subsequent to subsurface soil exposure. Results of the baseline risk assessment indicate that the unacceptable cancer risks and adverse noncarcinogenic health effects associated with potential on-site worker exposures will not occur. On-site workers were considered the only potential human receptors because of the proximity of soil contamination to the water table and proposed plans to construct a highway through the site. Results of the baseline risk assessment indicate that a no action remedy would be adequately protective of human health. No ecological risk assessment was conducted as part of the Interim Remedial Action RI because of the depths of the soil contamination limits possible ecological exposure to contaminated soil. An ecological risk assessment will be conducted as part of the comprehensive RI/FS that is being performed concurrently at Site 35.

Based on the results of the risk assessment, unacceptable human health risks are not expected at Site 35. Consequently, the scope and goals for the remediation of petroleum hydrocarbon contaminated soil were developed based on NC DEHNR guidelines for soil remediation. The NC DEHNR guidelines address the presence of low and high boiling point petroleum hydrocarbons and oil and grease. Remediation goals based on the NC DEHNR guidelines were developed by performing a Site Sensitivity Evaluation (SSE). Based on the SSE remediation goals were developed as follows:

- TPH (via EPA Method 5030/8015: low boiling point) = 40 mg/kg
- TPH (via EPA Method 3550/8015: high boiling point) = 160 mg/kg
- Oil and grease (via EPA Method 8071) = 800 mg/kg

Oil and grease was subsequently excluded from the remediation goals because it was detected in background surface soil samples (BCSB11 and BCSB1B) located approximately 1/4 to 1/2 mile upstream of the Fuel Farm at levels on the order of 1610 mg/kg and 1110 mg/kg, respectively, or more than twice the remediation goal based on the SSE. Stream level measurements indicate the locations of the upstream surface soil samples to be beyond the reach of tidal influences and, consequently, indicate that high levels of naturally-occurring hydrocarbons are present in the soil adjacent to Brinson Creek. Although other surface soil samples obtained under the Interim Remedial Action RI indicated the presence of oil and grease at levels as high as 7,500 mg/kg, only one of the surface soil samples (BSCB01) exhibited both detectable concentrations of TPH (60 mg/kg) and oil and grease (3,000 mg/kg). The discrepancy is likely due to the fact that oil and grease is a gravimetric analysis which is highly subject to interferences and influences such as those presented by many naturally-occurring organic chemicals that could be expected to be present in the frequently flooded soils adjacent to Brinson Creek.

Based on the remediation goals, soils exhibiting TPH levels in excess of 40 mg/kg as measured by EPA Method 5030/8015 and 160 mg/kg as measured by EPA Method 3550/8015 will be subject to remediation.

Summary of Alternatives

Various technologies and process options were screened and evaluated under the Interim Remedial Action FS. Ultimately, six Remedial Action Alternatives (RAAs) were developed and are listed as follows:

- RAA 1 - No Action
- RAA 2 - Source Removal and Off-Site Landfill Disposal
- RAA 3 - Source Removal and Off-Site Biotreatment
- RAA 4 - Source Removal and On-Site, Ex-Situ Soil Aeration
- RAA 5 - Source Removal and Off-Site Soil Recycling
- RAA 6 - Source Removal and On-Site Low Temperature Thermal Desorption

A brief description of each alternative as well as the estimated cost and timeframe to implement the alternative are as follows:

- RAA 1 - No Action

  Capital Cost: $0
  Annual Operation and Maintenance (O&M) Cost: $0
  Months to Implement: 0

  The No Action RAA is required under CERCLA to establish a baseline for comparison. Under this RAA, no actions will be performed to reduce the toxicity, mobility, or volume of the contaminated soil at Site 35. This alternative assumes that passive remediation will occur via biodegradation and other natural attenuation processes and that contaminant levels will be reduced over an indefinite period of time.

- RAA 2 - Source Removal and Off-Site Landfill Disposal

  Capital Cost: $527,390
  Annual O&M Cost: $0
  Months to Implement: 2

  Under RAA 2, contaminated soil located above the seasonal high groundwater table will be excavated and transported off site to an appropriately permitted solid waste landfill.

- RAA 3 - Source Removal and Off-Site Biotreatment

  Capital Cost: $558,366
  Annual O&M Cost: $0
  Months to Implement: 2

  RAA 3 involves the excavation of contaminated soil above the seasonal high groundwater table and biological treatment at an off-site commercial composting landfarming facility. Biological treatment is a process whereby naturally occurring microorganisms are stimulated to consume petroleum hydrocarbons as food and fuel with the resulting byproducts being carbon dioxide and water.

- RAA 4 - Source Removal and On-Site, Ex-Situ Soil Aeration

  Capital Cost: $455,304
  Annual O&M Cost: $0
  Months to Implement: 2

  RAA 4 involves the excavation of contaminated soil above the seasonal high groundwater table for remediation via on-site, ex-situ soil aeration. In this process the excavated soil is vigorously agitated at a staging area in an effort to release volatile hydrocarbons from the soil to the atmosphere.

- RAA 5 - Source Removal and Off-Site Soil Recycling

  Capital Cost: $558,366
  Annual O&M Cost: $0
  Months to Implement: 2

  RAA 5 involves the excavation of contaminated soil located above the seasonal high groundwater table and transport to an off-site commercial soil recycling facility. Soil recycling processes utilize the soil for the production of basic materials such as brick and asphalt.

- RAA 6 - Source Removal and On-Site Low Temperature Thermal Desorption

  Capital Cost: $613,542
  Annual O&M Cost: $0
  Months to Implement: 2

  RAA 6 involves the excavation of contaminated soil located above the seasonal high groundwater table for remediation via on-site low temperature thermal desorption. This process is commercially available from contractors that utilize mobile units to heat wastes to between 200 and 600 degrees Fahrenheit. The heat volatizes organic contaminants which are then either collected in activated carbon, destroyed via catalytic oxidation, or released to the atmosphere.

Evaluation of Alternatives and the Preferred Alternative

All of the alternatives, except for RAA 1 - No Action will result in a permanent reduction in toxicity, mobility, and volume of waste at Site 35, comply with ARARs, achieve the TPH remediation goals, and contribute to the overall protection of human health and the

environment. The preferred alternative is RAA 5 (Source Removal and Off-Site Soil Recycling) on the basis of its being cost effective and easiest to implement. RAA 3 (Source Removal and Off-Site Biotreatment) was identified as an alternate to RAA 5 subject to approval and modification of the Interim ROD. RAA 5 was selected in lieu of RAA 3 because there are more off-site commercial soil recycling facilities that service the Camp Lejeune area than off-site commercial biotreatment facilities. This should make RAA 5 easier to implement than RAA 3.

Aside from RAA 1 (No Action) the other alternatives which were not selected include RAA 2 (Source Removal and Off-Site Disposal), RAA 4 (Source Removal and On-Site, Ex-Situ Soil Aeration), and RAA 6 (Source Removal and On-Site Low Temperature Thermal Desorption). RAA 2 involves a technology based on the transfer of the contaminated soil from the site where its effects are uncontrolled to a secure, appropriately permitted landfill where environmental impacts are routinely monitored. Unlike RAA 3 through RAA 6, RAA 2 does not include any provision for waste treatment and, therefore, was not selected as one of the preferred alternatives. RAA 4 - Source Removal and On-Site, Ex-Situ Soil Aeration, on the other hand, does involve soil treatment via aeration; a process designed to release volatile contaminants directly to the atmosphere in an uncontrolled manner. The other three treatment oriented RAAs 3, 5, and 6 involve processes whereby the contaminants are biologically metabolized (RAA 3), utilized in the production of basic materials (RAA 5), or physically captured or destroyed (RAA 6). The fact that the contaminants are released to another media (air) rather than being captured or destroyed coupled with a measured degree of uncertainty as to the potential overall effectiveness of soil aeration at this site result in RAA 4 not being selected as one of the preferred alternatives. RAA 6 was the mostly alternative considered.

A complete summary of the alternatives evaluation is presented in Table 1. A Glossary of the Evaluation Criteria is printed in Table 2.

COMMUNITY PARTICIPATION

A critical part of the selection of a remedial action alternative is community involvement. The following information is provided to the community in order to obtain input that addresses the selection of remedial action alternative for Operable Unit No. 10, Site 35.

TABLE 1

SUMMARY OF ALTERNATIVES EVALUATION
INTERIM PROPOSED REMEDIAL ACTION PLAN, CTO-0160
SITE 35 - CAMP GEIGER AREA FUEL FARM, MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

	Alternative 1: No Action	Alternative 2: Source Removal and Off-Site Landfill	Alternative 3: Source Removal and Off-Site Biotreatment
Overall Protection of Human Health and Environment	No reduction in potential risks.	Removes contaminated soil from site, thereby eliminating potential exposure to and migration of contaminants.	Removes contaminated soil from site thereby eliminating potential exposure to and migration of contaminants.
Compliance with ARARs			
• Chemical-Specific ARARs	Does not meet NC DEHNR guidelines for TPH soil remediation.	Will comply with NC DEHNR guidelines for TPH soil remediation.	Will comply with NC DEHNR guidelines for TPH soil remediation.
• Location-Specific ARARs	Contaminated soils left in place under no action could impact wetlands and, in turn, fish and wildlife.	Source removal will reduce risks to wetlands, the floodplain, and endangered species in the Camp Lejeune area.	Source removal will reduce risks to wetlands, the floodplain, and endangered species in the Camp Lejeune area.
• Action-Specific ARARs	Not relevant. There are no actions.	Will comply with NC DEHNR guidelines for disposal/treatment.	Will comply with NC DEHNR guidelines for disposal/treatment.
Long-Term Effectiveness and Permanence	Source remains in place. Natural attenuation may reduce contaminant levels, but is unpredictable.	Contaminated soil as a source is permanently removed from site.	Contaminated soil as a source is permanently removed from site.
Reduction of Toxicity, Mobility, or Volume	Natural attenuation may reduce contaminant levels, but is unpredictable.	Total reduction equal to volume of soil removed.	Total reduction equal to volume of soil removed.
Short-Term Effectiveness	No increased risk to community and no risk to workers because no remedial action is implemented.	Excavation and handling would release VOCs to atmosphere. Work to be completed in 1 to 2 months.	Excavation and handling would release VOCs to atmosphere. Work to be completed in 1 to 2 months.
Implementability	Nothing to implement.	Standard construction operation. Easy to implement. NC DEHNR approved landfills available.	Standard construction operation. Easy to implement. Commercial vendors available.
Costs			
Capital	$0	$527,390	$558,366
O&M	$0	$0	$0
USEPA/State Acceptance	USEPA and state will likely not prefer this alternative.	USEPA has a Federal mandate to favor treatment over disposal options. State has preference for on-site versus off-site treatment.	USEPA has a Federal mandate to favor treatment over disposal options. State has preference for on-site versus off-site treatment.

TABLE 1 (Continued)

SUMMARY OF ALTERNATIVES EVALUATION
INTERIM PROPOSED REMEDIAL ACTION PLAN, CTO-0160
SITE 35 - CAMP GEIGER AREA FUEL FARM, MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

	Alternative 4: Source Removal and On-Site Ex-Situ Soil Aeration	Alternative 5: Source Removal and Off-Site Soil Recycling	Alternative 6: Source Removal and On-Site Low Temperature Thermal Desorption
Overall Protection of Human Health and Environment	Risks reduced, but perhaps not to the degree of other alternatives because treated soil is used as backfill.	Removes contaminated soil from site, thereby eliminating potential exposure to and migration of contaminants.	Risks reduced, but not perhaps not to the degree of other alternatives because treated soil is used as backfill.
Compliance with ARARs			
• Chemical-Specific ARARs	Will comply with NC DEHNR guidelines for TPH soil remediation.	Will comply with NC DEHNR guidelines for TPH soil remediation.	Will comply with NC DEHNR guidelines for TPH soil remediation.
• Location-Specific ARARs	Will reduce risks to wetlands, the floodplain, and endangered species in the Camp Lejeune area, but not perhaps to degree of other alternatives because treated soil is used as backfill.	Source removal will reduce risks to wetlands, the floodplain, and endangered species in the Camp Lejeune area.	Will reduce risks to wetlands, the floodplain, and endangered species in the Camp Lejeune area, but not perhaps to degree of other alternatives because treated soil is used as backfill.
• Action-Specific ARARs	Will comply with NC DEHNR guidelines for disposal/treatment.	Will comply with NC DEHNR guidelines for disposal/treatment.	Will comply with NC DEHNR guidelines for disposal/treatment.
Long-Term Effectiveness and Permanence	Reductions in contaminant achieved via on-site treatment will be permanent. No long-term monitoring required.	Contaminated soil as a source is permanently removed from site.	Reductions in contaminant achieved via on-site treatment will be permanent. No long-term monitoring required.
Reduction of Toxicity, Mobility, or Volume	Total reduction is equal to volume of soil treated and total reduction of contaminant levels.	Total reduction equal to volume of soil removed.	Total reduction is equal to volume of soil treated and total reduction of contaminant levels.
Short-Term Effectiveness	Excavation, handling, and treatment would release VOCs to atmosphere during construction.	Excavation and handling would release VOCs to atmosphere. Work to be completed in 1 to 2 months.	Excavation and handling would release VOCs to atmosphere. Work to be completed in 1 to 2 months.
Implementability	Standard construction operation for excavation and treatment. No special equipment required.	Standard construction operation. Easy to implement. Commercial vendors available.	Standard construction operation. Easy to implement. Commercial vendors available.
Costs			
Capital	$455,304	$558,366	$613,542
O&M	$0	$0	$0
USEPA/State Acceptance	Potential objections regarding unrestricted VOC emissions during treatment. Engineering controls may be required.	USEPA has a Federal mandate to favor treatment over disposal options. State has preference for on-site versus off-site treatment.	USEPA has a Federal mandate to favor treatment over disposal options. State has preference for on-site versus off-site treatment.

TABLE 2
GLOSSARY OF EVALUATION CRITERIA

- **Overall Protection of Human Health and Environment** - addresses whether or not an alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment engineering controls or institutional controls.

- **Compliance with ARARs/TBCs** - addresses whether or not an alternative will meet all of the applicable or relevant and appropriate requirements (ARARs), other criteria to be considered (TBCs), or other Federal and state environmental statutes and/or provide grounds for invoking a waiver.

- **Long-term Effectiveness and Permanence** - refers to the magnitude of residual risk and the ability of an alternative to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

- **Reduction of Toxicity, Mobility, or Volume through Treatment** - is the anticipated performance of the treatment options that may be employed in an alternative.

- **Short-term Effectiveness** - refers to the speed with which the alternative achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.

- **Implementability** - is the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the chosen solution.

- **Cost** - includes capital and operation and maintenance costs. For comparative purposes, presents present worth values.

- **USEPA/State Acceptance** - indicates whether, based on review of the RI and FS reports and the PRAP, the USEPA and state concur with, oppose, or have no comments on the preferred alternative.

- **Community Acceptance** - will be assessed in the Record of Decision (ROD) following a review of the public comments received on the RI and FS reports and the PRAP.

Public Comment Period

The public comment period will begin on July 26, 1994, and end on August 26, 1994, for the Proposed Remedial Action Plan for Operable Unit No. 10, Site 35. Written comments should be sent to the following address:

Commander
Atlantic Division Naval Facilities Engineering Command
1510 Gilbert Street (Bldg. N-26)
Norfolk, Virginia 23511-2699
Attention: Ms. Katherine Landman, Code 1823

Information Repositories

A collection of information, including the administrative record, is available at the following location:

MCB Camp Lejeune
Building 67, Room 237
Marine Corps Base
Camp Lejeune, NC 28542
(910) 451-5068

M-F: 7:00 a.m.-4:00 p.m.
Closed Saturday and Sunday

Onslow County Library
58 Doris Avenue East
Jacksonville, NC 28540
(910) 455-7350

Hours: M-Th: 9:00 a.m. - 9:00 p.m.
F-Sa: 9:00 a.m. - 6:00 p.m.
Closed Sunday

IF YOU HAVE ANY QUESTIONS ABOUT OPERABLE UNIT NO. 10, PLEASE CONTACT ONE OF THE FOLLOWING:

Commanding General
AC/S EMD (IRD)
Marine Corps Base
PSC Box 20004
Camp Lejeune, North Carolina 28452-0004
Attention: Mr. Neal Paul
(910) 451-5068

Commander
Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Bldg. N-26)
Norfolk, Virginia 23511-2699
Attention: Ms. Katherine Landman, Code 1823
(804) 322-4818

Remedial Project Manager
U.S. EPA, Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365
Attention: Ms. Gena Townsend
(404) 347-3016

NC Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
Superfund Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687
Attention: Mr. Patrick Watters
(919) 733-2801

Community Information Line
Public Affairs Office
Marine Corps Base, Camp Lejeune, North Carolina
(910) 451-5782

MAILING LIST

If you are not on the mailing list and would like to receive future publications pertaining to Operable Unit No. 10, please fill out, detach, and mail this form to:

Commanding General
AC/S EMD (IRD)
Marine Corps Base
PSC Box 20004
Camp Lejeune, North Carolina 28452-0004
(910) 451-5068

Attn: Mr. Tom Morris

Name _____

Address _____

Affiliation _____

Phone ( ) _____