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FINAL

RECORD OF DECISION
OPERABLE UNIT NO. 13 (SITE 63)

MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0340

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/kg	microgram per kilogram
µg/L	microgram per liter
CDI	Chronic Daily Intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
COPC	Contaminant of Potential Concern
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DoN	Department of the Navy
ER-L	Effects Range - Low
ER-M	Effects Range - Median
FFA	Federal Facilities Agreement
HI	hazard index
HQ	hazard quotient
IAS	Initial Assessment Study
ICR	incremental cancer risk
IR	Installation Restoration
LANTDIV	Naval Facilities Engineering Command, Atlantic Division
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
NC DEHNR	North Carolina Department of Environment, Health and Natural Resources
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NCWQS	North Carolina Water Quality Standard
NOAA	National Oceanic Atmospheric Administration
OU	Operable Unit
PCBs	polychlorinated biphenyls
PRAP	Proposed Remedial Action Plan
QI	Quotient Index
RA	risk assessment
RCRA	Resource Conservation and Recovery Act

LIST OF ACRONYMS
(Continued)

RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SQC	Sediment Quality Criteria
SSSVs	surface soil screening values
SVOCs	semivolatile organic compounds
SWSV	surface water screening value
TAL	target analyte list
TCL	target compound list
USEPA	United States Environmental Protection Agency
VOCs	volatile organic compound

INTRODUCTION

This Record of Decision (ROD) document presents the final remedial action plan selected for Operable Unit (OU) No. 13 (Site 63) at Marine Corps Base (MCB), Camp Lejeune, North Carolina. The Final ROD document presents the selected remedy along with a description of the selection process. Various environmental media at Site 63 were investigated as part of a Remedial Investigation (RI) conducted during November 1995. Based upon the results of the RI, a preferred remedial alternative was identified in the Proposed Remedial Action Plan (PRAP) document. The public was then given the opportunity to comment on both the RI and PRAP documents. Comments received during the public meeting, the public comment period, and new information that became available during the interim were used to select the final remedy for Site 63.

Document Organization

This ROD document has been divided into four main sections. The first section presents the introduction and report organization. The second section provides a formal declaration that identifies the selected remedy for Site 63. The declaration indicates that the remedy selection process was implemented in accordance with applicable statutory and regulatory requirements. The third section presents information pertaining to previous investigation activities conducted at Site 63. The third section also presents the background and setting of both MCB Camp Lejeune and Site 63; the highlights of community participation; the scope and role of the response action; site characteristics; and a summary of site risks determined by human health and ecological risk assessments. Finally, the fourth section provides the responsiveness summary that contains a synopsis of comments received during the public meeting and public comment period.

DECISION DECLARATION

Site Name and Location

Operable Unit No. 13
(Site 63 - Verona Loop Dump)
Marine Corps Base
Camp Lejeune, North Carolina

Decision Basis and Purpose

This Record of Decision document presents the selected remedy for Operable Unit (OU) No. 13 at Marine Corps Base (MCB), Camp Lejeune, North Carolina. The remedy for OU No. 13 has been selected in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. The decision presented herein is based upon the collaborative effort of federal, state, and community participants and information contained within the Administrative Record for OU No. 13.

The Department of the Navy and the Marine Corps have obtained concurrence for the selected remedy from the North Carolina Department of Environment, Health and Natural Resources and the United States Environmental Protection Agency Region IV. Prior to any future deviation from the specified remedy additional concurrence shall be obtained.

Description of the Selected Remedy

The selected remedy for OU No. 13 is No Further Action with Institutional Controls. The selected remedy, as the name implies, involves taking no further action at the site and leaving the environmental media as they currently exist. In addition, aquifer use restrictions in the Base Master Plan will prohibit the installation of water supply wells within 1,000 feet of OU No. 13. In the event that unforeseen hazards posed by conditions at the site occur in the future, monitoring to verify that no unacceptable exposures have occurred may be authorized.

Declaration Statement

No further action is required at OU No. 13 to ensure the continued protection of human health and the environment. Based upon risk assessment results and aquifer use restrictions implemented by MCB Camp Lejeune, site conditions at OU No. 13 appear to be protective of human health and environment both now and in the future.

_____ _____

Signature (Commanding General, MCB Camp Lejeune) Date

DECISION SUMMARY

Background and Setting of MCB Camp Lejeune

MCB Camp Lejeune is located in Onslow County, North Carolina. Construction of the "World's Most Complete Amphibious Training Base" was begun in 1941 for the United States Marine Corps. MCB Camp Lejeune is located approximately 45 miles south of New Bern, North Carolina and 47 miles north of Wilmington, North Carolina. The facility encompasses approximately 236 square miles and includes 14 miles of coastline. The military reservation is bisected by the New River, which flows in a southeasterly direction and forms a large estuary before entering the Atlantic Ocean. The Atlantic Ocean forms the eastern border of MCB Camp Lejeune; U.S. Route 17 and State Route 24 border the western and northwestern portions of MCB Camp Lejeune. The City of Jacksonville, North Carolina borders the facility to the north.

MCB Camp Lejeune was placed on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) National Priorities List effective October 4, 1989 (54 Federal Register 41015; October 4, 1989). The United States Environmental Protection Agency (USEPA) Region IV, the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR) and Department of the Navy (DoN) entered into a Federal Facilities Agreement (FFA) for MCB Camp Lejeune. The primary purpose of the FFA was to ensure that environmental impacts associated with past and present activities were thoroughly investigated and appropriate CERCLA response or Resource Conservation and Recovery Act (RCRA) corrective action alternatives were developed and implemented, as necessary, to protect public health and environment.

There are currently 42 Installation Restoration (IR) sites at MCB Camp Lejeune which have been grouped into 18 OUs. OUs are formed as an incremental step toward addressing individual site concerns. OUs may address geographical portions of a study area, site-specific problems or initial phases of an action, or may consist of any set of actions performed over time or any actions that may be concurrent but located in different parts of a site. OU No. 13 consists of only one IR site; Site 63 is also referred to as the Verona Loop Dump. As depicted on Figure 1, Site 63 is located within the western portion of the facility, to the south of Marine Corps Air Station (MCAS), New River. [Note: All tables and figures have been provided at the end of this document.]

Site Name, Location, and Setting

The Verona Loop Dump is comprised of approximately five acres and is located nearly two miles south of the MCAS, New River operations area. As depicted on Figure 2, the study area is located along Verona Loop Road approximately 1.25 miles east of U.S. Route 17. Site 63 is bordered to the south by Verona Loop Road, to the east by an unnamed tributary to Mill Run, and to the west by a gravel access road.

Site 63 is relatively flat, however, the eastern portion of the study area slopes toward an unnamed tributary; the unnamed tributary then discharges into Mill Run approximately 2,000 feet south of Site 63. Mill Run discharges into the Southwest Creek which eventually flows into the New River. A drainage ditch along Verona Loop Road receives surface water runoff from the extreme southern portion of the site and the asphalt road surface. Figure 3 depicts the topography and general arrangement of Site 63.

Much of the site is heavily vegetated with dense understory and trees greater than three inches in diameter. A partially improved gravel road provides access to the main portion of the study area;

other unimproved paths extend outward from this road. Training exercises, maneuvers, and recreational hunting are frequently conducted in the area. Several personnel entrenchments, used during training exercises, have been excavated throughout the study area. Earthen berms and small to medium size trees have been felled to construct protective works around many of the entrenchments.

Site History

Very little information is available regarding the history or occurrence of waste management practices at Site 63. The study area reportedly received wastes generated during training exercises. The type of materials generated during these exercises are described only as "bivouac" wastes. Additional information suggests that no hazardous wastes were disposed of at Site 63. The years during which disposal activities may have taken place are also not known.

The following describes the previous investigation activities that have been conducted at Site 63. These investigations include an initial assessment study (IAS), a site inspection (SI), and an RI.

Initial Assessment Study, 1983

In 1983, an IAS was conducted at MCB Camp Lejeune by Water and Air Research, Inc. The IAS evaluated potential hazards at various sites throughout MCB Camp Lejeune, including Site 63. The IAS was based upon review of historical records, aerial photographs, a site visit, and personnel interviews. The IAS concluded that waste quantities at Site 63, regardless of their nature, were of a volume that did not require further investigation; therefore, additional investigations were not recommended for the study area at that time.

Site Inspection, 1991

In 1991, Baker Environmental, Inc. conducted an SI at Site 63 to confirm findings of the IAS. The SI consisted of the following field activities: the installation and sampling of three monitoring wells; the collection of two soil samples from each monitoring well pilot test boring (one sample obtained near the surface and the other obtained just above the water table); the collection of two soil samples from six additional soil test borings; and the collection of two surface water and two sediment samples from the adjacent tributary to Mill Run.

Upon visual inspection of the site, conclusive indications (e.g., distressed vegetation, denuded areas, etc.) of hazardous waste disposal were not apparent; however, reinforced concrete rubble, construction material, and various other inert debris was identified during the SI and subsequent site visits. The observed waste material was limited to a number of distinct piles or areas, rather than being strewn throughout the study area.

The following paragraphs briefly describe the results and conclusions of the SI at Site 63. Tables 1 through 4 present summaries of laboratory analytical results from analyses performed on the samples collected during the SI.

The volatile organic compounds (VOCs) toluene and xylene were detected at concentrations of 2 and 3 micrograms per kilogram (mg/kg) in a soil sample obtained from ground surface to a depth of one foot. No other volatile compounds were detected among any of the samples obtained from either surface or subsurface soils. As provided in Table 1, concentrations of semivolatile organic compounds (SVOCs) ranged from 43 μg/kg of di-n-butylphthalate to 280 μg/kg of benzoic acid.

The six soil samples obtained during installation of the three monitoring wells provided the only SVOC detections. The pesticides 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected at low concentrations in one surface sample obtained from the eastern portion of the study area; no other pesticides were detected among the other soil samples. Aroclor-1254 was detected once at a concentration of 1,000 µg/kg in a surface sample obtained near the central portion of the study area; no other polychlorinated biphenyls (PCBs) were detected. Several metals were also detected among the soil samples obtained at Site 63. The concentrations of the detected metals were, for the most part, consistent with base-specific background levels. Table 1 presents positive detections of both organic and inorganic soil analytical results from the SI at Site 63.

Carbon disulfide, benzoic acid, and bis(2-ethylhexyl)phthalate were the only organic compounds detected among groundwater samples. Carbon disulfide was not detected in any other environmental media at Site 63. Total metal concentrations of aluminum, barium, chromium, lead, iron, and manganese exceeded either federal Maximum Contaminant Levels (MCLs) or North Carolina Water Quality Standards (NCWQSs). However, other studies conducted at several sites throughout MCB Camp Lejeune have also exhibited concentrations of total metals in excess of water quality standards. These analyses tend to reflect the presence of suspended material in groundwater samples resulting from sampling disturbance, rather than depict true groundwater conditions. Table 2 presents a summary of the groundwater analytical results from the SI conducted at Site 63.

No organic compounds were detected among the two surface water and two sediment samples obtained from the unnamed tributary. A number of metals were, however, detected in both the surface water and sediment samples. Iron was the only metal detected among the surface water samples at a concentration which exceeded applicable state or federal standards. Table 3 provides a summary of positive surface water detections.

Two sediment samples were also collected from the same surface water and sediment sampling stations along the unnamed tributary. Several metals were detected including arsenic, chromium, copper, lead, nickel, and zinc. Only one detection each of copper and lead exceeded federal screening values. The sediment comparison values were based upon a potential to adversely impact aquatic life. The concentrations of copper and lead were within the "probable" adverse effects to biota range. Table 4 presents sediment analytical results generated during the SI at Site 63.

Remedial Investigation, 1995

The RI field investigation of Site 63 was conducted during November 1995. The RI field program at Site 63 consisted of a site survey; a soil investigation, which involved direct-push sample collection; a groundwater investigation, which included temporary monitoring well installation, sampling, and aquifer testing; a surface water and sediment investigation; and a habitat evaluation. The following provides an overview of the various investigation activities carried out during the RI:

- Surface Soil Samples Collected 46
- Subsurface Soil Samples Collected 50
- Temporary Wells Installed and Sampled 8
- Existing Shallow Wells Sampled 3
- Surface Water Samples Collected 5
- Sediment Samples Collected 5

Findings from the RI are presented within a number of the sections which follow.

Summary of Site Characteristics

Various investigations were performed during the RI at Site 63 to assess the nature and extent of contamination that may have resulted from previous waste management practices or site activities; to assess the human health, ecological, and environmental risks associated with exposure to surface and subsurface soils; and to characterize the geologic and hydrogeologic setting of the study area. The following provides a brief summary regarding the extent of contamination at Site 63. This summary focuses upon primary site concerns and is not intended to address all analytical results. A summary of site contamination, by media, is provided in Table 5. Figure 4 depicts the various RI sampling locations at Site 63.

Soil

Styrene was detected in only one of the subsurface soil samples obtained at Site 63. Styrene was detected at a concentration of 41 μg/kg in a subsurface sample from location 63-SB15. No other VOCs were detected among the 96 soil samples retained for laboratory analyses. Given the limited extent of styrene and the lack corroborating evidence of volatile contamination, the presence of styrene is most likely the result of a single event rather than long-term disposal operations. Additionally, the single styrene detection did not exceed the applicable soil screening value of 2,000 μg/kg.

The presence of SVOCs in soil is most likely the result of either former operational activities at Site 63 or the decomposition of organic matter (e.g., leaves, pine needles, etc.). The concentration and infrequent detection of semivolatile compounds among soil samples is consistent with the historical use of Site 63; indicative of incidental spillage, or may be the result of ongoing maneuvers and training exercises. Semivolatile compounds were identified in both surface and subsurface soil samples obtained from the suspected disposal portion of the study area. Concentrations of SVOCs were limited to two surface and three subsurface sampling locations throughout the entire site. The positive SVOC results correspond directly to the visual identification of graded soil or construction debris observed during the field investigation. None of the positive SVOC detections exceeded applicable soil screening values for the protection of groundwater, nor do they suggest long-term disposal operations.

Positive detections of pesticides were observed among both surface and subsurface soil samples at Site 63. Pesticide concentrations were low (i.e., less than 100 μg/kg) and primarily limited to within and adjacent to the suspected disposal portion of the study area. The majority of pesticide detections were observed among surface soil samples. The frequency and overall concentration of pesticides in soil, nonetheless, does not suggest pesticide disposal activities. Much of the study area appears to have been graded during previous site operations; the reworked surface soil may have contained residual pesticides. The presence of pesticide compounds among soil samples obtained at Site 63 is most likely the result of routine base-wide application and use of pesticides.

As provided in Table 5, a number of samples submitted for analyses had target analyte list (TAL) metal concentrations which exceeded applicable soil screening values or base-specific background levels. Arsenic, barium, and nickel were detected at concentrations which exceeded soil screening values protective of groundwater among 1, 5, and 7 of the 96 soil samples submitted for analyses; however, the same 3 metals were not detected above NCWQSs among any of the groundwater samples obtained at Site 63.

The distribution of detected metals among both surface and subsurface samples followed no discernible pattern. In at least one case, however, findings from the analytical program were consistent with visual observations of buried debris and non-native surface material recorded during the field investigation. A total of 13 metals were detected above twice their average base-specific background levels; 9 of the 13 metals were detected at maximum concentrations in a subsurface sample obtained from location 63-SB23. Boring 63-SB23 is located within the central portion of the suspected disposal area and identified as having both surface and subsurface debris (refer to Figure 4). With the exception of boring 63-SB23, metals were observed at varying concentrations scattered throughout the study area.

Groundwater

Volatile, semivolatile, pesticide, and PCB organic compounds were not detected in any of the groundwater samples submitted for analyses from Site 63. As a result of those analyses, the extent of organic compounds in groundwater were not addressed.

Metals were detected in each of the 11 groundwater samples submitted for analyses from Site 63. Iron, manganese, and zinc were the only target analyte list (TAL) total metals detected at levels in excess of either federal MCL or NCWQS. Positive detections that exceeded applicable screening standards for both iron and manganese were distributed throughout the suspected disposal portion of the study area. The sample obtained from temporary well 63-TW07 exhibited the only positive detection of zinc; detected at a concentration of 17,100 micrograms per liter (µg/L) which exceeded the 2,100 µg/L screening standard. Subsurface soil samples collected from both the eastern and western portions of the study area had positive detections of zinc which exceeded background levels. Although the distribution of zinc among soil samples is not limited to the suspected disposal portion of the study area, temporary well 63-TW07 is located within one of the areas identified as having elevated concentrations of zinc in soil. The presence of zinc in soil, however, does not completely account for its elevated concentration in groundwater. If zinc disposal operations had taken place at Site 63 elevated concentrations of zinc would also be evident in the adjacent monitoring well 63-GW02 and at much higher concentrations among soil samples obtained from the suspected disposal area. Temporary monitoring well 63-TW07 is hydraulically downgradient from the suspected disposal portion of the study area and permanent well 63-GW02. The limited dispersion of zinc in sampling media suggests that its presence is not indicative of former or ongoing disposal activities.

Groundwater within the coastal plain region of North Carolina is naturally rich in iron and manganese. Groundwater concentrations of both iron and manganese at MCB Camp Lejeune often exceed the state standards of 300 and 50 µg/L, respectively. Elevated levels of iron and manganese, at concentrations above the NCWQS, were reported in samples collected from a number of base potable water supply wells which were installed at depths greater than 162 feet below ground surface. Certain total metal concentrations in groundwater are due more to geologic conditions (i.e., naturally occurring concentrations and unconsolidated soils) and sample acquisition methods, than to mobile metal concentrations in the surficial aquifer.

Iron and manganese concentrations from a number of wells at Site 63 exceeded the NCWQS but fell within the range of concentrations for samples collected elsewhere at MCB Camp Lejeune. Additionally, positive detections of both iron and manganese among groundwater samples retained from the upper-most portion of the surficial aquifer had no discernible pattern of distribution. The presence and concentrations of both iron and manganese in groundwater samples obtained at Site 63 appear to be indicative of natural site conditions rather than disposal activities.

Surface Water

No organic compounds were detected among any of the five surface water samples submitted for analyses from Site 63. As a result of those analyses, the extent of organic compounds in surface water were not addressed within the RI report.

Aluminum was the only TAL total metal identified among each of the five surface water samples obtained from the unnamed tributary that exceeded state or federal chronic screening values. Each sampling station had a positive detection of aluminum above the 87 µg/L chronic screening value. Positive aluminum detections among the five surface water samples obtained from the unnamed tributary ranged from 602 to 688 µg/L. The headwaters of the unnamed tributary are less than one hundred yards upgradient of Site 63, amongst pine and hardwood trees. The combination of acidic soil and acidification due to decaying leaves and pine needles most probably has contributed to the slightly acidic nature of surface water at Site 63. Field chemistry results suggest that the pH of the unnamed tributary is less than 4.0. Several hundred or even several thousand milligrams per liter of aluminum is not unusual for natural waters having a pH below 4.0. The slight acidity of surface water at Site 63, coupled with the natural occurrence of aluminum in site soil and sediment has effectively contributed to the observed levels of aluminum among each of the surface water samples.

Lead was identified among two of the five surface water samples at concentrations in excess of chronic screening values. The maximum concentration of lead detected among the five surface water samples was 2.2 µg/L; the fresh water chronic screening value for lead is 1.32 µg/L. The two lead detections were obtained from adjacent and downstream sampling stations. As with aluminum, water with a pH value below neutral may also dissolve considerable amounts of lead. The limited dispersion and low concentration of lead in surface water which exceeded applicable chronic screening values is not indicative of former or ongoing disposal activities, however.

Sediment

None of the TAL metal sampling results from Site 63 exceeded chronic sediment screening values; therefore, the extent of inorganic analytes in sediment were not addressed within the RI report. A summary of site contamination is presented in Table 5. Volatile, semivolatile, and PCB compounds were not detected among any of the five sediment samples submitted for analyses from Site 63. As a result of those analyses, the extent of volatile, semivolatile, and PCB compounds in sediment were also not addressed.

The pesticides 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, alpha-chlordane, and gamma-chlordane were detected in one of the five sediment samples retained for analysis from Site 63. The only other pesticide detection was that of 4,4'-DDD in a sample obtained from a separate sampling station. Each of the pesticides were detected at concentrations less than 15 µg/kg. The maximum pesticide concentration among the five sediment samples obtained for laboratory analysis was 11 µg/kg of 4,4'-DDD. Each of the pesticide detections exceeded applicable chronic sediment screening values; however, the pesticide detections did not contribute significantly to either human health or ecological risks. The observed concentrations of the detected pesticides were typical of levels observed in sediments throughout MCB Camp Lejeune. Positive detections of these compounds at Site 63 are most likely the result of former base-wide application and use of pesticides. The frequency and overall concentration of pesticides at Site 63 is not indicative of pesticide disposal activities.

Summary of Site Risks

As part of the RI, both a human health risk assessment (RA) and an ecological RA were conducted to determine potential risks associated with possible exposure to environmental media at Site 63. The following briefly summarizes the findings of the human health and ecological RAs.

Human Health Risk Assessment

Contaminants of potential concern (COPCs) were selected as part of the human health RA for surface soil, subsurface soil, groundwater, surface water, and sediment. The selection of COPCs was based upon criteria provided in the USEPA Risk Assessment Guidance for Superfund. For each COPC identified, incremental lifetime cancer risk (ICR) values and hazard index (HI) values were calculated to quantify potential carcinogenic and noncarcinogenic risks posed by possible exposure to site media. Table 6 presents ICR and HI values for each environmental media and both current and future potential receptors. Current and future potential receptors evaluated in the RI included current military personnel, current trespassers (i.e., children and adults), future residents (i.e., children and adults), and future construction workers. Table 6 also presents total ICR and HI values, which represent combined risks posed by possible exposure to site media. The total site-related risk was estimated by logically summing the multiple exposure pathways likely to affect the receptor during a given activity.

Table 6 presents the HI values that exceed the USEPA acceptable limit of 1.0. As depicted in Table 6, unacceptable risk values include the HI for future child residents exposed to groundwater (10.0) and the HI for future adult residents exposed to groundwater (4.5). The subsections which follow present both current and future risk scenarios.

Current Scenario

In the current case, the following receptors were assessed: military personnel and trespassers. Receptor exposure to surface soil, surface water, and sediment was assessed for the trespassers. Receptor exposure to surface soil, subsurface soil, surface water, and sediment was assessed for military personnel. The potential risks associated with the current receptors were within or below the acceptable risk range as defined by USEPA.

Future Scenario

In the future case, child and adult residents were assessed for potential exposure to groundwater, surface soil, surface water, and sediment. A construction worker was evaluated for surface soil and subsurface soil exposure. There were no unacceptable risks associated with the construction worker. However, there were potential noncarcinogenic risks calculated for the child resident from groundwater (10.0) exposure. Similarly, there was a noncarcinogenic risk (4.5) calculated for the adult resident from groundwater exposure. These risk values exceeded the hazard index of 1.0 for noncarcinogenic effects. The maximum level of iron and zinc in groundwater were the primary contributors to these noncarcinogenic risks.

As stated previously, groundwater is not currently used potably at the site, and future residential development of the site is unlikely. Based on this information, the future groundwater exposure scenario evaluated in this risk assessment, although highly protective of human health, is unlikely to occur.

It should be noted that iron is an essential nutrient. The toxicity values associated with exposure to this metal are based on provisional studies which have not been verified by USEPA. In fact, if iron were removed from the evaluation of risk from groundwater ingestion, the noncarcinogenic risk for the child would decrease from 10.0 to 4.8 and, for the adult, from 4.5 to 2.3. As a result, the potential human health risk from exposure to iron in groundwater is conservative.

The other analyte contributing to the unacceptable HI value in groundwater for the future residential child and adult is zinc. Zinc had a HI of 3.6 for the future child resident and 1.6 for the future adult resident. While zinc was detected at a frequency of six out of eleven samples, only one detection exceeded the comparison criteria. This concentration of zinc (17,000 µg/L) is one order of magnitude greater than those detected in Site 63 soils. In addition, zinc was not detected in surface water. Consequently, the potential human health risk from exposure to zinc in groundwater is a conservative estimate.

Although the HI values for future residents exceed USEPA acceptable limits, the risks they represent appear to be insignificant. As a result, conditions at OU No. 13 may be considered protective of human health and the environment.

Ecological Risk Assessment

During the ecological RA, COPCs were selected for surface water, sediment, and surface soil, as provided in Table 7. Then, potential ecological risks associated with each COPC were evaluated. The following paragraphs summarize the conclusions made for aquatic and terrestrial receptors at Site 63.

The following subsections provide an overview of potential risks to both aquatic and terrestrial environs identified at Site 63 during this assessment. Potential risks to the aquatic environment at Site 63 are demonstrated by the cumulative quotient index (QI) ratios greater than 1.0 calculated for both surface water and sediment. In addition, potential risks to the terrestrial environment are demonstrated by exceedances of soil toxicity values and risk exhibited in terrestrial chronic daily intake (CDI) models. However, the significance of the potential risks is considered to be low based on this ecological risk assessment.

Aquatic Ecosystem

Surface water concentrations of aluminum, barium, and lead may be adversely impacting the aquatic environment in the freshwater stream at Site 63. Cumulative quotient index (QI) ratios were calculated for the surface water at 1.31 for acute and 16.28 for chronic. These inorganic COPCs were detected at relatively the same concentrations at each sampling location. However, due to the conservative barium criteria and lead in the blank sample, aluminum appears to be the only COPC potentially impacting the aquatic environment. It should be noted that aluminum and barium were detected at higher concentrations during the 1991 SI. In addition, aluminum dissolves readily into surface water under acidic conditions; pH concentrations detected at Site 63 surface water stations were below four. Therefore, the low pH levels may have elevated the concentrations of aluminum detected in the surface water.

The potential risk to the aquatic community posed by the sediment is demonstrated by cumulative QI value of 11.33 for the effects range-low (ER-L). It is noted that risk is not demonstrated by the cumulative QI values calculated for the effects range-median (ER-M) (0.98) and sediment quality criteria (SQC) (0.66) values. The risk to the aquatic environment from the sediment is primarily due

to concentrations of chlordane, 4,4'-DDD, and 4,4'-DDE. However, these pesticides are not site-related contaminants, but rather a result of former base-wide pesticide control programs.

The intermittent, shallow nature of the stream may also introduce stress to the aquatic environment. The shallowness of the stream subjects the surface water to low dissolved oxygen concentrations and high temperatures both of which may adversely impact many aquatic organisms.

Terrestrial Ecosystem

Overall, some potential impacts to soil flora and fauna may occur as a result of concentrations of aluminum, chromium, copper, iron, lead, manganese, mercury, and zinc detected in the surface soil at Site 63. It should be noted that there is much uncertainty in the use of the flora and fauna surface soil screening values (SSSVs). In addition, the inorganics with the most exceedances of the SSSVs (aluminum, chromium, and iron) also exceed SSSVs for the background concentrations, indicating that regional conditions contribute to the potential risk to the terrestrial flora and fauna.

The terrestrial intake models only demonstrated a significant risk greater than one for the raccoon model. This risk was driven by concentrations of aluminum in the surface water via bioconcentration in fish tissue; however, it should be noted that background surface water concentrations of aluminum also may generate a risk in the raccoon model. Therefore, regional conditions are contributing to the terrestrial risk to the vertebrate population at Site 63.

The conclusions of the ecological RA, for both aquatic and terrestrial receptors, indicate that although a number of organic compounds and inorganic analytes exceeded applicable screening values, ecological risks at Site 63 appear to be insignificant. As a result, conditions at Site 63 may be considered protective of the environment.

Highlights of Community Participation

The Final RI Report and Final PRAP for OU No. 13 were released to the public on November 6, 1996. These documents are available to the public in an administrative record file at both the Onslow County Public Library in Jacksonville, North Carolina and at the Installation Restoration Division Office (Building 67, Room 238) at MCB Camp Lejeune. A notice regarding the availability of these documents was published in the "Jacksonville Daily News" on November 3, 1996.

A public meeting was held on November 6, 1996 to accept questions from the community regarding the No Further Remedial Action Alternative for OU No. 13. During the public meeting, representatives of the DoN and the Marine Corps discussed the preferred remedial action under consideration. A copy of the public meeting transcript is provided as Appendix A to this ROD. A 30-day public comment period concerning the preferred remedy for OU No. 13 followed the public meeting and concluded on December 6, 1996. No significant comments, criticisms, or relevant information was received during the public comment period; therefore, responses to comments havenot been prepared.

Scope and Role of Response Action

No Further Action with Institutional Controls is the selected alternative for OU No. 13. This decision is based upon the findings of the RI, particularly the results of both human health and

ecological risk assessments. Justification for No Further Remedial Action with Institutional Controls is presented within the sections which follow.

Description of the Selected Remedy

No Further Action with Institutional Controls is the preferred remedy for Site 63. As the name suggests, this alternative involves taking no further action at OU No. 13. This includes conducting no further environmental investigations or sampling. The site and all environmental media located within the site will remain in their current state as long as existing site conditions do not change. In addition, aquifer use restrictions in the Base Master Plan will prohibit the installation of water supply wells within 1,000 feet of Site 63. This decision is justifiable because conditions at OU No. 13 are protective of human health and the environment. This selected remedy will have no cost associated with it.

No Further Action with Institutional Controls Decision Rationale

A detailed justification in support of the preferred alternative for OU No. 13 is presented herein. The paragraphs which follow address individual site concerns and remedial limitations which have lead to the selection of the selected remedy.

There are no unacceptable site-related carcinogenic risks associated with exposure to environmental media at Site 63. Multiple exposure pathways were evaluated for current and future potential human receptors; resultant estimates indicate that carcinogenic site risks are within or below the acceptable risk range as defined by USEPA.

An assessment of potential noncarcinogenic risks posed by exposure to environmental media at Site 63 was also completed for possible current and future human receptors. This conservative evaluation of site risk suggests that future residents, given a number of exposure assumptions, could experience some adverse health effects. The evaluation was based upon the potential exposure of future child and future adult residents. Over 90 percent of noncarcinogenic risk generated by the future residential scenario is the result of presumed shallow groundwater ingestion. Ingestion of iron and zinc at the maximum concentrations detected among all groundwater samples obtained from Site 63 were used in the estimation of risk. Additionally, ingestion of iron and lead at the maximum concentrations detected among soil samples constituted the remaining noncarcinogenic risk to future child residents. It is important to note that this risk assessment is highly protective of human health and that future residential development of the site is unlikely.

The majority of site-related noncarcinogenic risk to future residents was generated by possible ingestion of inorganic analytes in groundwater. Hydraulic conductivity results from Site 63 suggest that potable wells supplying groundwater for human consumption from the uppermost portion of the surficial aquifer would not be practical. Groundwater flow rates would not be sufficient to support a potable source of drinking water. In addition, suspended material resulting from loose surficial soils would further inhibit groundwater flow capacities through siltation. Given these circumstances, it is unlikely that the surficial aquifer could be used as a drinking water source. If a potable well were required in the future at Site 63 it would most likely supply groundwater from the deeper, Castle Hayne Aquifer.

An ecological risk assessment of potential site-related impacts to both aquatic and terrestrial ecosystems was performed. Environmental media were assessed to determine the theoretical risks posed to various on-site ecological communities. Results of the ecological risk assessment indicate

that the aquatic environment may potentially be impacted by pesticides detected in the sediment and that risks posed to the terrestrial environment are a result of naturally occurring inorganic analytes detected in the surface water and surface soil. Similar aquatic and terrestrial risks have been demonstrated by reference samples collected throughout MCB Camp Lejeune from areas not known or suspected of having been impacted by facility operations. Based upon this assessment, the significance of potential risks to ecological receptors at Site 63 is considered negligible.

Inorganic analytes were detected in each soil, groundwater, surface water, and sediment sample obtained during the field investigation at Site 63. Analytes such as aluminum, arsenic, iron, lead, manganese, and zinc were principal contributors to both human health and ecological site risks. These and other inorganic analytes naturally occur, often abundantly, in site media. No discernible pattern of analyte distribution was evident among the various media sampled. Former site operations do not appear to have contributed to the presence or frequency of these analytes.

RESPONSIVENESS SUMMARY

The Responsiveness Summary serves a dual purpose and is the final component of the ROD. First, the Responsiveness Summary provides information regarding both the remedial preferences and the general site concerns of the community. Second, it demonstrates to members of the community that their comments and concerns are an integral part of the remedial decision making process.

A transcript of the November 6, 1996 public meeting is provided as Appendix A of this document. Based upon the comments received during the public meeting, members of the community support the selected remedy. No written comments concerning the proposed remedy for Site 63 were received during the public comment period.

Community Involvement

A review of MCB Camp Lejeune files suggests that community involvement is centered upon outreach programs and social clubs. Written concerns that the community may have regarding any Installation Restoration (IR) sites were not identified during the file search. A review of published newspaper articles indicated that the community is interested in the local drinking water supply, groundwater quality, and surface water quality of the New River; however, there were no expressed interests or concerns specific to the MCB Camp Lejeune IR sites (including Site 63). Two local environmental groups, the Stump Sound Environmental Advocates and the Southeastern Watermen's Association, have posed questions to MCB Camp Lejeune and local officials in the past regarding other environmental issues. Representatives of the two groups were sought as interview participants prior to the development of the MCB Camp Lejeune, Community Relations Plan. Neither group was available for the interviews.

Community relation activities pertaining to MCB Camp Lejeune IR sites in general and OU No. 13 specifically to date are summarized as follows:

- Conducted community relations interviews during February and March 1990. A total of 41 interviews were conducted with base personnel, on-base residents, local officials, and off-base residents.

- Prepared a Community Relations Plan during September 1990.

- Conducted additional community relations interviews during August 1993. Nineteen individuals were interviewed representing local business, military and civilian interests, civic groups, and residential communities.

- Prepared a Final Community Relations Plan in February 1994.

- Established information repositories at both the Onslow County Public Library in Jacksonville, North Carolina and at the Installation Restoration Division Office (Building 67, Room 238) at MCB Camp Lejeune.

- Established an administrative record for all IR sites at MCB Camp Lejeune.

- Released the PRAP for OU No. 13 for public review and comment on November 6, 1996.

- Released a notice soliciting public comment and announcing availability of the PRAP document on November 3, 1996.

- Held a Remedial Action Board meeting on November 6, 1996 to solicit comments concerning the RI findings and PRAP recommendation.

- Held a public meeting on November 6, 1996 to solicit comments and to provide information and findings concerning OU No. 13. Approximately 16 members of the community were in attendance. The transcript from the public meeting is provided as Appendix A to this ROD and is also available at the two information repositories.

Integration of Comments

A public meeting was held on November 6, 1996 at the Onslow County Library in Jacksonville, North Carolina. Members of the community and representatives from the DoN, MCB Camp Lejeune, USEPA Region IV and NC DEHNR were in attendance. The public meeting transcript is provided in Appendix A. No written comments concerning the proposed remedy for Site 63 were received during the public comment period.

As a result of both public meeting and public comment period, no significant changes to the selected remedy were required.

TABLES

TABLE 1

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE INSPECTION, 1991
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Organic Compounds	Surface Soil (0-2 feet)			Subsurface Soil (below 2 feet)		
	Detection Frequency	Range of Positive Detections (µg/kg)	Location of Maximum Concentration	Detection Frequency	Range of Positive Detections (µg/kg)	Location of Maximum Concentration
Toluene	1/9	2	SB03	0/9	ND	NA
Total Xylenes	1/9	3	SB03	0/9	ND	NA
Benzoic Acid	2/9	45-280	MW02	0/9	ND	NA
Di-n-butylphthalate	3/9	43-51	MW01	2/9	43-78	MW02
bis(2-Ethyhexyl) phthalate	3/9	44-72	MW02	1/9	62	MW01
4-4'-DDE	1/9	58	SB04	0/9	ND	NA
4-4'-DDD	1/9	53	SB04	0/9	ND	NA
4-4'-DDT	1/9	39	SB04	0/9	ND	NA
Aroclor-1254	1/9	1000	SB02	0/9	ND	NA

TABLE 1 (Continued)

SUMMARY OF POSITIVE DETECTIONS IN SOIL
SITE INSPECTION, 1991
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Inorganic Analytes	Surface Soil (0-2 feet)			Subsurface Soil (below 2 feet)		
	Detection Frequency	Range of Positive Detections (mg/kg)	Location of Maximum Concentration	Detection Frequency	Range of Positive Detections (mg/kg)	Location of Maximum Concentration
Aluminum	8/9	975-8,450	SB01	9/9	1,920-20,500	SB04
Arsenic	4/9	1.4-2.3	SB03	5/9	1.3-9.1	SB06
Barium	3/9	16.9-22.9	SB04	3/9	16.3-41.8	SB04
Calcium	0/9	ND	NA	3/9	79.7-377.0	SB04
Chromium	8/9	1.7-11.3	SB03	9/9	2.0-30.3	SB04
Copper	8/9	2.3-20.3	SB05	9/9	2.9-24.0	SB04
Iron	8/9	741-5980	SB03	9/9	682-16,100	SB01
Lead	8/9	2.2-36.3	SB04	9/9	2.1-8.5	SB04
Magnesium	7/9	32.2-324.0	SB01	9/9	40.9-1020.0	SB04
Manganese	7/9	6.6-22.8	SB04	8/9	4.9-57.1	SB04
Nickel	5/9	2.1-3.9	SB01	7/9	2.2-7.3	SB04
Potassium	4/9	373-697	SB03	7/9	290-2,000	SB04
Vanadium	8/9	2.2-13.8	SB03	9/9	1.6-36.9	SB04
Zinc	6/9	8.4-57.1	SB04	7/9	6.6-33.9	SB04

Notes:

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
ND - not detected
NA - not applicable

TABLE 2

SUMMARY OF POSITIVE DETECTIONS IN GROUNDWATER
SITE INSPECTION, 1991
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Potential Contaminant	Detection Frequency	Range of Positive Detections (µg/L)	Location of Maximum Concentration	Comparison Criteria	
				USEPA MCL (µg/L)	North Carolina WQS (µg/L)
Carbon Disulfide	2/3	1	MW01, MW02	NE	70
Benzoic Acid	1/3	3	MW02	NE	NE
bis(2-Ethylhexyl)phthalate	1/3	9	MW02	NE	NE
Aluminum	3/3	3,650-85,300	MW02	0.05 - 0.2	NE
Barium	3/3	56.1-5,410	MW02	2,000	2,000
Chromium	3/3	4.4-134	MW02	100	50
Iron	3/3	4,320-100,000	MW02	300	300
Lead	3/3	4.3-369	MW02	15[1]	15
Manganese	3/3	50.3-1,020	MW02	50	50

Notes:

µg/L - microgram per liter
MCL - Maximum Contaminant Level
WQS - Water Quality Standard (North Carolina Administrative Code Title 15A, Subchapter 2L)
[1] USEPA "action level" for lead
NE - Not Established

TABLE 3

SUMMARY OF POSITIVE DETECTIONS IN SURFACE WATER
SITE INSPECTION, 1991
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Contaminant	Detection Frequency	Range of Positive Detections (µg/L)	Comparison Criteria	
			FWQSV (µg/L)	NCWQSV (µg/L)
Aluminum	2/2	1,030-1,170	NE	NE
Barium	2/2	26.9-34.8	NE	1,000
Calcium	2/2	1,570-2,520	NE	NE
Copper	1/2	6.3	6.54	7.0
Iron	2/2	1,040-1,090	NE	1,000
Magnesium	2/2	746-845	NE	NE
Manganese	2/2	10.4-13.6	NE	200
Nickel	1/2	10.2	8.8	25
Sodium	2/2	4,150-4,780	NE	NE
Thallium	1/2	2.0	NE	NE

Notes:

µg/L - micrograms per liter
FWQSV - Fresh Water Quality Screening Value (USEPA Region IV, 1994).
NCWQSV - North Carolina Water Quality Screening Value for fresh water aquatic life or more stringent standard to support additional uses.
NE - Not Established

TABLE 4

SUMMARY OF POSITIVE DETECTIONS IN SEDIMENT
SITE INSPECTION, 1991
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Contaminant	Detection Frequency	Range of Positive Detections (mg/kg)	Comparison Criteria
			Effects Range Low[1] (mg/kg)
Aluminum	2/2	803-13,400	NE
Arsenic	1/2	3.5	8.2
Barium	2/2	2.7-34.2	NE
Beryllium	1/2	0.31	NE
Calcium	1/2	160	NE
Chromium	2/2	1.7-17.3	81
Copper	2/2	16.8-76.8	34
Iron	2/2	376-5750	NE
Lead	2/2	3.4-90.0	46.7
Magnesium	2/2	36.5-525	NE
Manganese	2/2	2.7-14.7	NE
Nickel	2/2	3.5-8.2	20.9
Potassium	1/2	873	--
Vanadium	2/2	1.6-24.0	--
Zinc	2/2	3.5-19.0	150

Notes:

mg/kg - milligrams per kilogram
[1] Region IV - Effects Range Low from Long, et. al., 1995.
NE - Not Established

TABLE 5

SUMMARY OF SITE CONTAMINATION
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Media	Fraction (units)	Detected Contaminants or Analytes	Comparison Criteria		Min.	Max.	Location of Maximum Detection	Detection Frequency	Detections Above		Distribution of Positive Detections
			Screening Standard	Base Background					Screening Standard	Base Background	
Surface Soil	Volatile (µg/kg)	ND	Soil SL	NA				0/46			
	Semivolatile (µg/kg)	Nitrosodiphenylamine	200	NA	51 J	51 J	SB12	1/45	0/45	NA	adjacent to 63-GW01
		Di-n-butylphthalate	120,000	NA	78 J	78 J	63-TW06	1/45	0/45	NA	southeast
		BEHP	11,000	NA	41 J	4,400	SB12	7/45	0/45	NA	1 exceeds blank conc.
	Pesticide (µg/kg)	Dieldrin	1.0	NA	3 J	4.1 J	SB32	3/46	3/46	NA	central, scattered
		4-4'-DDE	500	NA	2.7 J	55 J	SB35	7/45	0/45	NA	central, scattered
		4-4'-DDD	700	NA	12	26 J	SB35	2/45	0/45	NA	central and eastern
		Endosulfan Sulfate	NA	NA	1.9 J	2.8 J	SB18	4/45	NA	NA	central and northern
		4-4'-DDT	1,000	NA	2 J	50 J	SB29	11/45	0/45	NA	central, scattered
		alpha-Chlordane	NA	NA	3.5	16	SB35	2/45	NA	NA	central and eastern
		gamma-Chlordane	NA	NA	2.7 J	9	SB35	2/45	NA	NA	central and eastern
	PCB (µg/kg)	Aroclor-1260	NA	NA	28 J	97	SB30	2/45	NA	NA	central
	Metal (1) (mg/kg)	Arsenic	15	1.3	0.32	3.7	SB21	36/46	0/46	5/46	scattered
		Barium	32	17.3	3.0	53.1	SB35	46/46	3/46	8/46	scattered
		Beryllium	180	0.2	0.1 J	0.27	SB32	5/46	0/46	1/46	central
		Cadmium	6	0.7	1.0	3.1	SB21	2/46	0/46	2/46	central and eastern
		Chromium	NA	6.6	1.1	11.1	SB21	44/46	NA	6/46	scattered
		Copper	NA	7.1	0.47	74.8	SB29	29/46	NA	10/46	scattered
		Iron	NA	3,702	590	22,400	SB21	46/46	NA	9/46	scattered
		Lead	NA	23.4	2.6	107	SB29	46/46	NA	5/46	scattered
		Manganese	NA	18.5	3.4 J	348 J	SB03	46/46	NA	13/46	scattered
		Mercury	3	0.09	0.06	0.21 J	SB23	4/46	0/46	1/46	central
		Nickel	21	3.5	0.62 J	9.8	SB21	33/46	0/46	2/46	central
		Silver	NA	0.9	0.72	0.97	SB29	2/46	NA	1/46	central
		Zinc	42,000	13.8	0.98	1,860	SB21	36/46	0/46	7/46	scattered

TABLE 5 (Continued)

SUMMARY OF SITE CONTAMINATION
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Media	Fraction (units)	Detected Contaminants or Analytes	Comparison Criteria		Min.	Max.	Location of Maximum Detection	Detection Frequency	Detections Above		Distribution of Positive Detections
			Screening Standard	Base Background					Screening Standard	Base Background	
Subsurface Soil	Volatile (µg/kg)	Styrene	2,000	NA	41	41	SB15	1/50	0/50	NA	northwest
	Semivolatile (µg/kg)	Nitrosodiphenylamine	200	NA	94 J	350 J	SB19	2/49	1/49	NA	northern
		BEHP	11,000	NA	41 J	4,700	SB19	12/49	0/49	NA	3 exceed blank conc.
	Pesticide (µg/kg)	Dieldrin	1.0	NA	2.1 J	5.0 J	SB32	2/50	2/50	NA	northern and western
		4,4'-DDE	500	NA	2.6 J	2.8 J	SB22	2/50	0/50	NA	central
		4,4'-DDD	700	NA	5.6	5.6	SB22	1/50	0/50	NA	central
		4,4'-DDT	1,000	NA	7.8	7.8	SB20	1/50	0/50	NA	northern
	PCB (µg/kg)	ND	Soil SL	NA				0/50			
	Metal (1) (mg/kg)	Aluminum	NA	7,413	312	16,000	SB07	50/50	NA	32/50	scattered
		Antimony	NA	6.5	2.5 J	16.2 J	SB23	7/42	NA	1/42	central
		Arsenic	15	2	0.4	16	SB14	47/50	1/50	28/50	scattered
		Barium	32	14.4	2.5	1,120	SB23	50/50	2/50	8/50	scattered
		Beryllium	180	0.2	0.08	0.29	63-TW08	18/50	0/50	6/50	scattered
		Chromium	NA	12.5	1.2	84.4	SB23	50/50	NA	27/50	scattered
		Copper	NA	2.4	0.55	160	SB23	38/50	NA	27/50	scattered
		Iron	NA	7,135	425 J	149,000	SB23	50/50	NA	20/50	scattered
		Lead	NA	8.3	2 J	1,650	SB23	50/50	NA	11/50	scattered
		Manganese	NA	8.0	1.5	586	SB23	50/50	NA	18/50	scattered
		Nickel	21	3.7	1.0	76.1	SB26	44/50	7/50	19/50	scattered
		Silver	NA	0.9	1.8	5.3	SB23	2/50	NA	2/50	central
		Zinc	42,000	6.7	1.3	1,130	SB23	38/50	0/50	16/50	scattered
Groundwater	Volatile (µg/L)	ND	NCWQS/ MCL	NA				0/11			
	Semivolatile (µg/L)	ND	NCWQS/ MCL	NA				0/11			
	Pesticide (µg/L)	ND	NCWQS/ MCL	NA				0/10			
	PCB (µg/L)	ND	NCWQS/ MCL	NA				0/10			
	Total Metal (µg/L)	Iron	300	NA	73.5	24,300	63-TW05	8/11	4/11	NA	central
		Manganese	50	NA	1.8	311	63-GW02	11/11	4/11	NA	central
		Zinc	2,100	NA	4.9	17,100	63-TW07	6/11	1/11	NA	eastern

TABLE 5 (Continued)

SUMMARY OF SITE CONTAMINATION
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Media	Fraction (units)	Detected Contaminants or Analytes	Comparison Criteria		Min.	Max.	Location of Maximum Detection	Detection Frequency	Detections Above		Distribution of Positive Detections
			Screening Standard	Base Background					Screening Standard	Base Background	
Surface Water	Volatile (µg/L)	ND	NCWQS	NA				0/5			
	Semivolatile (µg/L)	ND	NCWQS	NA				0/5			
	Pesticide (µg/L)	ND	NCWQS	NA				0/5			
	PCB (µg/L)	ND	NCWQS	NA				0/5			
	Metal (2) (µg/L)	Aluminum	87	1,350	602	688	63-SW05	5/5	5/5	0/5	maximum downstream
Sediment	Volatile (µg/kg)	ND	NOAA ER-L	NA				0/5			
	Semivolatile (µg/kg)	ND	NOAA ER-L	NA				0/5			
	Pesticide (µg/kg)	4,4'-DDE	2	NA	4.2 J	4.2 J	63-SD04	1/5	1/5	NA	adjacent to site
		4,4'-DDD	2	NA	2.6 J	11 J	63-SD04	2/5	2/5	NA	adjacent to site
		4,4'-DDT	1	NA	1.6 J	1.6 J	63-SD04	1/5	1/5	NA	adjacent to site
		alpha-Chlordane	0.5	NA	4.7 J	4.7 J	63-SD04	1/5	1/5	NA	adjacent to site
		gamma-Chlordane	0.5	NA	6.2 J	6.2 J	63-SD04	1/5	1/5	NA	adjacent to site
	PCB (µg/kg)	ND	NOAA ER-L	NA				0/5			
	Metal (2) (mg/kg)	ND above screening val	NOAA ER-L	Background					0/5	0/5	

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

(1) Metals in both surface and subsurface soils were compared to twice the average base background positive concentrations for aluminum, barium, iron, manganese and priority pollutant metals only (priority pollutant metals include antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, zinc).

(2) Total metals in surface water and sediment were compared to the range of positive detections in upgradient samples at MCB, Camp Lejeune.

BEHP - bis(2-Ethylhexyl)phthalate

NA - Not applicable

ND - Not detected

MCL - Federal Maximum Contaminant Level. Maximum permissible level of a contaminant in water which is delivered to any user of a public water system. U.S. Environmental Protection Agency - Drinking Water Regulations and Health Advisories.

NCWQS - North Carolina Water Quality Standards. Separate Values Applicable to Groundwater (North Carolina Administrative Code, Title 15A, Subchapter 2L) and Surface Water (North Carolina Administrative Code, Title 15A, Subchapter 2B).

NOAA ER-L - USEPA Region IV Sediment Effects-Range Low Screening Values, established by the National Oceanic and Atmospheric Administration.

Soil SL - USEPA Region III Soil Screening Levels for Protection of Groundwater, established by the Office of Solid Waste Emergency Response: R.L. Smith (October 4, 1995).

TABLE 6

SUMMARY OF CURRENT AND FUTURE POTENTIAL SITE RISKS
REMEDIAL INVESTIGATION, 1995
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Receptors	Surface Soil		Subsurface Soil		Groundwater		Surface Water/Sediment		Total	
	ICR	HI	ICR	HI	ICR	HI	ICR	HI	ICR	HI
Current Military Personnel	1.3E-07	0.02	5.0E-07	0.1	NA	NA	2.1E-08	<0.01	6.5E-07	0.12
Current Adolescent Trespasser	2.8E-07	0.02	NA	NA	NA	NA	8.4E-08	0.01	3.7E-07	0.03
Future Child Resident	2.2E-06	0.2	NA	NA	8.6E-06	10	2.5E-07	0.05	1.1E-05	10.3
Current Adult Trespasser	1.8E-07	<0.01	NA	NA	NA	NA	1.6E-07	<0.01	3.4E-07	<0.01
Future Adult Resident	1.5E-06	0.03	NA	NA	1.8E-05	4.5	1.6E-07	<0.01	2.0E-05	4.5
Future Construction Worker	4.7E-08	0.03	1.8E-07	0.15	NA	NA	NA	NA	2.3E-07	0.18

Notes:

ICR = Incremental Lifetime Cancer Risk
HI = Hazard Index
Total = Soil + Groundwater + Surface Water/Sediment
NA = Not Applicable
Boxed values indicate risk values that exceed the acceptable risk value of 1.0 for noncarcinogens.

TABLE 7

SUMMARY OF TERRESTRIAL QUOTIENT INDICES
REMEDIAL INVESTIGATION, 1995
SITE 63 - VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MCB, CAMP LEJEUNE, NORTH CAROLINA

Contaminant	Red Fox	Bobwhite Quail	Cottontail Rabbit	Raccoon	Whitetail Deer
4,4'-DDE	1.94E-07	6.64E-05	3.41E-05	9.48E-07	2.97E-07
4,4'-DDT	1.88E-07	6.04E-05	2.56E-05	9.67E-07	1.90E-07
DiEldrin	5.94E-06	6.61E-05	3.79E-03	8.97E-05	5.45E-08
Endosulfan SulfatE	2.20E-07	1.59E-06	3.49E-04	2.28E-06	4.17E-06
Aluminum	5.72E-03	3.21E-01	9.16E-01	1.22E+01	5.79E-03
Arsenic	7.77E-04	1.89E-04	2.27E-03	3.31E-03	5.91E-05
Barium	2.50E-02	3.48E-02	2.20E-01	8.39E-02	1.15E-02
Beryllium	4.16E-06	1.20E-04	6.09E-04	2.09E-05	4.71E-06
Chromium	7.44E-05	9.06E-05	2.83E-04	3.84E-04	5.53E-06
Cobalt	1.96E-05	9.14E-04	3.50E-03	9.40E-05	8.10E-05
Copper	1.42E-04	6.41E-03	7.49E-02	4.04E-04	4.70E-03
Iron	6.74E-03	6.63E-02	3.78E-01	1.93E-02	6.47E-03
Lead	1.47E-04	8.66E-03	6.80E-02	1.27E-03	2.07E-03
Manganese	5.95E-04	1.16E-03	4.22E-02	3.53E-03	2.79E-03
Mercury	3.09E-05	3.07E-03	2.48E-02	3.25E-05	8.16E-04
Nickel	1.34E-06	2.02E-04	6.37E-03	9.63E-05	1.75E-04
Zinc	6.87E-03	1.49E-02	2.54E-01	2.98E-04	8.15E-03
Total Quotient Index	**4.61E-02**	**4.58E-01**	**2.00E+00**	**1.23E+01**	**4.26E-02**

Note:

Boxed values represent Quotient Indices that exceed "1"

FIGURES

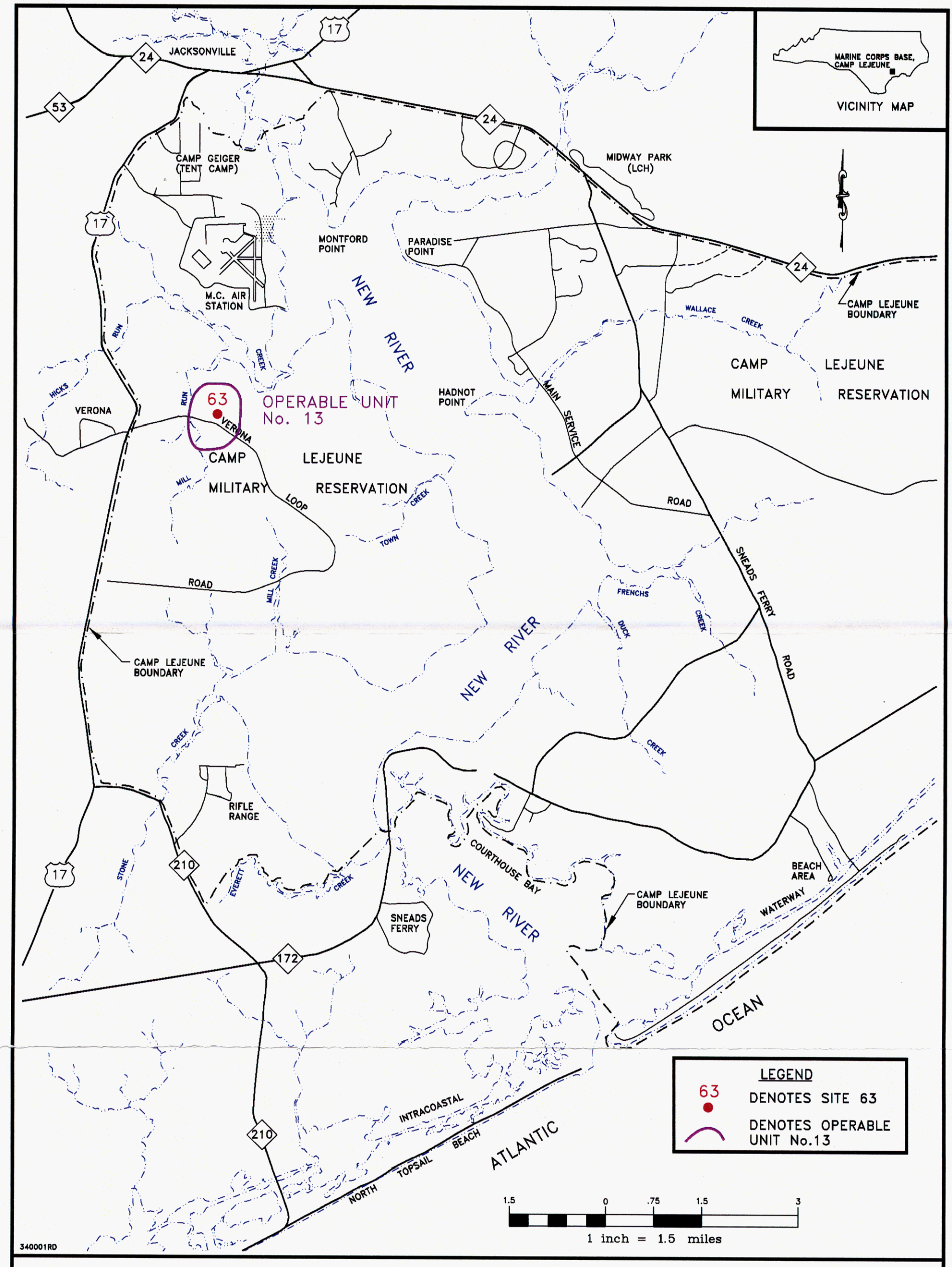


FIGURE 1
OPERABLE UNIT 13 – SITE 63
RECORD OF DECISION, CTO–0340

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

01754.11 BIX

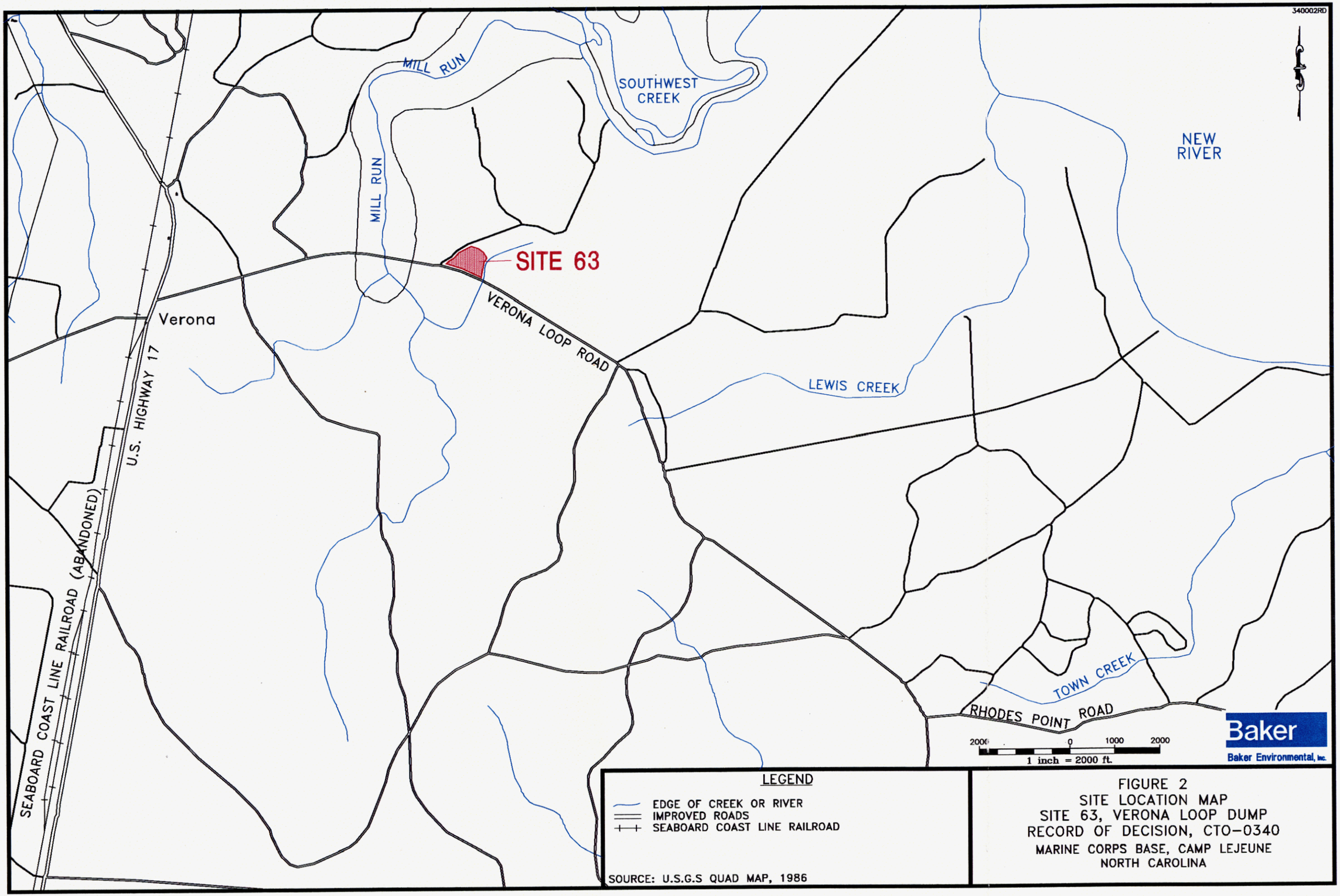
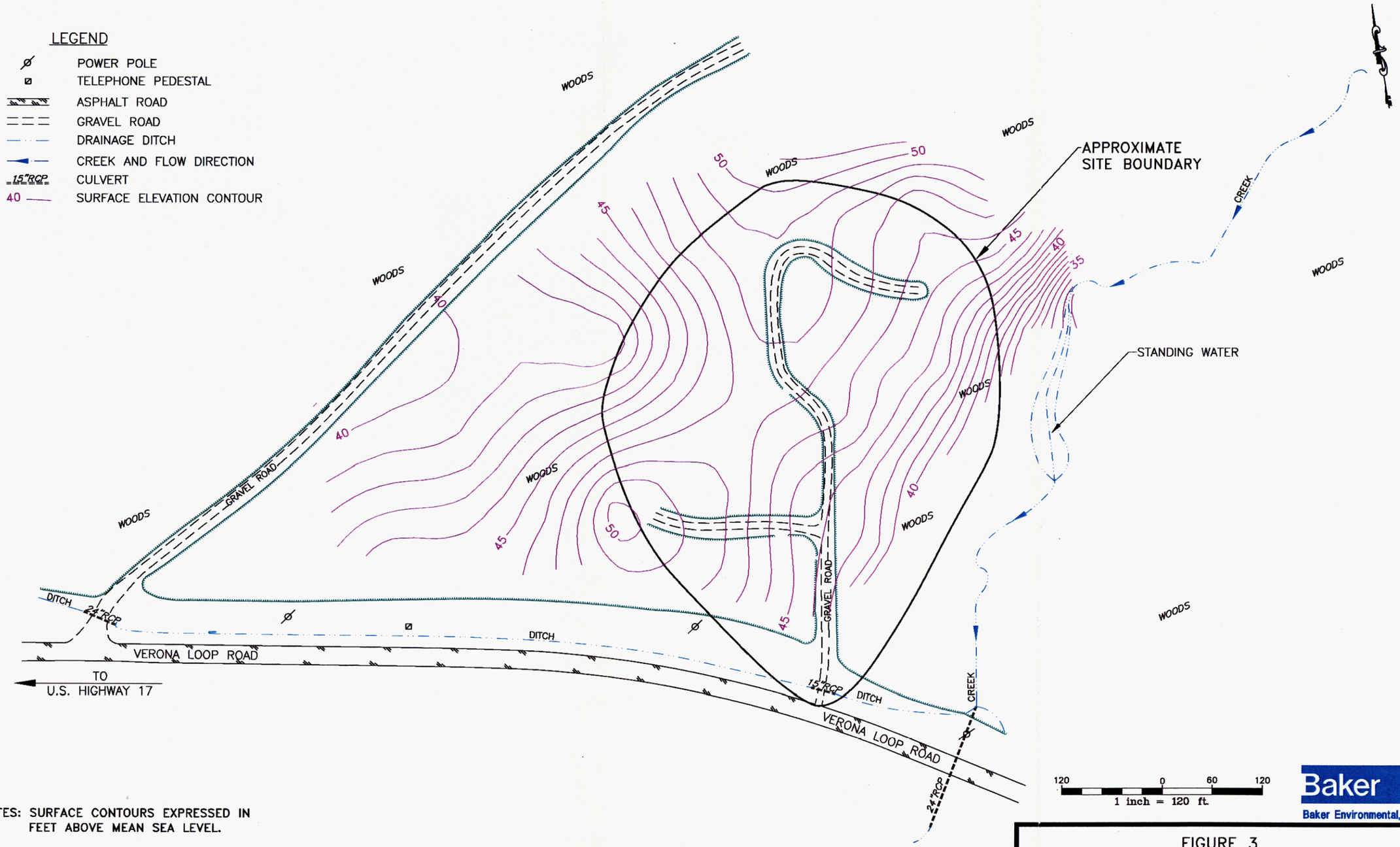


FIGURE 2
SITE LOCATION MAP
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

340003RD



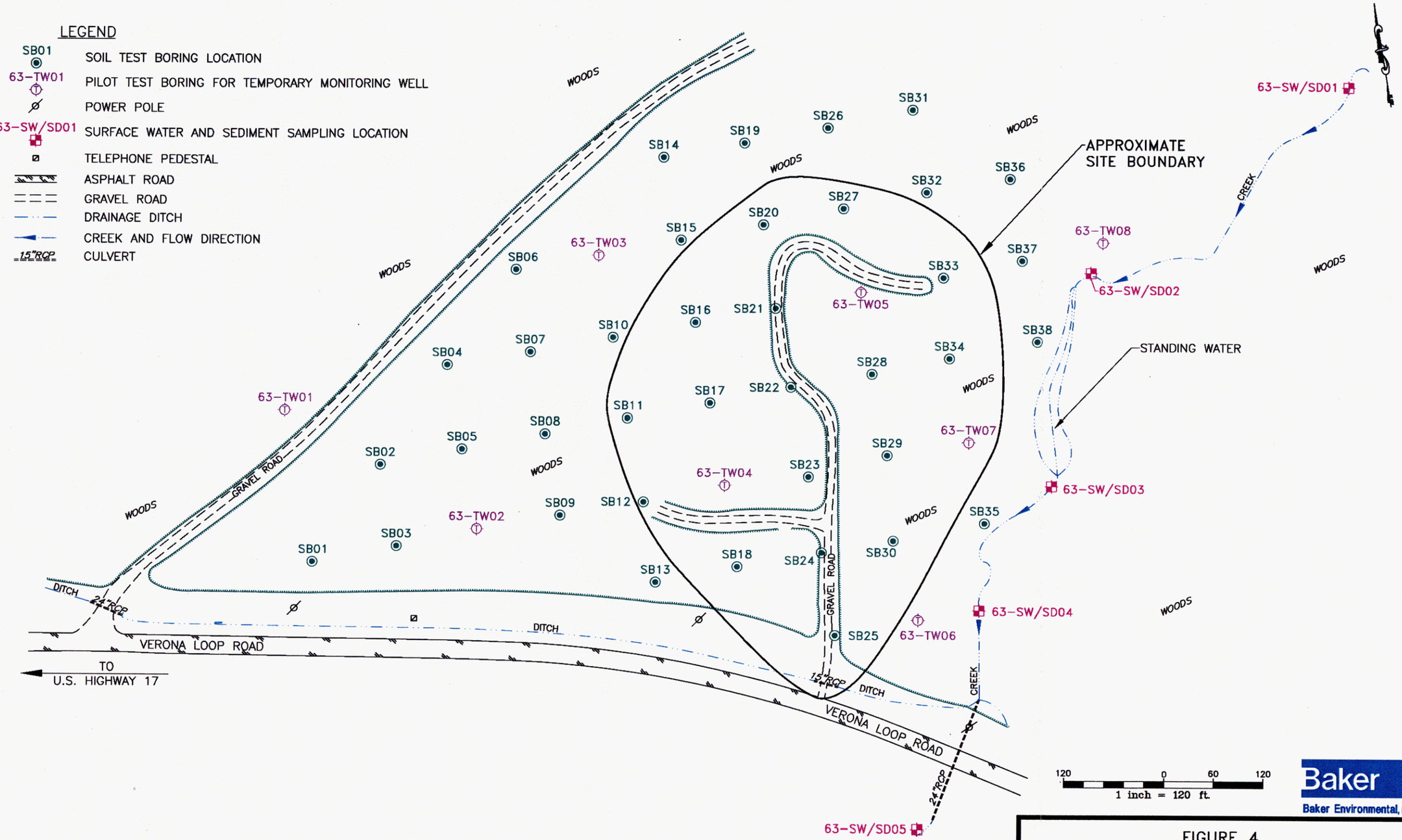
NOTES: SURFACE CONTOURS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL.

SOURCE: LANTDIV, 1992
SURVEY: W.K. DICKSON & ASSOC., 1995

Baker
Baker Environmental, Inc.

FIGURE 3
SITE MAP AND SURFACE CONTOURS
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

340005RD



Baker
Baker Environmental, Inc.

FIGURE 4
REMEDIAL INVESTIGATION SAMPLING LOCATIONS
SITE 63, VERONA LOOP DUMP
RECORD OF DECISION, CTO-0340
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

SOURCE: LANTDIV, 1992
SURVEY: W.K. DICKSON & ASSOC., 1995

APPENDIX A
PUBLIC MEETING TRANSCRIPT

RESTORATION ADVISORY BOARD MEETING

Proposed Remedial Action Plan

Operable Unit No.12 (Site 3)
Operable Unit No.13 (Site 63)

November 6, 1996.
Onslow Public Library,
Jacksonville, North Carolina

Reported by:

E D N A P O L L O C K, CVR
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Hampstead, North Carolina 28443
(910) 270-4541
Fax: 270-5180

* Copy *

WEDNESDAY EVENING SESSION

November 6, 1996

The Slide Presentation of the Proposed Remedial Action Plan for Operable Units 12 and 13 by Baker Environmental, Inc. during the Restoration Advisory Board Meeting, convened at 8:00 o'clock p.m. in the Conference Room of Onslow Public Library, 58 Doris Avenue East, Jacksonville, North Carolina.

MR.THOMAS TREBILCOCK: We'll go ahead with the slide presentation.

Some of these figures that are going to be in here are in the Proposed Remedial Action Plan that we have there.

We apologize for getting that out so late, but I guess this has been on sort of a particular track.

But, anyway, my name is Tom Trebilcock with Baker Environmental to speak to you tonight about Operable Unit No.13, Site 63.

During the presentation, I would welcome any questions that you have and if you don't mind, if you don't object, just state your name before your question so our Court Reporter can just get a record of where the

questions are from and that will help us when we go to address these questions with a response summary that will be provided later.

As Matt talked about earlier, as he went through each of the operable units, there are 18 operable units. Some of those operable units are comprised of more than one site.

It just so happens that Operable Unit 13 is comprised of only one site and that's Site 63, the Verona Loop Dump.

A sense of where the site is located, it's in the western part of the facility over here, about two miles south of the Marine Corps Air Station.

The next slide has a little bit better regional location of it.

It's about a mile east of Highway 17 for Verona and it's about a mile-and-a-half west of the New River.

MR.CARRAWAY: That's the one we did not see on our field trip.

MR.MORRIS: We went there, but there were trees down across the entrance.

MR.TREBILCOCK: Yes.

Yeah, it got some storm damage in both hurricanes.

Site 63 is approximately a five acre site which is comprised of mixed hardwood and pine forest. It's located on sort of a topographic high or saddle between two drainages.

So it's sort of on top of a hill.

It's reported to have received what's called "bivouac" waste and I have a picture following this that shows some of what that might include, although the "bivouac" was never really described or defined in any historical documents.

There were no known hazardous waste disposed of at Site 63 also.

Same picture.

Okay, this is a photograph of Site 63 showing the site from an access road that comes off of Verona Loop Road which is what the site is named for.

Looking into the site looking north right here, you can see it's sort of a fairly wooded area. Actually, it's pretty thickly wooded.

Okay, the area is primarily used now as a

training area.

This is one that the personnel trenched out, a sort of foxhole that they've dug out there.

This area and the site are also used for hunting and recreational hunting, but primarily for exercises, training exercises, things like that.

Let me get this in a little better focus.

But, this shows some of the things that were observed out at the site and this is what--there are a few mounds of the same type of - it looks like construction material, but it's concrete, some metal, scrap metal and in some of the other piles, there have been derelict vehicles, vehicle parts, tires, wheel covers and things like that.

So, you know, although we don't have a definition of "bivouac" waste, from these piles out there we could see the concrete and other - looks like construction material.

There's a small tributary to Mill Run on this side of the Base and it runs right--abuts sort of the site itself.

This creek tends to dry up in the summer but

it's about two to three feet across right here.

And, that's the way most of it is all along beside Site 63.

This is - in case you're wondering - is a statement, just shows where a sample was taken, in this case the surface water and sediment sample.

The investigation at that particular site, the site was originally identified in an initial assessment study in 1983 as a potential dump area.

In 1991, the first samples were collected at Site 63 and that's part of the site investigation.

The findings from that site investigation prompted the next step, the remedial investigation.

Part of the site investigation was recommending further study of the site because only a limited amount of soil samples and groundwater samples were collected.

As part of the remedial investigation that we conducted in 1995, a total of 96 soil samples were collected and 11 shallow groundwater samples were collected from eight temporary wells and three existing shallow wells.

And, also, five surface water and five sediment

samples were collected.

The findings from the soil investigation indicated that among the 96 soil samples that were collected, 20 of those samples had - let me get this in focus - 20 of those samples had detectable levels of pesticides.

Now it's sliding away. This slide projector is living up to its name - sliding.

Twenty of those samples had pesticides, detectable levels of pesticides in them.

Nineteen of the samples had detectable levels of semi-volatile organic compounds in them.

And, then two of the ninety some samples had polychlorinated biphenyls or what's commonly referred to as PCBs.

And, then, finally, one sample had detectable levels of volatile organic compounds.

Now, the concentrations of these compounds with the exception of the semi-volatile organic compounds were below one hundred parts per billion.

Now, only a few, actually one semi-volatile organic compound was detected above that and it was

detected more than once.

This slide shows exactly where these soil samples were collected throughout the site.

This shows what was thought to be, or still remains to be what we think is the approximate site boundary and this is the gravel road that we saw the picture before.

Now, a lot of the sampling would basically extend out beyond the boundary of the site just in case, you know, this area wasn't well, and it hasn't been well defined in the records.

Okay, the findings from the groundwater investigation indicated that no organic compound was detected among the 11 groundwater samples that were collected.

Iron, manganese and zinc were however detected at concentrations which exceeded the North Carolina Groundwater Quality Standard.

But, those concentrations were detected at concentrations that are typical of natural site conditions in the Coastal Plain in North Carolina.

Next slide.

If there are any questions--[laughter]--I'm kind of rolling through this.

MS.ELEANOR WOOD: I have one in looking at this chart and it talks about chlordane and it compares some criteria of stream sediment and there is no chlordane and I was curious about that.

MR.TREBILCOCK: That's right, for soil.

MS.WOOD: For soil.

MR.TREBILCOCK: Yes, that's right.

For some of the pesticides there are standards and they're related to how and what concentration in soil would a contaminant potentially impact groundwater.

And, for chlordane, for example, does not--

MS.WOOD: You don't have to deal with soil.

MR.TREBILCOCK: Well, it doesn't have a standard.

I'm sure there probably is a concentration of it that would impact groundwater, but I guess it hasn't been established.

I don't know.

Are there any other questions?

[No response]

This figure here shows the location of each of the samples, the groundwater sample locations. There are five within the known site boundary, or six within the known site boundary and five that extend outward from there.

There were, as I mentiond before, five surface water and five sediment samples collected.

There were also no organic compounds detected in the surface water samples and there were only two of the five samples that had detectable levels of pesticides in them.

MR.JAMES SWARTZENBERG: Excuse me, Jim Swartzenberg.

Is there a pattern to where these particular samples were taken from?

MR.TREBILCOCK: Where they were taken?

MR.SWARTZENBERG: Yes.

MR.TREBILCOCK: Yeah, actually--

MR.SWARTZENBERG: Found.

MR.TREBILCOCK: Oh, found.

MR.SWARTZENBERG: Where you found some pesticide and stuff.

MR.TREBILCOCK: It pretty much follows what we've seen in other sites, you know. It gets back I think not too long ago, actually '57 or sixties or fifties, pesticides were fairly commonly used around the Base.

And, when we do find them, they're pretty scattered throughout the Base.

MR.SWARTZENBERG: The same is true for the heavy metals and PCB's and all that.

MR.TREBILCOCK: Yeah, there were no particular--

MR.SWARTZENBERG: Next to where the concrete was?

MR.TREBILCOCK: Well, yeah, there were higher metals detected where we had--where we did observe some in the main part of the site there.

Visually, you could see metals in the sample like rusted iron so in those samples we have a higher concentration of iron.

But, that's where we had buried material mostly. There were only a few places.

But, it usually did correlate.

Pesticides in sedment at least, they tend to adhere to particles so where the surface water flows

across soil, it may pick up the particles in the sediment.

So, we see a lot of water pollution in sediments because they sort of adhere to particles and they collect in these drainage basins.

Yes!

MR.CARAWAY: Eric Caraway!

I was noticing on the map itself of the samples, was there any particular reasoning why they were going more towards 17 and none of them were taken across the creek, or the little small branch?

MR.TREBILCOCK: Well, because it's in a sort of a topographic high, the thinking was that if there were sites and we weren't so sure where that site was, if the only thing we had to indicate where the site was, was that gravel road and also some of these debris piles, but the thinking was that if there were a disposal area, it would be on that kind of flat area at the top.

The site actually slopes pretty steeply down to that creek that's to the east.

Maybe if I can flash that, flip forward and show you the surface water sample locations--

MR.CARAWAY: My experience with landfills, you

fill in a low area.

MR.TREBILCOCK: Well, it's not a landfill.

MR.CARAWAY: Well, I know, but it was a dump site.

MR.TREBILCOCK: A dump site.

MR.CARAWAY: Yeah, okay, dump site, landfill, there's a definition now. Back then there wasn't.

If you have a low area you want to fill it in, you start in the lowest part of the area and work your way up.

So my question is not being able to see the area--

MR.TREBILCOCK: Right.

MR.CARAWAY: --Was the ridge part of the waste area, or was there a ridge and it was put on top and the things filtered down?

MR.TREBILCOCK: It looks like that just this area within the site boundary had the evidence of, you know, that construction debris.

And, I think those are what originally indicated where the site might be, the location of those debris piles.

Now, you know, we dug down in the ground over 46 spots and only two of those spots did we find any evidence of something buried and that was within this area here, within this same--

MR.CARAWAY: Well, that was part of my question was--

MR.TREBILCOCK: Yeah.

MR.CARAWAY: --That if we start by the creek and work our way towards and the further we got towards and then we worked towards 17 we're getting more samples, we're getting our information toward the 17 side versus the creek side.

MR.TREBILCOCK: Yeah.

MR.CARAWAY: Okay.

MR.TREBILCOCK: Yeah, I follow you.

And, actually, this out here had no evidence of much of anything. In fact, it looks like they're following the scenario that you described.

They were beginning to fill in or dump things down towards the creek from the top, you know, down.

MR.CARAWAY: Yeah.

MR.TREBILCOCK: You know, like pull up a truck

and dump it down towards in the direction of the creek.

But, it's sort of like that, but I don't think they buried much and if they did, it was just in--because we had the place pretty well peppered--

MR.CARAWAY: Right.

MR.TREBILCOCK: --With the soil locations.

MR.CARAWAY: Thank you.

MR.TREBILCOCK: Sure.

Okay, which brings us to I guess the goal of the Remedial Investigation is to provide some indication of these sites, do they pose a human health hazard?

A human health risk assessment was performed and for these different potential receptors:

Current military personnel.

A current trespasser.

An adult trespasser.

A child trespasser.

A future construction worker.

A future adult resident.

A future child resident.

Now, the Environmental Protection Agency has established guidelines to determine at what level do

carcinogenic or cancer risks, at what level and at what number do they pose a threat.

And, that number is below this number up here.

And, for non-carcinogenic or non-cancerous risk, the number is less than one.

Well, after going through exposure scenarios for the various potential receptors we had, we came up with a potential non-carcinogenic risk to future adult residents and future child residents.

And, those numbers are based on the ingestion of groundwater from the site.

Now, if you remember, we didn't see any indication of organic contaminants in groundwater, but we saw indications of metals, high metal concentrations in the groundwater samples.

So, these two scenarios assume that for the future adult resident and future child resident that groundwater that we collected would be their primary source of potable water, or drinking water.

So, that's how those are and so it's a very conservative number that represents based on what we are doing.

Based on the next slide, which we can come back to this one, but based on the no further remedial action which is the proposed remedy for Site 63, based on this criteria the site will remain in its current state, with no further environmental investigation.

And, also, there will be an aquifer for use restriction placed on the site.

The potential for residents to ingest the groundwater will be eliminated because that will be prohibited from future development.

Are there any other questions about any of the slides or about anything?

MR.SWARTZENBERG: Jim Swartzenberg!

So, you're not proposing that they even go in and clean up--

MR.TREBILCOCK: The surface debris?

MR.SWARTZENBERG: --The surface debris and stuff like that?

MR.TREBILCOCK: No, that's right.

Just leave it there.

MR.SWARTZENBERG: Is it your opinion that that wouldn't do any good?

MR.TREBILCOCK: Well, I think maybe Neal might have a better handle on that.

I think in the past we've sort of just said instead of suggesting, you know, if you say, well, we're going to clean up the site from the aesthetic point of view, you might indicate that, well, you think there might be something there that could cause future contamination.

Right now, we don't think that, you know, concrete or the scrap metal or whatever else is going to cause anything.

But, that's pretty much just a housecleaning thing that I don't know whether Camp Lejeune--

MR.SWARTZENBERG: That's not the problem in other words.

MR.TREBILCOCK: No.

MR.NEAL PAUL: No, that's not the problem.

MS.KATHERINE LANDMAN: It's not a problem of contaminated site.

You might consider it an eyesore--

MR.TREBILCOCK: Yeah.

MS.LANDMAN: --But, you know, at such time as

the Marine Corps wants to do that is something else. They might decide not to remove it.

MR.PAUL: It's a pretty remote area which we don't have any plans to use, or any planned use or any way to go in there.

On the other hand, you take lot 2 or 3, you know, I think you guys got to see that site and all the debris that was at that site. That's a site where we have a lot of debris that's not contributing to contamination of the site, but we are going to remove it because we want to turn it over to a future industrial land use.

So, if there's a land use plan, then yeah we would go in to remove the debris.

But, here, we don't have any planned land use.

MR.MORRIS: This site can be used or can be pointed out to the Marine Corps for their Operation Clean Sweep, which every spring they go through and pick up debris.

We can identify this as one of the sites that they could go ahead and clean up.

MR.PAUL: That's a good point, Tom.

MR.TREBILCOCK: Were there any other questions

about the site itself?

MR.SWARTZENBERG: If they did do the Clean Sweep thing - I don't want to run his over--

MR.TREBILCOCK: Oh, no, no.

MR.SWARTZENBERG: If you did do the Clean Sweep though, from what you said it wouldn't change your figures at all?

MR.TREBILCOCK: No, no.

MR.SWARTZENBERG: It would just make it look a little better.

MR.PAUL: It would make it look a little better.

MR.CARAWAY: Wouldn't it change the figures ten years down the road if that metal continues to deteriorate?

Is the metal above the ground?

MR.TREBILCOCK: Well, it could, but, you know, once again, it would be iron and things that really wouldn't be hazardous to people or to the environment.

I mean, it could become more unsightly, you know, if you have iron oxidizing and you're going to have a stain or whatever on your ground, but not from a hazard standpoint.

MS.TRACEY DeBOW: So, actually what we have at this site was a couple of examples which had semi-volatile organics so that somewhere between 43 and 80 micrograms per millimeter of water or per liter.

And, that would really be, what, parts per million or parts per billion?

MR.TREBILCOCK: Parts per billion.

MS.DeBOW: Parts per billion ratio, so it's more than likely by the time we did anything to remove those organics, they of themselves would dissociate--

MR.TREBILCOCK: Right.

MS.DeBOW: --And, not be worth the price--

MR.TREBILCOCK: Well, it would be very difficult to remediate or to remove it.

MS.DeBOW: Since it's such a small amount.

MR.TREBILCOCK: Yeah.

MS.DeBOW: And, we don't have any real risk of it getting in the creek?

MR.TREBILCOCK: No.

MS.DeBOW: Because I don't see any--

MR.TREBILCOCK: There is a chance for the pesticide, for example. In my opinion, the pesticides are

probably migrating from the site into the sediment in the form of particulates or, you know, tiny pieces absorbed have washed into the creek and are now at the bottom of the creek so when you collect a sediment sample, well, you're going to see pesticides on that particle absorbed.

MS.DeBOW: Yes.

MR.TREBILCOCK: Now it has become a piece of sediment, but it had been just a piece of regular surface water.

MS.DeBOW: But, from what I saw, the pesticides were below State minimum acceptable limits.

MR.TREBILCOCK: Yes.

MS.DeBOW: Yeah, okay.

MR.TREBILCOCK: In fact, this is one of the--this site is probably at lower levels of pesticides than what we typically see.

And, fewer in number too.

MS.WOOD: And, the same would apply to the naphtha?

MR.TREBILCOCK: Yeah, it had two detections in the soil and they were both under one hundred parts per billion, so, yeah, the same thing would apply to those

also.

MR.PAUL: And, Tom, correct me if I'm wrong, but as a general rule, pesticides are pretty much in the soil, they're not going to be a mobile contaminant.

MR.TREBILCOCK: No, no. They're going to adhere to the soil.

The bottom line really at this site it's going to be controlled through time by the Marine Corps, but right now there's no further remedial action indicated.

MR.BARTMAN: If you look at the regulations, the regulations that are involved here, you know, federal and state governments set of qualitative regulations and then you go through them and we do qualitative assessment and we determine we may have levels in the media that are above our regulatory levels, but we determine that the concentration and the specifics of the contaminant were not posing a human health risk, it won't go anywhere.

MS.DeBOW: We won't go anywhere.

MR.BARTMAN: We won't go in there, exactly.

No exposures, no receptors.

MR.TREBILCOCK: Well, if there aren't any more questions, of if you'd like I'll be around after the

meeting if you want to talk to me about any specifics about the site, but I'll turn it over to Matt.

We're sort of going in backwards order. I talked about Operable Unit 13 and Matt Bartman's going to talk about Operable Unit 12.

MR.BARTMAN: The discussion that I'll be dealing with is Operable Unit 12, Site 3, which is also referred to as the old Creosote Plant.

I know these pictures are difficult to see.

But, the old creosote plant, I'm going to pass around this photo.

This is an aerial photo from 1949.

The old creosote plant is also referred to, like I said, to Operable Unit 12, Site 3, and it's located on Holcomb Boulevard, about a half-mile off of Holcomb Boulevard, the main side of the Base.

It's also referred to as Lot 204 and that's the big chimney, if anyone's going to the site you'll be able to see this site.

This is from the entrance coming from Holcomb Boulevard to the site.

And, this is what we refer to as the northern

area during our investigation.

This area will be referred to as the treatment area, but then there's also the southern portion of the site.

This is the side of the chimney for those of you who were on the site may be familiar with the area.

Just to get everyone in here - see the reason I passed around the aerial photo from 1949, this plant was in operation from 1951 to 1952 and basically the operation of the plant was to treat lumber for the construction of the Base railroad.

And, as you can see in that aerial photo, the Base railroad has not been constructed yet.

There's no indication of subsurface creosote disposal however until we did our investigation.

However, like Site 63, there was a site inspection completed here where subsurface contamination in the form of creosote or PAH, polyaromatic hydrocarbon contamination was indicated, therefore turning it into the remedial investigation site.

Currently, the area is currently used to construct a staging area for the removal of downed trees.

That's all taken place in the northern area of the site from the hurricane that's taken place.

Now you can see the north area is the staging area for all the downed trees.

This is a very quick slide of the layout of the site.

Again we have the northern area where the downed trees are now staged.

This is what we refer to as the treatment area and then the railroad spike or the southern portion of the site.

Mainly all the creosote treating operations were conducted in this area. Again, the reason the chimney is located here.

A dirt track and the railroad spike area which not only comes to about here, but you can see remanants of it where they used the pumps where they appeared to derive water.

Field Investigation Summary.

What Baker Environmental did here, we had a multi-phase field program which was conducted from September 1994 to September 1996.

And, I say multi-phase because unlike Tom's investigation, we found contamination and had to keep delineating our contamination both in groundwater and in soil.

In September of 1994, we came out here and collected approximately 84 surface soil samples and those surface soil samples were analyzed in the field using a kit that's a immunoassay kit, bacterial testing kit, to determine where PAHs - again polyaromatic hydrocarbons which we knew are our known contaminants given our source which was the creosote.

So, we came out here and we had to delineate the site using surface soil samples.

We had to kind of focus our investigation in the area where we think creosote contamination was going to be a problem.

We came out in November of 1994 using the information that we collected in September and were able to focus our surface and subsurface soil investigation in a specific area where we knew we had contamination.

As a follow-up, we had to come back out in June of '95 to take additional samples because we were able to

locate through subsurface soil contamination in '94 that we had additional problems.

This is again the treatment area and this is just to give you an indication of how many samples we collected out here.

The pink being the ENSYS investigation.

The green being the different phases of the investigation we did in November of '94 and June of '95.

And, this does not even show the northern area where we had several soil samples taken and also the railroad spike area.

The multi-phase investigation also included groundwater investigation.

In December of 1994 we put in seven shallow and one intermediate monitoring well.

And, then due to the contamination we found there, we came back out and had to put in eight. We sampled the eight existing shallow monitoring wells.

We installed five new shallow monitoring wells.

One intermediate well and one deep well.

The shallow wells being roughly 25 to 30 feet.

Intermediate depth, 40 to 60 feet below ground

surface.

And, the deep well 140 feet below ground surface.

MS.WOOD: How many deep wells?

I'm sorry, I got confused reading this.

The deep wells were going in to Castle Hayne?

MR.BARTMAN: Yeah.

MS.WOOD: But not the intermediate?

MR.BARTMAN: No. The intermediate would be upper portion of Castle Hayne.

MS.WOOD: Right, okay.

MR.BARTMAN: And, the reason we had to do this intermediate and deep wells in multi-phase so we could go out there, we investigate the shallow for particle contamination.

We go down vertically to see if the intermediates are contaminated. If the intermediates are contaminated, we focus in and keep going deeper until we can find the particle extent of the contamination.

In order to confirm our findings from the June of 1995 investigation, we came back out in September and did another full round of sampling to confirm the presence

or absence of contamination.

That was again by September of 1995.

Through the findings of September of 1995, we kind of have suspected misleading information between July of '95 and September of '95 and wanted to confirm that and that was in the deep well.

We only put in one deep well.

So, we had contamination in '95. We did see the contamination in September of '95 and we came back out in January of '96 and sampled that water and confirmed that there was an absence of contamination deep.

Had we found contamination, we would've had to go deeper.

But, given the nature of the contaminants which again the majority of them are PAHs, again the contaminants don't travel or migrate very readily in soil.

Usually you don't see them in the groundwater because they don't have a high mobility, or high leachability into the groundwater.

But, unfortunately, given the levels of creosote in our soil, we saw them in groundwater.

This figure indicates the areas where our

groundwater monitoring wells were placed.

I apologize for the figures.

Again, the pink indicates the shallow monitoring wells.

The blue are the intermediate wells.

And, the purple is the deep well.

You see we have wells on the north area, the treatment area and the southern portions of the site.

Due to contamination we had here in this intermediate well, in the second phase, we decided to put in this intermediate well.

And, then go back and due to the contamination put in this deep well.

What we found in all these phases of investigations was that a majority of our contamination both in soil and in groundwater, as we suspected but had to confirm, was all of our contamination was in what we were thinking would be the treatment area.

The chimney area used to heat the creosote.

If you don't know what creosote is, I could explain it, but I think everybody knows what it is.

But, at first, it's a very tarry material that

needs to be cut using fuel related materials.

They heat it and then they treat the lumber.

So, we could tell that this was all where the treatment took place.

And, we found in the northern area and in the southern portion of the area we found isolated detections of creosote contamination, apart from the drippings but no known disposal.

So, we did have contamination in other portions of the site, but concentrated mainly again in this treatment area.

Like Tom's site, we had to go through the human health risks.

Fortunately, for us we had limited receptors.

We only had the future residential child, future residential adult.

The third, military personnel that could be exposed.

We think at that site in the future construction workers.

As you can see, the risks obviously to the future residential child and would be the residential

adult, both carcinogenic and non-carcinogenic risks.

And, this is from the ingestion of groundwater.

However, shallow groundwater in this area is not even used as a potable water supply.

However, we still have to consider it as a potential exposure to future adult, to future residents.

Given that we don't have a risk to subsurface soils, which the construction worker is the only exposed receptor to subsurface soil.

However, we knew that that was part of our readings and our findings or detections, we knew that subsurface soil was where our contamination was. However, there's no risk.

That puts us in a Catch-22 because we have contamination but it's not causing risk, so what do you do with it?

So, we knew that our sources was the soil. Our groundwater was causing our contamination and causing our risks.

So, we had to remove the source and that's what we plan on doing as part of our proposed remedial action.

We went through five different alternatives.

The alternatives have been selected for treatability studies at this phase, Number 5, which was the source removal and biological treatment.

For those of you who did visit Lot 203, saw two water treatment plants, for the pump and treat plant, there's a biocell constructed there, we'll be doing a similar biological treatment.

This biological treatment will be for PAH contamination where that one at Lot 203 is for POL waste.

We'll be doing a treatability study hopefully beginning in March to test out whether this technology will be feasible to remediate this contamination.

We'll be excavating for subsurface soil contamination down to roughly nine feet, where we know we have known contamination.

Placing it into the biocell, mixing it with several different types of bugs, nutrients, having it aerated, water applied to it to see if the bugs, the nutrients are able to degrade or decompose this contamination.

As for groundwater, we know we have contamination in our groundwater.

We know it exceeds regulatory levels.

We know that it poses a potential risk.

However, we feel that the source is really the soil, so therefore we remove the soil.

All we want to do here is monitor the groundwater.

Apparently, it's not posing a risk.

So, what we want to do is, again, monitor the groundwater, see if once we remove the source what happens to the concentrations in the groundwater?

Do they remain the same?

Do they increase?

Is there another source out there?

So, this monitoring will be conducted over a 30 year period, probably on a semi-annual basis and will be up for a five year review by the regulators.

So, that's roughly what's going to be happening at Site 3.

MS.WOOD: It says here the clinical phase, this is because it is impractical to remediate the saturated soil, which earlier it states is detectable for PAH contamination because of water--[inaudible].

So, it is saturated soil below the water table.

MR.BARTMAN: Uh-huh.

MS.GOOD: Okay, and it is the PAHs are not going to migrate.

MR.BARTMAN: No, they don't migrate readily into the water.

Think of it this way, a piece of tar, take a beaker and put some sand in it, drop the piece of tar into that and that's what you have.

MS.GOOD: Okay.

And, they aren't going to break down into any other--

MR.BARTMAN: They don't biodegrade. They're not like chlorinated solvents.

MS.GOOD: All right.

MR.BARTMAN: No biodegradability. They don't migrate readily even in presoils or groundwater.

That's why we don't see--we had this known source inside this, I guess when I said take a beaker of sand or a fish tank. Throw a piece of asphalt in there and you have the water flowing back and forth, you don't see the migration.

And, that's exactly what's happened in this case.

MS.GOOD: Thank you.

MR.JOE BARNETT: You said the risk looks like is higher for children, or I didn't understand that statistic.

It looked like it was less for children.

MR.BARTMAN: Can't remember.

MS.DeBOW: It was ten to the minus three.

MR.BARTMAN: Ten to the minus three.

It's actually less for children, higher for an adult.

MR.BARNETT: Does that mean for the adult, because it started as a child and there's--

MR.BARTMAN: Basically--

MR.BARNETT: --A cumulative effect over your lifetime for carcinogenic effect?

MR.BARTMAN: Exactly.

MR.BARNETT: Okay.

MR.BARTMAN: Also, exposure, the amount ingested is higher for an adult. Exposure period's longer, so you're at a higher risk.

There's usually a flip-flop for non-carcinogenic. Usually the child is at higher risk, the adult is at lower risk.

MR.SWARTZENBERG: What's the land use plan for that area? Is there any?

MR.BARTMAN: Neal!

MR.PAUL: I don't think so. Tom!

MR.MORRIS: As a matter of fact, I was contacted this afternoon about that treatment site.

They want to build a storage area into that particular area.

MR.BARTMAN: Into the southern portion, or into the treatment area?

MR.MORRIS: Into the southern portion of the southern portion.

MR.BARTMAN: Okay.

MR.MORRIS: In other words, it's going to start down the road a bit and extend up into the southern portion of--

MS.WOOD: The railroad spur.

MR.MORRIS: --The railroad spur, right..

MR.BARTMAN: All right.

MR.PAUL: This is high performance storage facility is POLs?

MR.MORRIS: Yes, PLOs.

MR.BARTMAN: It probably wouldn't be a problem from our standpoint if it's that treatment area.

The southern portion, there's a monitoring well on WO6 which I believe is the most downgraded shallow well.

It's going to be one of the wells that we're going to need to monitor because, for some reason, we found contamination of subsurface soil and in that groundwater as well.

So, as far as, I mean, as long as they don't disturb any of the wells that we'll be using for longterm monitoring, we're probably in good shape.

MR.PAUL: Is that an old site or new site?

MR.MORRIS: For?

MR.PAUL: What you talked about.

MR.BARTMAN: That is not the existing site that we've been planning on--

MR.MORRIS: This is the one that NEPA is still doing documentation on.

MR.PAUL: The only problem I see with it, this facility is going to be only a hazardous waste storage facility to the south?

MR.MORRIS: Uh-huh.

MR.PAUL: And, if we have contamination already in the area, I don't know.

MS.LANDMAN: My response to that would be they would need to stay around the area and need to monitor.

MR.PAUL: Yeah, right.

I don't want it to get that the current use facility is contributing to the contamination and then builds into--[inaudible].

MR.MORRIS: I only brought that up because they are still looking in that area as far as doing additional development.

MR.BARTMAN: One of the things during the investigation, I talked about PAHs in the creosote contamination, this is not like water. We kind of knew going in what contaminants we were looking for.

Now, the regulators still require that we did full scan - I say full scan, that means we looked at all the organics, semi-volatile organics, pesticide PCBs and

metals, as well as on select samples of soil and groundwater, we ran full scan.

And, we did find trace levels of detections in fish which was the volatile contaminants and in groundwater and in soil.

So, that's when we go back to this multi-phase groundwater samples to find out where that contamination was coming from.

So, I just want to let everybody know that we didn't just blow off certain chemical parameters. We did examine other things.

The PAHs are driving our risks and our contamination problems, so that's what our remedial effort goes out to.

MR.PAUL: What units will be discussed after our meeting will be more than likely--

MR.BARTMAN: Will be eleven which is Site 7, Tarawa Terrace and also Site 80 which is the Paradise Point Golf Course.

If there's any questions on that now, what's going on with those sites, what's happened at those sites, I can answer those also.

MS.WOOD: I did have a question on 80.

When did the dumping and cleaning of the pesticides stop?

MR.BARTMAN: The time critical for--

MS.GOOD: No, no, when did they start cleaning up. I wasn't sure on that.

MR.BARTMAN: Okay.

MR.DUNN: There was no dumping.

MS.GOOD: Just washing it out, but--

MR.BARTMAN: It's a discharging unit.

MS.GOOD: Right, well, when did they start doing that?

When you all came in, were they doing it, or had it stopped fifteen years ago, or what was the length of time?

MR.BARTMAN: Well, it's still a pesticide mixing area.

MS.GOOD: Oh, they're still, but they're not washing it?

MR.BARTMAN: It's registered pesticides.

MS.GOOD: Okay.

MR.BARTMAN: It's not the DDDs, the DDEs.

Unregulated pesticides are not being used.

MS.GOOD: Yeah, okay.

MR.DUNN: The area is still a maintenance area for the golf course.

They still apply pesticides to the golf course, but they're not the hazardous pesticides that we used in the past.

MS.WOOD: Okay, so the hazardous pesticides were stopped around '78?

MR.DUNN: I believe that's right.

MS.GOOD: DDT?

MR.DUNN: The DDT earlier, but the chlordane I think was in '78.

MR.BARTMAN: Yeah, the Chlordane

MS.LANDMAN: The highest concentration area in that particular site was probably due to a single event spill rather than--I mean, there were other trace areas that may have been due to washout or overspill to poor mixing practices.

But, the one main area was most likely due to one single incident spill in time which, you know, we wouldn't know.

That's what the results appear to be.

MR. BARTMAN: If there's any questions regarding these sites as you read through the documents, the fact sheets of the Proposed Remedial Action Plan, feel free to give Peter or Neal a call, or Tom or I at Baker Environmental and we'll be able to answer questions relating to the site.

[Whereupon the proceedings concluded at 8:50 o'clock p.m.]