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Final

Ecological Risk Assessment for Operable Unit No. 2 (Sites 6, 9, and 82)

Marine Corps Base, Camp Lejeune, North Carolina

Prepared For:

Department of the Navy
Atlantic Division
Naval Facilities
Engineering Command
Norfolk, Virginia

Under the

LANTDIV CLEAN Program

Comprehensive Long-Term
Environmental Action Navy

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ACRONYMS AND ABBREVIATIONS

AQUIRE	-	Aquatic Retrieval Database
ARAR	-	Applicable or Relevant and Appropriate Requirements
B	-	Represents that the value is above the instrument detection limit but is below the contract required quantitation limit
BCF	-	Bioconcentration Factor
BI	-	Biotic Index
BH	-	Bear Head Creek
CLEAN	-	Comprehensive Long-Term Environmental Action - Navy
COC	-	Contaminant of Concern
CRDL	-	Contact Required Detection Limit
CTO	-	Contract Task Order
DEM	-	NCDEHNR Division of Environmental Management
EPA	-	United States Environmental Protection Agency
ER-L	-	EPA Region IV Sediment Screening Value, Effects Range-Low
ER-M	-	EPA Region IV Sediment Screening Value, Effects Range-Median
ERA	-	Ecological Risk Assessment
FWS	-	U.S. Fish and Wildlife Service
H'	-	Species Diversity Coefficient
HQW	-	High Quality Water
IDL	-	Instrument Detection Limit
J	-	Represents that the value is estimated, either for a tentatively identified compound or when a compound is present but the value is below the contract required quantitation limit.
JB	-	Represents that the value is estimated below the contract required detection limit, but greater than the instrument detection limit.
MBI	-	Macroinvertebrate Biotic Index
MCB	-	Marine Corps Base
mg/l	-	Milligrams per liter
mg/kg	-	Milligrams per kilogram

msl	-	Mean Sea Level
NCDEHNR	-	North Carolina Department of Environment, Health and Natural Resources
NOAA	-	National Oceanic and Atmospheric Administration
NSCRF	-	National Study of Chemical Residues in Fish
NWI	-	National Wetlands Inventory
QA/QC	-	Quality Assurance/Quality Control
PAH	-	Polyaromatic Hydrocarbons
PC	-	Pettiford Creek
PCB	-	Polychloronated Biphenyl
ppt	-	Parts per thousand
RI/FS	-	Remedial Investigation/Feasibility Study
RV	-	Ravine
SAP	-	Remedial Investigation/Feasibility Study Sampling and Analysis Plan for Sites 6, 9, 48, and 69
SAV	-	Submerged Aquatic Vegetation
Sj	-	Jaccard Similarity Coefficient
SQSV	-	Region IV Sediment Screening Values
Ss	-	Sorenson Similarity Coefficient
S.U.	-	Standard Units
SVOCs	-	Semivolatile Organic Compounds
TAL	-	Target Analyte List
TCL	-	Target Compound List
TPH	-	Total Petroleum Hydrocarbons
VOCs	-	Volatile Organic Compounds
ug/l	-	Micrograms per liter
ug/kg	-	Micrograms per kilogram
WC	-	Wallace Creek
WQS	-	North Carolina Water Quality Standards
WQSV	-	EPA Region IV Water Quality Screening Values

EXECUTIVE SUMMARY

INTRODUCTION

Marine Corps Base (MCB), Camp Lejeune, North Carolina was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL) that became effective on 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 the United States Department of the Navy (DoN) then 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 at the MCB were thoroughly investigated and appropriate CERCLA response/Resource Conservation and Recovery Act (RCRA) corrective action alternatives were developed and implemented as necessary to protect public health and the environment.

The Fiscal Year 1994 Site Management Plan for MCB Camp Lejeune, a primary document identified in the FFA, identifies 27 sites requiring Remedial Investigation/Feasibility Study (RI/FS) activities. These 27 sites have been divided into thirteen operable units to simplify proceeding with RI/FS activities. This report describes the RI conducted at Operable Unit (OU) No. 2, which is comprised of Sites 6, 9, and 82.

SITE DESCRIPTION

OU No. 2 is located approximately 1.75 miles east of the New River and 2 miles south of State Route 24 on the mainside portion of MCB Camp Lejeune. The unit is bordered by Holcomb Boulevard on the west, Sneads Ferry Road on the south, Piney Green Road on the east, and by Wallace Creek on the north boundary. Camp Lejeune Railroad operates rail lines parallel to Holcomb Boulevard bordering OU No. 2. OU No. 2 covers an area of approximately 210 acres. OU No. 2 consists of three sites: Sites 6, 9, and 82.

There are distinctive areas of concern within each site of OU No. 2. The following section describes the background of each site.

Site 9

Site 9 is referred to in this report as the "Fire Training Area" (the formal name, as provided in the FFA, is "Fire Fighting Training Pit at Piney Green Road"). The site covers an area of approximately 2.6 acres. Site 9 is bounded by Holcomb Boulevard on the west, Bear Head Creek approximately 500 feet to the north, Piney Green Road on the east and Sneads Ferry Road on the south. Site 6 also borders Site 9 to the north. Locally, the site is bounded by unnamed streets leading to various storage buildings in the vicinity. Site 9 consists of an asphalt-lined fire training pit, an oil/water separator, four aboveground storage tanks (ASTs), and a fire tower (smoke house). The fire training pit, located in the southern area of the site, is used to conduct training exercises for extinguishing fires caused by flammable liquids. The oil/water separator is located next to the fire training pit to collect water used in the training exercises and storm water that falls into the pit. The recovered product collected in the oil/water separator is disposed of off site. Two of the ASTs at Site 9 are 2500-gallon steel tanks labeled "DO NOT USE". These tanks are not currently in use. Two additional storage tanks are located in a bermed area. These tanks are constructed of steel and contain approximately 500 gallons each.

Site 6

Site 6 is located north of and adjacent to Site 9. Site 6 is bounded on the north by Site 82, by Piney Green Road on the east, by Site 9 on the south, and by Holcomb Boulevard on the west. Site 6 covers an area of approximately 177 acres that incorporates Storage Lots 201 and 203, the wooded area between the storage lots, and a ravine, which begins at Site 6 and bisects Site 82. Three surface water bodies are associated with Site 6 for the purpose of this RI: Wallace Creek, Bear Head Creek, and a ravine located in the wooded area north of Lot 203 that drains to Wallace Creek.

Open Storage Lot 201 (Lot 201) is a fenced lot located in the south-central portion of Site 6. It is a flat area with sparse vegetation around the fence lines. The lot is approximately 25 acres in size. It is currently being used for the storage of military vehicles and equipment, lumber, hydraulic oils and lubricants, non-PCB transformers, and other supplies (ESE, 1991).

Open Storage Lot 203 (Lot 203) is a fenced lot located in the northern portion of Site 6 covering approximately 46 acres. Lot 203 is a relatively flat area with elevation differences of approximately five feet. The ground surface is comprised of both naturally existing soil and fill material. Lot 203 is bordered by Site 82, Piney Green Road to the east, woods to the south, and by Holcomb Boulevard to the west. Lot 203 is currently inactive.

Approximately 40 55-gallon drums are present at Lot 203. The majority of the drums, if labeled, were identified as containing lubricants, petroleum products, or corrosives. Empty storage tanks were also found on Lot 203. They were labeled as containing diesel fuel, gasoline, and kerosene (Baker, 1992).

A ravine is located in the northwest section of Site 6. The steepest area of the ravine is located "inside" of Storage Lot 203. The banks of the ravine gradually decline as the ravine bisects Site 82. The elevation ranges from 25 feet above msl at the north boundary of Lot 203 to 5 feet above msl where the ravine drains into Wallace Creek. The surface of the ravine area is littered with various debris including batteries, fencing, tires, empty unlabeled drums, wire cables, commercial ovens, commodes, and respirator cartridges. An empty drum labeled "DDT" was also found in the ravine area, as were small canisters labeled to contain "DDT".

Woods and open fields surround both Storage Lots 201 and 203 and make up the remaining area of Site 6. The topography of the wooded areas is relatively flat, but localized trenching and mounding is visible just north of Lot 203 and west of Piney Green Road. The wooded areas are randomly littered with debris including spent ammunition casings, and empty or rusted drums. Markings were observed on a few drums (most drums did not contain marking due to their condition and age) located north of Lot 203. These drums were marked as "lubrication oils". Many of the drums observed were only shells or fragments of drums. (Baker, 1992)

Site 82

Site 82 is situated at the northern end of OU No. 2. It is bordered to the north by Wallace Creek, to the east by Piney Green Road, to the west by Holcomb Boulevard, and to the south by Site 6. Site 82 encompasses approximately 30 acres and is predominantly covered by woodlands. The site is randomly littered with debris including communication wire, spent ammunition casings, and empty or rusted drums. Markings were observed on a few drums, however, most of the drums did not contain markings due to their condition and age. Some of the drums were marked as "lubrication oil" and "anti-freeze".

The topography within Site 82 is relatively flat near the southern portion of the site, but becomes very steep near the bank of Wallace Creek. Localized trenching and mounding is visible near the southern portion of the site. The ravine bisects the site, as shown on Figure 1-3.

SITE HISTORY

Site 9

Site 9 has been used as a fire fighting training area from the early 1960s to the present. Fire extinguishing activities took place in an unlined pit. In 1981 the pit was lined with asphalt. The training fires in the pit were started with used oil, solvents, and contaminated fuels (unleaded). Approximately 30,000 to 40,000 gallons of JP-4 and JP-5 fuel were also burned in the fire training pit (Baker, 1992).

Site 6

Site 6 has a long history of various uses including the disposal and storage of wastes and supplies. This discussion on the history of Site 6 has been broken down into Storage Lot 201, Storage Lot 203, and the wooded areas and ravine to simplify the historical descriptions of these areas.

Currently, Lot 201 is used to store military equipment, vehicles, hydraulic oils, and other "non-hazardous" supplies. Pesticides were reportedly stored in the northeast and southeast corners of the lot. Transformers containing PCBs were reportedly stored in the southwest corner of the lot (Water and Air Research, 1983).

Lot 203 has been used as a disposal area since the 1940s. There is little documentation on the disposal activities at this lot. Lot 203 in not currently active as a storage or disposal area, but the ground surface is littered with various debris. Lot 203 was also used for the storage and disposal of radio and communication parts, shredded tires, lubricants, petroleum products, corrosives, expended demolition kit training materials, ordnance, sheet metal debris, wire cables, and wooded pallets. Empty and full 55-gallon drums were found at various locations on Lot 203.

Lot 203 is currently fenced. From historical photographs, it appears that the fenced boundaries have changed since the lot was in operation. Former employees at Lot 203 have reported disposal of various chemicals including PCBs, cleaning solvents, electrolytes from used batteries, and waste oils.

The surface of the wooded areas around Lots 201 and 203 is randomly littered with debris including drums, metal storage containers, and spent ammunition cartridges. No organized disposal operations are documented for the wooded areas. A ravine is located on the northern boundary of Lot 203. As previously stated, this area is currently littered with various debris. From the deposition of the debris in the ravine, it appears that trucks may have dumped their contents into the ravine from Lot 203.

PREVIOUS INVESTIGATIONS

During the period 1983 through 1991, various studies were conducted at Sites 6, 9, and 82 by the Department of the Navy. These studies included an Initial Assessment Study and a Confirmation Study under the DoN's Installation Restoration Program. The studies included soil investigations at Site 6 (Lots 201 and 203), groundwater investigations at Sites 6, 9, and 82 and surface water/sediment investigations at Wallace Creek and Bear Head Creek.

Soil samples collected from shallow borings at Lot 201 and 203 were analyzed for pesticides. Low levels of pesticides ranging in concentration from 1.3 µg/kg to 770 µg/kg were detected in almost all of the soil samples. Groundwater samples collected from eight shallow monitoring wells at Site 6 revealed low levels of volatile organic compounds such as carbon disulfide and chloromethane in well 6GW6, which is located to the east of Lot 201. In addition, low levels of benzene and 1,1,2,2-tetrachloroethane were detected in well 6GW1, which is located just north of Lot 203. Further investigation of nearby water supply wells revealed elevated levels of trichloroethene (TCE), vinyl chloride, 1,2-dichloroethene, and tetrachloroethene (PCE) in wells HP-651 and HP-653. These wells are located east of Piney Green Road near Lot 203. The supply wells are screened to a depth of approximately 200 feet. The wells are no longer in operation due to elevated volatile organic compounds (VOCs).

Three shallow monitoring wells were installed at Site 9. Groundwater samples were collected in 1984, 1986, and 1987. In addition, one sample was collected in 1984 from a nearby supply well. No contamination was detected in the supply well. Low levels of phenol were detected in all three shallow monitoring wells. In addition, low levels of lead and chromium were detected in all three wells.

Upstream and downstream surface water samples were collected from Wallace Creek and Bear Head Creek. Surface water samples collected from Wallace Creek revealed elevated levels of VOCs such as TCE, vinyl chloride, and 1,2-dichloroethene. No organic contamination was detected in Bear Head Creek. Sediment samples collected from Bear Head Creek revealed low levels of pesticides (13 to 75 µg/kg) both upstream and downstream from Site 6. No pesticides were detected in either sample collected from Wallace Creek. However, PAHs (1,990 µg/kg total) were detected in the downstream sediment sample collected near Holcomb Boulevard.

Site 82

A site investigation was conducted at Site 82 in June, 1991 by Halliburton NUS Environmental Corporation (NUS). The investigation was initiated based on results from an Environmental Science and Engineering (ES&E) field investigation in 1986 (the investigation was conducted as part of a study for Site 6). During this investigation, surface water samples collected from Wallace Creek contained VOCs. It was determined that the source of the VOCs in Wallace Creek most likely did not originate from Site 6 (Lot 203). Subsequently a new site, Site 82, was created to investigate the source of the VOCs (NUS, 1992).

The investigation conducted by NUS consisted of installing six shallow soil borings and three shallow monitoring wells, soil and groundwater sampling, and surface water and sediment sampling (Wallace Creek). Results from the investigation indicated positive detections of organic contamination in all of the media sampled. Pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan II, and dieldrin) were detected in soil (33 to 110 µg/kg) and sediment (12 to 69 µg/kg) samples with lower levels in surface water and groundwater. PCB (PCB-1260 and PCB-1242) contamination was also present in soil (150-1,900 µg/kg), groundwater (15 µg/l), surface water (80 µg/l), and sediments (220-700 µg/kg). Further, levels of TCE (3 to 74 µg/l), 1,2-dichloroethene (6 to 64 µg/l), and vinyl chloride (11 µg/l) were detected in surface water samples. Note that concentrations of VOCs were not detected in any of the wells sampled.

REMEDIAL INVESTIGATION ACTIVITIES

A Remedial Investigation (RI) was conducted at Operable Unit No. 2 beginning in August 1992 (Final Project Plans were submitted in May 1992). The RI focused on various areas of concern within Operable Unit No. 2 including: Lot 201, Lot 203, the wooded areas surrounding both storage lots, the ravine north of Lot 203, Site 9, Site 82, Wallace Creek, and

Bear Head Creek. Moreover, the investigation was conducted in two phases of work: Phase I (August through November 1992) and Phase II (February through May 1993).

The soil investigation focused the reported disposal areas within Lot 201 and Lot 203. Sampling grids were established at the following areas:

- Two reported pesticide storage areas within Lot 201
- A reported PCB storage area within Lot 201
- A reported pesticide disposal area within Lot 203
- A reported PCB disposal area within Lot 203

In addition, the soil investigation focused on other portions of OU No. 2 that were determined to be environmental concerns based on site reconnaissances and review of historical photographs. Sampling grids were established at the following areas:

- The wooded areas to the north, east, and south of Lot 201
- Site 82
- The fenced-in portion of Lot 203
- The ravine north of Lot 203

Two sampling grids were also established at Site 9 to evaluate potential soil contamination. The grids were established at:

- The fire training pit and oil/water separator
- Aboveground storage tanks

The grid points were surveyed by a licensed surveyor prior to initiating the soil investigation. Shallow borings were augered at each grid point and soil samples were collected at 2-foot continuous intervals until the water table was encountered. The majority of the samples were analyzed for full Target Compound List (TCL) organics and Target Analyte List (TAL) inorganics. In areas where a certain contaminant was expected based on existing information (e.g., pesticide disposal area at Lot 203), the majority of samples were analyzed for a particular contaminant of concern (e.g.,TCL pesticides); however, at least ten percent of samples collected from these areas were analyzed for full TCL organics and TAL inorganics.

The groundwater investigation focused on evaluating surficial and deep groundwater quality at Operable Unit No. 2. Shallow wells were installed in the wooded areas, Site 82 Lot 201, Lot 203, and Site 9. Deep groundwater wells were installed at Site 9, Lot 201, Lot 203, and Site 82. Groundwater samples were analyzed for full TCL organics and TAL inorganics (total and dissolved metals analysis). Furthermore, two rounds of samples were collected from the Phase I and existing wells, and one round of samples were collected from the Phase II wells. The groundwater investigation also included three to four rounds of water level measurements. These measurements included staff gauges that were installed in Bear Head Creek and Wallace Creek.

Placement of monitoring wells was based on reported storage/disposal areas, results of a geophysical investigation conducted at Lot 203, and review of historical aerial photographs produced by the U.S. Environmental Protection Agency (EPA) Environmental Photographic Interpretation Center (EPIC). Additionally, the placement of the Phase II shallow wells were based on the results of a soil gas survey and placement of the Phase II deep wells were based on the results of the Phase I analytical results.

Surface water and sediment investigations were conducted in Bear Head Creek, Wallace Creek, and the ravine. Surface and subsurface sediment samples were collected from the middle portion of the stream as well as from the stream bank. Deep surface water samples were collected when the depth of water exceeded five feet. All samples were analyzed for full TCL organics and TAL inorganics.

In addition to these studies, an ordnance survey was required at Lot 203 and the wooded areas surrounding Lot 203 due to the presence of surface and subsurface unexploded ordnance (UXO). On two occasions, the MCB Camp Lejeune ordnance specialists were contacted to examine UXO. In both cases, the devices were not determined to present a hazard.

Ecological Risk Assessment

Baker Environmental conducted an Ecological Risk Assessment (ERA) for Operable Unit No. 2 (Sites 6, 9 and 82) in accordance with the scope of work identified under Task 6 in the Final Remedial Investigation/Feasibility Study Work Plan (May 1992), prepared by Baker Environmental, Inc. (Baker), under Contract Task Order (CTO) 0133. The ERA has been conducted in conjunction with a remedial investigation/feasibility study (RI/FS) at Operable Unit No. 2 (OU No. 2) under the Department of Navy's Comprehensive Long-Term

Environmental Action - Navy (CLEAN) Program, Contract N62470-89-D-4814. The RI and FS documents have been submitted under a separate cover.

The objective of the ERA is to determine if past reported disposal practices at OU No. 2 are adversely impacting the ecological integrity of the terrestrial environment and of Wallace Creek, Bear Head Creek, or the ravine. This assessment also evaluated the potential effects of contaminants at OU No. 2 on sensitive environments including wetlands, protected species, and fish nursery areas. The conclusions of the ERA will be used in conjunction with the human health risk assessment in order to determine the appropriate remedial action at this site for the overall protection of public health and the environment.

The ERA evaluated and analyzed the results from the remedial field investigation conducted as part of CTO 0133 and historical data collected during previous studies. The remedial field investigations included sampling and chemical analysis of the surface water, sediments, soil, and groundwater. In addition, ecological field investigations were conducted including collecting fishes for population statistics and chemical analysis of their tissues; collecting benthic macroinvertebrates for population statistics; and collecting blue crabs for chemical analysis of their tissues. Finally, information used to evaluate sensitive environments was obtained from historical data and previous studies conducted at Marine Corps Base (MCB) Camp Lejeune, North Carolina.

This assessment also evaluated the potential effects of contaminants at OU No. 2 on sensitive environments including wetlands, protected species, and fish nursery areas. Information for these environments were obtained primarily from historical data and previous studies conducted at MCB Camp Lejeune.

Conclusions

The following sections contain the summary/conclusions for the ERA including water quality, sediment quality, surface soil quality, fish, benthic macroinvertebrates and terrestrial fauna.

Water Quality

The water quality summary/conclusions are discussed in the following sections.

Wallace Creek

None of the TCL organic COCs detected in Wallace Creek exceeded applicable water quality criteria values. Dissolved oxygen concentrations and pH values were below WQS and WQSV at some of the stations, but probably were associated with natural conditions.

As detailed below, the surface water concentrations of cadmium, copper, lead, mercury, nickel, silver, and zinc exceeded the North Carolina Water Quality Standards (WQS) and/or U.S. EPA Region IV acute or chronic Water Quality Screening Values (WQSV) in some of the samples. Nickel, copper, and mercury exceeded standards in sampling stations upstream, adjacent, and downstream of Site 6 and 82. Cadmium and silver exceeded standards at one adjacent station. Whereas, lead concentrations exceeded standards at one station upstream to Sites 6 and 82. Zinc was exceeded in one upstream and one downstream station to Sites 6 and 82.

In addition, several TAL inorganics had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in Wallace Creek to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

Bear Head Creek

None of the TCL organic COCs detected in Bear Head Creek exceeded applicable water quality criteria values. Dissolved oxygen concentrations and pH values were below WQS and WQSV at some of the stations, but probably were associated with natural conditions.

Surface water concentrations of copper, lead, mercury, nickel, and silver exceeded the WQS and/or WQSV in some of the samples. Copper, nickel, and silver concentrations exceeded standards at one downstream station. Whereas, mercury concentrations exceeded standards at two downstream stations. Lead exceeded standards at one immediately downstream and one immediately upstream station to Sites 6 and 9.

In addition, several TAL inorganics had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in Bear Head Creek to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

Ravine

None of the TCL organic COCs detected in the ravine exceeded applicable water quality criteria values.

Surface water concentrations of aluminum, cadmium, copper, iron, lead, silver, and zinc exceeded the WQS and/or WQSV in some of the samples. Aluminum and lead concentrations exceeded standards in the samples from the northern section of Site 6 through Site 82. Zinc concentrations were exceeded at one station within Site 6 and several stations throughout Site 82. Aluminum and zinc concentrations were higher at the southern stations within Site 82. Iron exceeded standards at two stations in the northern ravine area of Site 82. Cadmium concentrations exceeded standards in one ravine station in Site 6 and one in Site 82. Copper exceeded standards at one station in Site 6 and three stations in Site 82. Silver exceeded surface water standards at stations throughout Site 82.

In addition, several TAL inorganics had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in the ravine to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

Pettiford Creek

Dissolved oxygen concentrations were below the WQS at one station, but probably was associated with natural conditions.

Sediment Quality

Currently promulgated sediment quality criteria do not exist. Until these criteria are developed, Region IV is using sediment values compiled by NOAA as screening values for evaluating the potential for chemical constituents in sediments to cause adverse biological effects (USEPA, 1992b). The lower ten percentile (Effects Range-Low (ER-L)) and the median percentile (Effects Range-Median (ER-M)) of biological effects have been developed for several of the chemicals identified during the sediment investigations at OU No. 2. If sediment contaminant concentrations are above the ER-M, adverse effects on the biota are considered probable. If contaminant concentrations are between the ER-M and ER-L, adverse effects on the biota are considered possible, and EPA recommends conducting toxicity tests as a follow-up. Finally, if contaminant concentrations are below the ER-L, adverse effects on the biota are considered unlikely (USEPA, 1992b).

The sediment quality summary/conclusions are discussed in the following sections.

Wallace Creek

Sediment concentrations of copper, lead, silver, zinc, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, dieldrin, PCB-1260, benzo(a)pyrene, fluoranthene, and pyrene exceeded the Region IV lower 10 percentile (ER-L) and/or median percentile (ER-M) sediment screening values (SQSV) in some of the samples. The exceedences of the TAL inorganics occurred in both upstream and downstream samples. Copper concentrations exceeded regional values at one station upstream of Sites 6 and 82. Lead concentrations were in exceedence in upstream, adjacent, and downstream stations. Zinc exceeded regional values at one station upstream and two downstream stations to Sites 6 and 82.

Dieldrin was detected in the uppermost station only. The remaining pesticides and PCBs exceeded the SQSV primarily in adjacent and downstream samples and their presence might be attributable to site runoff. The PAHs only were detected near roadways.

In addition, several TAL inorganics and TCL organics had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in Wallace Creek to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

Bear Head Creek

Sediment concentrations of lead, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, PCB-1260, and benzo(a)pyrene exceeded the ER-L and/or ER-M SQSVs in some of the samples. The exceedences of lead occurred in both upstream and downstream samples and, therefore, do not appear site related. The pesticides and PCBs exceeded the SQSV primarily in adjacent and downstream samples and their presence might be attributable to site runoff. The PAHs exceeded the SQSV near the roadway only.

In addition, several TAL inorganics and TCL organics had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in Bear Head Creek to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

Ravine

Sediment concentrations of cadmium, lead, mercury, silver, zinc, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, dieldrin, endrin, PCB-1260, and several PAHs exceeded the ER-L and/or ER-M SQSVs in some of the samples. These constituents probably are attributable to site runoff.

Cadmium and silver concentrations in the sediments exceeded regional values at one ravine station in the northern section of Site 6. Lead values were in exceedence at one station in the southern section of Site 82. Mercury exceeded regional values at the two stations within Site 6 and one station in the northern section of Site 82. Zinc concentrations were in exceedence at one station in northern section of Site 6 and three stations throughout Site 82. The concentrations of 4', 4'-DDE; 4', 4'-DDD; and 4', 4'-DDT were in exceedence at one station in the northern section of Site 6 and throughout the ravine stations within Site 82. Dieldrin was in exceedence at one station within Site 6 and one station in the southern section of Site 82. Whereas, endrin was only found at one station within Site 6. PCBs were in exceedence in the two ravine stations in Site 6 and one station in the southern section of Site 82. PAHs were in exceedence of regional values at one station in the northern section of Site 6.

In addition, several TAL inorganics and TCL organics had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in the ravine to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

Surface Soil Quality

The surface soil quality summary/conclusions are discussed in the following sections. The following paragraphs discuss effects on terrestrial life from the metals for which toxicological information was found.

Site 9

None of the metals detected in the Site 9 surface soil for which toxicological information was available exceeded the applicable values.

Site 6 (Lot 201)

Surface soil concentrations of chromium detected at Site 6 (Lot 201) exceeded published toxicological values and potentially may cause adverse effects to terrestrial life.

Site 6 (Lot 203)

Surface soil concentrations of chromium, copper and zinc detected at Site 6 (Lot 203) exceeded published toxicological values and potentially may cause adverse effect to terrestrial life.

Sites 6 (Wooded and Ravine Areas) and 82

Surface soil concentrations of arsenic, copper, and zinc detected at Sites 6 (Wooded and Ravine Areas) and 82 exceeded published toxicological values and potentially may cause adverse effects to terrestrial life.

Fish

The fish summary/conclusions are discussed in the following sections.

Population Statistics

The summary/conclusions for the fish population statistics are discussed in the following sections.

Wallace Creek

The majority of the individuals collected at Wallace Creek were represented by juveniles representing the following species: eastern mosquito, shiner sp., pumpkinseed and the American eel.

Community similarity indices showed the greatest similarity between Stations 6-BH6A and 6-WC6A (0.53) and the least similarity between Stations 6-BH6A and 6-WC11 (0) and Stations 6-WC4 and 6-WC11 (0). Because a limited number of fish were collected at all the stations, the similarity values are not reliable.

The diversity of fishes collected at Wallace Creek varied within the stations. Typically, estuarine environments produce a high biomass and abundance, but are limited in the quantity of species. As with the similarity values, the diversity values are not representative of the creek due to the limited data set.

At Wallace Creek, there were no anomalies observed on the fish such as lesions, bacterial or viral infections.

The fish community at Wallace Creek appeared healthy and the population statistics did not indicate that the environment was impacted by contaminants of concern from OU No. 2.

Bear Head Creek

The majority of the individuals collected at Bear Head Creek were represented by juveniles which included, eastern mosquito, spot, and pumpkinseed.

Community similarity indices showed the greatest similarity between Stations 6-BH6A and 6-WC6A (0.53) and the least similarity between Stations 6-BH6A and 6-WC11 (0) and Stations 6-WC4 and 6-WC11 (0). Because a limited number of fishes were collected at all the stations, the similarity values are not reliable.

The diversity value derived from the fish collected at Bear Head Creek was 0.29. Typically, estuarine environments produce a high biomass and abundance, but are limited in the quantity of species. As with the similarity values, the diversity values are not representative of the creek due to the limited data set.

At Bear Head Creek, there were no anomalies observed on the fish such as lesions, bacterial or viral infections.

The fish community at Bear Head Creek appeared healthy and the population statistics did not indicate that the environment was impacted by contaminants of concern from OU No. 2.

Pettiford Creek

The individuals collected at Pettiford Creek included, shiner sp., pumpkinseed, and striped mullet. Because of the limited numbers of fishes that were collected, conclusions regarding population were limited.

The only diversity value derived from the fish collected at Pettiford Creek was 0.45. Typically, estuarine environments produce a high biomass and abundance, but are limited in the quantity of species.

At Pettiford Creek, there were no anomalies observed on the fish such as lesions, bacterial or viral infections.

The fish community at Pettiford Creek appeared healthy and the population statistics did not indicate that the environment was impacted by contaminants.

Tissue Analysis

The summary/conclusions for the fish tissue analysis are discussed in the following sections.

Wallace Creek

Toluene, silver, benzene, and selenium were detected in fish and crab tissue samples. The fish tissue concentrations were within the range of tissue concentrations for these contaminants reported in ecological studies. Because of the frequency of detection of these contaminants both upstream and downstream from OU No. 2, the contaminants may not be attributed to the sites. Due to the limited database, additional studies are recommended to better assess whether contaminants present in fish are due to the migration of contaminants from the operable unit.

The fish community at OU No. 2 had elevated tissue concentrations of the following contaminants of concern: pesticides, PCBs, trichloroethene, and zinc. Due to the nature of the contaminants of concern, these constituents may be attributed to OU No. 2. The crab tissues had elevated levels of phenols, although the contaminant may not be attributed to the site.

Bear Head Creek

Toluene, cadmium, benzene and selenium were detected in fish and crab tissue samples. The fish tissue concentrations were within the range of tissue concentrations for these contaminants reported in ecological studies. Because of the frequency of detection of these contaminants both upstream and downstream from OU No. 2, the contaminants may not be attributed to the sites.

The fish community in Bear Head Creek had elevated tissue concentrations of the following contaminants of concern: pesticides, PCBs, and zinc. Due to the nature of the contaminants of concern, these constituents may be attributed to OU No. 2.

Pettiford Creek

Baker was not tasked with collecting fish for tissue analysis at Pettiford Creek.

Benthic Macroinvertebrate

The benthic macroinvertebrate summary/conclusions are discussed in the following sections.

Wallace Creek

Species richness in Wallace Creek was highest in the upstream stations (7-12 species) and lowest in the downstream stations (0-3 species). Species density followed a similar pattern with approximately 1,200 individuals/m^2 in the upper reaches and approximately 50 individuals/m^2 in the lower reaches of the creek. Species diversity was less than 0.5 at all the sampled stations on Wallace Creek.

The dominant species in the creek varied from the chiromid species Tribelos jucundum (74 percent of the individuals) in the upper reaches, the amphipod Gammarus fasciatus (64 percent of the individuals) in the mid-reaches, and the polychaetes Nereis succinea and Capitella capitata (five of the eight individual) and the oligochaete Limnodrilus hoffmeisteri (three of the eight individuals) in the lower reaches of Wallace Creek. This variation followed the variation in salinity measurements at the stations and indicated the effects of the tidal influence seen in the transition from a freshwater system in the upper reaches of the creek and the estuarine influence in the lower reaches of the creek.

The Macroinvertebrates Biotic Index (MBI) ranged from good-fair (6.46) in the upper reaches of the creek to poor (9.8) in the lower reaches of the creek. However, the salinity gradient influenced the species composition in the lower reaches with the tolerant freshwater oligochaete species being present. In addition, the presence of the salt wedge and low dissolved oxygen can create an adverse habitat for intolerant species.

Bear Head Creek

Species richness in Bear Head Creek was highest in the upstream stations (16-33 species) and lowest in the downstream station (one species). Species density followed a similar pattern with approximately 2,700 to 3,700 individuals/m^2 in the upper reaches and approximately 25 individuals/m^2 in the lower reaches of the creek. Species diversity was less than 1.0 at the upper reach station and less than 0.5 in the mid-reach station. Only one species was found in the lower reach station.

The dominant species in the creek varied from the oligochaete species Isochaetides curvisetosus (45 percent of the individuals) in the upper reaches, the bivalve Pisidium casertanu (70 percent of the individuals) in the mid-reaches, and the polychaete Nereis succinea (100 percent of the individuals) in the lower reaches of Bear Head Creek. This variation followed the variation in the salinity measurements at the stations and indicated the effects of the tidal influence seen in the transition from a freshwater system in the upper reaches of the creek and the estuarine influence in the lower reaches of the creek.

The MBI was poor and ranged from 7.51 in the upper reaches of the creek to 7.06 in the mid-reach of the creek. However, the salinity gradient influenced the species composition in the lower reach with no freshwater species being present. In addition, the presence of the salt wedge and low dissolved oxygen can create an adverse habitat for intolerant species.

Pettiford Creek

Four species were collected in Pettiford Creek and species density was 210 individuals/m^2. Species diversity was less than 0.5 at the sampled station on Pettiford Creek. The dominant species in the creek was the oligochaete Limnodrilus hoffmeisteri (70 percent of the individuals). The MBI was poor at 8.84.

Terrestrial Receptors

Total exposure to the COCs in the soil and surface waters by the terrestrial receptors was evaluated by estimating the chronic daily dose and comparing this dose to terrestrial reference values (TRVs). Indicator species used in this analysis were the whitetailed deer, cottontail rabbit and the quail. The exposure points for these receptors are the surface soils and surface water (surface soils from site 6, Lot 201; Site 6, Lot 203; Sites 6, Wooded areas and Ravine, Site 82; and Site 9; Surface water from Wallace Creek). The routes for terrestrial exposure to the COCs in the soil and water are incidental soil ingestion, drinking water ingestion, and vegetation ingestion. Estimates of the potential risk to the terrestrial receptors were made by comparing the total exposure of the COCs to the TRVs using the Quotient Index (QI) method. Ratios of less than unity indicate a low likelihood of adverse effects while a ratio above unity indicate the likelihood of an adverse affect to the receptor. For the COCs that had available TRVs, the QI did not exceed unity for any of the indicator terrestrial receptors.

Ecological Significance

The objective of the ERA was to determine if past reported disposal practices at OU No. 2 were adversely impacting the ecological integrity of the terrestrial environment or of Wallace Creek, Bear Head Creek, or the ravine. The ecological significance of the results is necessary to provide the risk managers with the requisite information, to be used in conjunction with the human health risk assessment, in order to determine the appropriate remedial action at the site for the protection of public health and the environment.

Based on the above findings, past reported disposal practices at OU No. 2 potentially are adversely impacting the ecological integrity of Wallace Creek, Bear Head Creek, or the ravine. The findings do not indicate a potentially adverse impact to vertebrate terrestrial receptors.

1.0 INTRODUCTION

This Ecological Risk Assessment (ERA) for Operable Unit No. 2 (Sites 6, 9 and 82), has been prepared in accordance with the scope of work identified under Task 6 in the Final Remedial Investigation/Feasibility Study Work Plan (May 1992), prepared by Baker Environmental, Inc. (Baker), under Contract Task Order (CTO) 0133. The ERA has been conducted in conjunction with a remedial investigation/feasibility study (RI/FS) at Operable Unit No. 2 (OU No. 2) under the Department of Navy's Comprehensive Long-Term Environmental Action - Navy (CLEAN) Program, Contract N62470-89-D-4814. The RI and FS documents have been submitted under a separate cover.

1.1 Objectives of the Ecological Risk Assessment

The objective of the ERA is to determine if past reported disposal practices at OU No. 2 are adversely impacting the ecological integrity of the terrestrial environment or of Wallace Creek, Bear Head Creek, or the ravine. This assessment also evaluated the potential effects of contaminants at OU No. 2 on sensitive environments including wetlands, protected species, and fish nursery areas. The conclusions of the ERA will be used in conjunction with the human health risk assessment in order to determine the appropriate remedial action at this site for the overall protection of public health and the environment.

1.2 Scope of the Ecological Risk Assessment

The ERA will evaluate and analyze the results from the remedial field investigation conducted as part of CTO 0133 and historical data collected during previous studies. The remedial field investigations include sampling and chemical analysis of the surface water, sediments, soil, and groundwater. In addition, ecological field investigations were conducted including collecting fishes for population statistics and chemical analysis of their tissues; collecting benthic macroinvertebrates for population statistics; and collecting blue crabs for chemical analysis of their tissues. Finally, information used to evaluate sensitive environments was obtained from historical data and previous studies conducted at Marine Corps Base (MCB) Camp Lejeune, North Carolina.

The risk assessment methodologies used in this evaluation are consistent with those outlined in the U.S. EPA Supplemental Risk Assessment Guidance for the Superfund, Volume II, Environmental Evaluation Manual (USEPA, 1989a). In addition, information found in the following documents were used to supplement the EPA guidance document:

- Framework for Ecological Risk Assessment (USEPA, 1992a)

- Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference (USEPA, 1989b)

- Rapid Bioassessment Protocols for use in Streams and Rivers: Benthic Macroinvertebrates and Fish (USEPA, 1989c)

2.0 SITE BACKGROUND

This section includes a discussion of the site setting, history, study area and a summary of the remedial investigation conducted at OU No. 2.

2.1 Site Description

There are three distinctive sites within OU No. 2. The following section describes the background of each site.

2.1.1 Site 9

Site 9 covers an area of approximately 2.6 acres. Site 9 is bounded by Holcomb Boulevard on the west, Site 6 to the north, Piney Green Road on the east and Sneads Ferry Road on the south. Locally, the site is bounded by unnamed streets leading to various storage buildings in the vicinity. Site 9 consists of an asphalt-lined fire training pit, an oil/water separator, five aboveground storage tanks (ASTs), and a fire tower (smoke house). The fire training pit, located in the southern area of the site, is used to conduct training exercises for extinguishing fires caused by flammable liquids. The oil/water separator is located next to the fire training pit to collect water used in the training exercises and storm water that falls into the pit. The recovered product collected in the oil/water separator is disposed of offsite. Two of the ASTs at Site 9 are 2,500-gallon steel tanks labeled "DO NOT USE". These tanks are not currently in use. Two additional storage tanks are located in a bermed area. These tanks are constructed of steel and contain approximately 500 gallons each. Two pressurized containment tanks are also located at Site 9. Their contents are unknown. The smoke house, located in the northern part of Site 9, is also used for training exercises. No fuel products are used in this area.

2.1.2 Site 6

Site 6 is located north of and adjacent to Site 9. Site 6 is bounded by Site 82 on the north , by Piney Green Road on the east, by Site 9 on the south, and by Holcomb Boulevard on the west. Site 6 covers an area of approximately 177 acres that incorporates Storage Lots 201 and 203, the wooded area behind the storage lots, and a ravine which begins at Site 6 and bisects Site 82. Three surface water bodies were associated with Site 6 for the purpose of this RI: Wallace Creek, Bear Head Creek, and a ravine (intermittent surface water body) located in the wooded area north of Lot 203 that drains to Wallace Creek. Specific details of the individual areas that make up Site 6 are described below.

2.1.2.1 Storage Lot 201

Storage Lot 201 (Lot 201) is a fenced lot located in the south-west portion of Site 6. It is a flat area with sparse vegetation around the fence lines. The ground surface is densely compacted soil. Lot 201 is bordered by woods and Bear Head Creek to the south, by Holcomb Boulevard to the west and Piney Green Road to the east. The lot is approximately 25 acres in size. It is currently being used for the storage of military vehicles and equipment, lumber, hydraulic oils and lubricants, non-PCB transformers, and other supplies (ESE, 1991).

2.1.2.2 Storage Lot 203

Storage Lot 203 (Lot 203) is a fenced lot located in the northern portion of Site 6. The fenced area of the lot encompasses approximately 46 acres. Lot 203 is a relatively flat area with elevation differences of approximately five feet. The ground surface is comprised of both naturally existing soil and fill material. Lot 203 varies in vegetation from a hard compact surface with no vegetation to areas with loose sandy soil and dense vegetation. Lot 203 is bordered by woods to the north (Site 82) and south, Piney Green Road to the east, and Holcomb Boulevard to the west. Lot 203 is currently inactive, but it still contains randomly stored scrap materials from former activities such as rubber rafts, shredded tires, radio/ communications parts, empty ammunition boxes, spent ammunition casings, fiberglass-like material, barbed wire fencing, used demolition kit training materials, a non-PCB transformer, wooden pallets, shredded tires, metal debris, and 55-gallon drums.

The 55-gallon drums found on Lot 203 were observed in small groupings throughout the lot. The majority of the drums, if labeled, were identified as containing lubricants, petroleum products, or corrosives. Drum sampling was conducted as part of the RI. The results of the drum sampling are provided in Section 4.0 of the Remedial Investigation report (Baker, 1992). The drums will be removed during the non-time critical removal action.

Empty storage tanks were also found on Lot 203. They were labeled as containing diesel fuel, gasoline, and kerosene (Baker, 1992). These tanks will also be removed during the non-time critical removal action.

2.1.2.3 Wooded and Ravine Areas

Woods and open fields surround both Storage Lots 201 and 203 and make up the remaining area of Site 6. The topography of the wooded areas is relatively flat, but localized trenching and mounding is visible west of Piney Green Road. The wooded areas are randomly littered with debris including spent ammunition casings, and empty or rusted drums. Many of the drums observed were only shells or fragments of drums. (Baker, 1992)

A ravine is located in the north west section of Site 6. The ravine begins "inside" of Storage Lot 203 and bisects Site 82. The elevation ranges from 25 feet above msl at the north boundary of Lot 203 to 5 feet above msl where the ravine drains into Wallace Creek. The surface of the ravine area is littered with various debris including batteries, fencing, tires, empty unlabeled drums, wire cables, commercial ovens, commodes, and respirator cartridges. An empty drum labeled "DDT" was also found in the ravine area, as were small canisters labeled to contain "DDT". The date on the canisters was marked November, 1957.

2.1.3 Site 82

Site 82 (more commonly referred to as "Piney Green Road VOC Site") is situated at the northern end of OU No. 2. It is bordered to the north by Wallace Creek, to the east by Piney Green Road, to the west by Holcomb Boulevard, and to the south by Site 6. Site 82 encompasses approximately 30 acres and is predominantly covered by woodlands. The site is randomly littered with debris including communication wire, spent ammunition casings, and empty or rusted drums. Markings were observed on a few drums, however, most of the drums did not contain markings due to their condition and age. Some of the drums were marked as "lubrication oil" and "anti-freeze".

The topography within Site 82 is relatively flat near the southern portion of the site, but becomes very steep near the bank of Wallace Creek. Localized trenching and mounding is visible near the southern portion of the site. The ravine bisects the site, as shown on Figure 3-1.

2.2 Site History

The following paragraphs describe the documented history of OU No. 2. Waste storage and disposal activities at the individual sites are described below.

2.2.1 Site 9

Site 9 has been used as a fire fighting training area from the early 1960s to the present. Fire extinguishing activities took place in an unlined pit. In 1981 the pit was lined with asphalt. The training fires in the pit were started with used oil, solvents, and contaminated fuels (unleaded). Approximately 30,000 to 40,000 gallons of JP-4 and JP-5 fuel were also burned in the fire training pit. Chemical retardants containing diethylene glycol monobutyl ether, proprietary mixtures of hydrocarbons, fluorosurfactants and inorganic salts were occasionally used to extinguish the training fires (Baker, 1992).

2.2.2 Site 6

Site 6 has a long history of various uses including the disposal and storage of wastes and supplies. This section on the history of Site 6 has been broken down into Storage Lot 201, Storage Lot 203, and the wooded and the ravine areas to simplify the historical descriptions of these areas.

2.2.2.1 Storage Lot 201

Currently, Lot 201 is used to store military equipment, vehicles, hydraulic oils, and other "non-hazardous" supplies. Pesticides were reportedly stored in the northeast and southeast corners of the lot. Transformers containing PCBs were reportedly stored in the southwest corner of the lot (Water and Air Research, 1983). No storage or disposal activities have supporting documentation other than what is reported in the Initial Assessment Study prepared in 1983 by Water and Air Research.

2.2.2.2 Storage Lot 203

Storage Lot 203 has been used as a disposal area since the 1940s. There is little documentation on the disposal activities at this lot. Lot 203 is not currently active as a storage or disposal area, but the ground surface is littered with various debris. Pesticides were reported to have been stored in a trailer on Lot 203 as well as in the southeast portion of the lot (Memo: Past Disposal Practices at DRMO Lot 203, 17 January 1989). Drums of DDT were found in the southwestern portion of the lot in 1989 (Memo: Unearthed 55-gallon drums of DDT and 55-gallon drums of unknown substance at Camp Lejeune DRMO Lot 203. 18 January 1989). Five 55-gallon drums and surrounding soil were containerized and disposed of (Memo: 18 January 1989).

Lot 203 was also used for the storage and disposal of radio and communication parts, shredded tires, lubricants, petroleum products, corrosives, expended demolition kit training materials, ordnance, sheet metal debris, wire cables, and wooden pallets. Empty and full 55-gallon drums were found at various locations on Lot 203. A drum survey was conducted as part of the RI and the results are located in Section 4.0 of the Remedial Investigation report (Baker, 1992).

Lot 203 is currently fenced. From historical photographs, it appears that the fenced boundaries have changed since the lot was in operation. Former employees at Lot 203 have reported disposal of various chemicals including PCBs, cleaning solvents, electrolytes from used batteries, and waste oils.

2.2.2.3 Wooded and Ravine Areas

The surface of the wooded areas around Lots 201 and 203 is randomly littered with debris including drums, metal storage containers, and rocket cartridges. No organized disposal operations are documented for the wooded areas. A ravine begins at the northern boundary of Lot 203. As previously stated, this area is currently littered with various debris. From the deposition of the debris in the ravine, it appears that trucks may have dumped their contents into the ravine from Lot 203.

2.2.3 Site 82

As described in Section 2.1.3, Site 82 is randomly littered with debris. No organized disposal operations are documented for the site. From the deposition of the debris at Site 82, it appears that the area was used for disposal of miscellaneous debris from Lot 203. Although the name of the site refers to VOCs (the site is named "Piney Green Road VOC Area"), there are not documents or memorandums which indicate any disposal of VOCs or solvents.

2.3 Study Area Description

This section describes the overall study area at MCB Camp Lejeune, North Carolina. The information in this section was obtained from previous studies conducted at the base, or from the available literature.

2.3.1 Regional Ecology

MCB Camp Lejeune, North Carolina, is approximately 108,800 acres, with 84 percent of the area covered by forests (USMC, 1987). The base drains primarily to the New River or its tributaries including Northeast Creek, Southwest Creek, Wallace Creek, French Creek, Bear Head Creek, Freeman Creek, and Duck Creek. The soil types range from sandy loams to fine sand and muck, with the dominant series being sandy loam (USMC, 1987).

Vegetation at MCB Camp Lejeune, North Carolina, includes pure pine stands of loblolly and longleaf pine in the drier upland soils, pure pond pine stands in high organic wet soils, pine-hardwood and pure hardwood stands in streamside zones and in more productive soils, and bottomland hardwoods in the floodplains of the major creeks (USMC, 1987). Wildlife on the base includes white-tailed deer, wild turkey, and black bear along with numerous small game species (e.g., bobwhite quail, morning dove, rabbit) (USMC, 1987).

Wallace Creek and Bear Head Creek are designated as Class SB NSW by the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR), which are saltwaters protected for primary recreation (swimming on a frequent basis), fishing, and aquatic life including propagation and survival (NCDEHNR, 1992a, 1992b). These creeks are classified as Nutrient Sensitive Waters which are waters subject to growths of microscopic or macroscopic vegetation requiring limitations on nutrient inputs (NCDEHNR, 1992a, 1992b). Wallace Creek is classified as Inland Waters above, and Coastal Waters below the first bridge upstream from its mouth (NCMFC, 1992). Wallace Creek and Bear Head Creek are classified as Inland Waters at all the sample stations.

The New River, downstream of OU No. 2, is designated as Class SC: which are saltwaters protected for secondary recreation, fishing, and aquatic life including propagation and survival (NCDEHNR, 1992a, 1992b). All saltwaters in North Carolina are classified to protect these uses at a minimum (NCDEHNR, 1992a, 1992b). This section of the New River also is classified as a Nutrient Sensitive Water (NCDEHNR, 1992a, 1992b).

2.3.2 Sensitive Environments

This section describes the sensitive environments that were evaluated at OU No. 2. These sensitive environments include wetlands, protected species, and other potentially sensitive environments.

2.3.2.1 Wetlands

The NCDEHNR's, Division of Environmental Management (DEM) has developed guidance pertaining to activities that may impact wetlands (NCDEHNR, 1992c). In addition, certain activities impacting wetlands also are regulated by the U.S. Corps of Engineers.

The U.S. Fish and Wildlife Service (FWS) prepared a National Wetlands Inventory (NWI) map for the Camp Lejeune, North Carolina quadrangle by stereoscopic analysis of high altitude aerial photographs (USDI, 1982). OU No. 2 is included in this map (see Appendix A for a copy of the NWI map). The wetlands were identified on the photographs based on vegetation, visible hydrology, and geography in accordance with Classification of Wetland and Deep-Water Habitats of the United States (Cowardin, et al, 1979). NWI maps are intended for a initial identification of wetland areas. They cannot be substituted for an actual wetland delineation that may be required by Federal, state and/or local regulatory agencies.

Several types of wetlands have been identified adjacent to Wallace Creek and Bear Head Creek from the NWI map. The wetlands along the creeks primarily are palustine forested wetlands consisting of pond, longleaf or loblolly pines, along with oaks, black gum and baldcypress (NCDNRCD, 1988). See the NWI map in Appendix A for the wetland classifications and their locations.

2.3.2.2 Threatened and Endangered Species

Certain species have been granted protection by the FWS under the Federal Endangered Species Act (16 U.S.C. 1531-1543), and/or the North Carolina Wildlife Resources Commission, under the North Carolina Endangered Species Act (G.S. 113-331 to 113-337). The protected species fall into one of the following status classifications: Federal or State endangered, threatened or candidate species, State special concern, State significantly rare, or State watch list. While only the Federal or State threatened or endangered and State special concern species are protected from certain actions, the other classified species have the potential for protection in the future.

Table 2-1 lists the protected faunal species (either endangered, threatened, or special concern) and the only federally endangered or threatened floral species that have been identified in previous studies within the boundaries of MCB Camp Lejeune (USMC, 1991; LeBlond, 1991; Fussell, 1991; and Walters, 1991). The following paragraphs discuss the protected species observed at MCB Camp Lejeune during previous studies.

A Peregrine falcon was spotted approximately five miles southeast of OU No. 2 (Fussell, 1991). These birds potentially may inhabit or feed in areas surrounding OU No. 2 because of their large foraging range. Black skimmers and piping plovers were observed near the New River Inlet (Fussell, 1991). However, these birds primarily inhabit shore line areas and, therefore, are not expected to be found at OU No. 2. Bachmans sparrows and Red-cockaded woodpeckers were observed at numerous locations throughout southern MCB Camp Lejeune. None of these species were observed at OU No. 2 during intensive investigations previously conducted for MCB Camp Lejeune, therefore, there is a low potential for them to exist at OU No. 2 (Fussell, 1991; Walters, 1991).

Sea turtles and sea turtle nests have been observed downstream of OU No. 2 in the New River on Onslow Beach. Sea turtles do not swim very far up the New River because of the low salinity, therefore, they are not expected to inhabit areas of OU No. 2 (USMC, 1991). During the ecological investigation conducted in August and September 1992, an alligator was observed in Wallace Creek. In addition, signs were posted at the boat launching ramp in Wallace Creek warning of the American alligators presence in the creek.

A protected floral species and special-interest community survey previously was conducted at Camp Lejeune (LeBlond, 1991). From this list, the Rough-leaf loosestrife was the only Federally threatened or endangered plant species found on the Marine Corp Base. Several State endangered or threatened and Federal and State candidate species were found on the MCB. A road meadow, inhabited by the state watch species Lugwigia microcarpa, was located upstream of OU No. 2 on Wallace Creek (see Appendix B).

Also upstream of OU No. 2 on Wallace Creek, a state registered natural resource area has been identified (see Appendix B). The general landscape consists of a broad floodplain and former mill pond on Wallace Creek which is dominated by a Cypress-Gum Swamp Community

TABLE 2-1

OPERABLE UNIT NO. 2
PROTECTED SPECIES WITHIN MCB CAMP LEJEUNE
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Protected Classification
American alligator (Alligator mississippienis)	T(f), T(s)
Bachmans sparrow (Aimophilia aestivalis)	SC
Black skimmer (Rhynochops niger)	SC
Green (Atlantic) turtle (Chelonia m. mydas)	T(f), T(s)
Loggerhead turtle (Caretta caretta)	T(f), T(s)
Peregrine Falcon (*)	(*)
Piping plover (Charadrius melodus)	T(f), T(s)
Red-cockaded woodpecker (Picoides borealis)	E(f), E(s)
Rough-leaf loosestrife (Lysimachia asperulifolia)	E(f), E(s)

Legend:
SC = State Special Concern
E(f) = Federal Endangered
E(s) = State Endangered
T(f) = Federal Threatened
T(s) = State Threatened

* The observer did not differentiate between the American eastern peregrine falcon [E (f), E (s)] or the Artic peregrine falcon [T(f), T(s)].

which grades upstream into a Coastal Plain Small Stream Swamp Community. The Cypress-Gum Swamp Community is dominated by Taxodium distichum, Nyssa biflora, Acer rubrum, Ulmus alata, and Fraxinus pennsylvanica. The Plain Small Stream Swamp Community is dominated by Taxodium distichum, Nyssa biflora, Fraxinus pennsylvanica, Ulmus americana, Acer rubrum, and Liquidambar styraciflua.

2.3.2.3 Other Sensitive Environments

In addition to wetlands and protected species, the presence of other sensitive environments, including those listed in 40 CFR Part 300, were evaluated. These sensitive environments are evaluated when assessing potential hazardous waste sites using the Hazard Ranking System. These sensitive environments and their presence or absence at OU No. 2 are discussed below.

- Marine Sanctuary - OU No. 2 is not located within a Marine Sanctuary (NCMFC, 1992).

- National Park - OU No. 2 is not located within a National Park (NPS, 1991).

- Designated Federal Wilderness Area - OU No. 2 is not located within a Designated Federal Wilderness Area (WS, 1989).

- Areas Identified under the Coastal Zone Management Act - The North Carolina Coastal Area Management Act (CAMA) regulates various types of Areas of Environmental Concern including estuarine waters, coastal wetlands, public trust areas, and estuarine shoreline through the establishment of unified policies, criteria, standards, methods, and processes (CAMA, 1974). Bearhead Creek, the inland portion of Wallace Creek and any coastal wetlands associated with these waters are regulated under CAMA. The tidal portions of Wallace Creek along with 75 feet adjacent to the mean water line also are regulated under CAMA (NCDEHNP, 1993a).

- Sensitive Areas Identified under the National Estuary Program (NEP) or Near Coastal Waters Program (NCWP) - OU No. 2 is not located within a Sensitive Area identified under the NEP or NCWP (USEPA, 1993).

- Critical Areas Identified under the Clean Lakes Program - OU No. 2 is not located within a Critical Area identified under the Clean Lakes Program (NPS, 1991).

- National Monument - OU No. 2 is not located within a National Monument (NPS, 1991).

- National Seashore Recreational Area - OU No. 2 is not located within a National Seashore Recreational Area (NPS, 1991).

- National Lakeshore Recreational Area - OU No. 2 is not located within a National Lakeshore Recreational Area (NPS, 1991).

- National Preserve - OU No. 2 is not located within a National Preserve (NPS, 1991).

- National or State Wildlife Refuge - OU No. 2 is not located within a National or State Wildlife Refuge (NCWRC, 1992).

- Unit of the Coastal Barrier Resource Program - OU No. 2 is not located within a unit of the Coastal Barrier Resource Program (USDI, 1993).

- Administratively Proposed Federal Wilderness Area - OU No. 2 is not located within an Administratively Proposed Federal Wilderness Area (WS, 1989, 1993).

- Spawning Areas Critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters. There are probable spawning areas for resident fish species within Wallace Creek and Bear Head Creek. However, specific areas have not been designated in these creeks by state agencies (NCDEHNR, 1993b).

- Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time - OU No. 2 is not a migratory pathway or feeding area critical for the maintenance of anadromous fish species (NCDEHNR, 1993b). There is not a significant population of anadromous fish in Wallace, Bear Head Creek, or the New River downstream of Wallace Creek

- Terrestrial areas utilized for breeding by large or dense aggregations of animals - A study of the terrestrial species was not conducted at OU No. 2. As discussed in the Regional Ecology section of this report several large terrestrial species inhabit MCB

Camp Lejeune. Therefore, there is the potential for breeding by large aggregations of animals. It should be noted that because of the frequent military activity on the land, and the fences around Lot 203 and Lot 201, the potential for breeding by terrestrial species on OU No. 2 may be limited.

- National river reach designated as Recreational - Wallace Creek, Bear Head Creek, or the New River downstream of Wallace Creek are not designated as National Recreational Rivers (NPS, 1990, 1993).

- Federal designated Scenic or Wild River - Wallace Creek, Bear Head Creek, or the New River downstream of Wallace Creek are not Federally designated Scenic or Wild Rivers (NPS, 1990, 1993).

- State land designated for wildlife or game management - OU No. 2 is not located within a State game land (NCWRC, 1992).

- State designated Scenic or Wild River - Wallace Creek, Bear Head Creek, or the New River downstream of Wallace Creek are not State designated Scenic or Wild Rivers (NCMFC, 1992).

- State designated Natural Area - OU No. 2 is not located within a State designated Natural Area or Area of Significant Value (LeBlond, 1991).

- State designated areas for protection or maintenance of aquatic life - No areas within the boundaries of OU No. 2 are designated as primary nursery areas or are unique or special waters of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses (NCDEHNR, 1992b).

- Areas of Significant Value - OU No. 2 is not located within a State Area of Significant Value (LeBlond, 1991).

- State Registered Natural Resource Area - The Wallace Creek Natural Resource Area is located upstream of OU No.2.

2.4 Remedial Investigations

The RI involved four environmental areas; Soil Investigation, Groundwater Investigation, Surface Water/Sediment Investigation, and Ecological Investigation. A summary of the results of the soil and groundwater investigations conducted at OU No. 2 is presented in this section of the report; detailed descriptions of these studies as well as the complete results can be found in the RI Report for OU No. 2 (Baker, 1993). The surface water and sediment investigations are discussed in Section 3.0 (Surface Water/Sediment Sampling) of this report while the ecological investigation is discussed in Section 4.0 (Ecological Investigation) of this report.

2.4.1 Source Identification

The remedial investigations concluded that organic and inorganic contamination was present in soil, groundwater, surface water, and sediments at OU No. 2. The data collected suggest that multiple sources have contributed to contaminating all the media. The following discussion identifies potential sources of contamination with each site.

2.4.1.1 Potential Sources of Contamination at Sites 6 and 82

Within Sites 6 and 82, numerous sources of contamination may exist including surficial and buried drums, miscellaneous size containers, surface spills, and routine spraying activities (pesticides).

Drums and other miscellaneous size containers were observed throughout Sites 6 and 82 including south of Bear Head Creek, north and east of Lot 201, within Lot 203, the ravine, and wooded areas north of Lot 203 (Site 82). Some of the drums were labeled as lubricating oils, pesticides (ravine area), or paint solvents. It was also reported (Memo: 12 January 1989) that drums may have been buried within Lot 203 although test pit excavations revealed only a limited number of small (5-gallon) canisters. Containers of paints, lubricating oils, and various solvents were observed in test pits trenched outside of Lot 203 (wooded area between Lots 201 and 203). Unidentified pits such as these may exist throughout the wooded areas. Surface spills of hazardous materials were not reported at Site 6 but some these materials are known to have existed on site (e.g., Lot 203).

Most of the groundwater contamination identified in the southeast portion of Site 82 appears to be centered in the vicinity of one well. The source of this contamination may be related to buried drums or containers in the area. Numerous apparently empty containers were identified on the surface in this area. Additional investigative activities may be needed to further evaluate this area.

The ravine is a potential source of contamination at Site 6. The ravine is filled with debris such as drums and five-gallon containers of unknown material, weathered battery packs, spent shell casings, and miscellaneous refuse (mainly demolition debris). It is unknown what materials, if any, underlie this surface debris. Trenching may be required in the ravine to further evaluate this potential source.

Several other contaminated areas within Site 6 were identified including Lot 201 and the wooded areas north and east of Lot 201. Within Lot 201, the sources of contamination appear to be related to current (i.e., storage of vehicles and pesticide spraying) and former site activities (PCBs and pesticide storage areas). Pesticides are very prevalent in surface soil at Lot 201.

2.4.1.2 Potential Sources of Contamination at Site 9

Investigation results indicate that the environmental contamination at Site 9 is minimal. The potential sources of contamination, although minimal, include the aboveground storage tanks and fire-fighting training pit (Volatile Organic Compounds (VOCs) and Semivolatile Organic Compounds (SVOCs), and spraying of pesticides on the surface). Overall, the site poses little risk to human health.

2.4.2 Overview of Results and Extent of Contamination

TCL organic and TAL inorganic contamination identified at OU No. 2 appears to have resulted from past disposal practices and recent site activities. The data suggest that these occurrences have impacted soil, groundwater, sediment, and surface water at OU No. 2. Contaminant distribution patterns at Site 82 for all of the media suggest that there is a significant source of groundwater contamination which appears to be located in the wooded area north of Lot 203. The nature and extent of this source, however, have not been fully evaluated. Moreover, many other sources of contamination also exist (e.g., the ravine Site 6), which have contributed to the overall environmental contamination.

Migration of contaminants, especially TCL organics, have resulted in widespread environmental contamination at the northern end of Site 6 and in Site 82. The data suggest that the primary contaminant plume (e.g., solvents, lubricating oils, etc.) is migrating away from the wooded area north of Lot 203 and toward Wallace Creek. TCL organics are contaminating the surface water and sediments of Wallace Creek. Migration of contaminants from the ravine area also appears to be contaminating Wallace Creek. Moreover, TAL inorganic contamination (potential source appears to be numerous battery packs) appears to be migrating from the ravine to Wallace Creek.

Other source areas within Sites 6 and 82 have been identified. The contaminant magnitude at these other areas is not as significant, however, as the primary occurrence at Site 82. These impacted areas appear to be isolated and not widespread. The sources of the contamination within these areas may be the result of small disposal pits or spills from drums.

2.4.3 Soil Investigation

The surface soil samples were analyzed for Target Compound List (TCL) organics, and Target Analyte List (TAL) inorganics. A summary of the results of the soil investigation conducted at OU No.2 are included in this section.

2.4.3.1 Site 9

Surface soil (i.e., ground surface to 6-inches) analytical results indicated the presence of TCL organics (including pesticides, volatiles, and semivolatiles), TAL inorganics (excluding cyanide), and total petroleum hydrocarbons (TPH). The following paragraphs summarize the results of the sampling.

Pesticides 4,4'-dichlorodiphenyl dichloroethylene (4,4'-DDE) and 4,4'-dichlorodiphenyl-trichloroethane (4,4'-DDT) were detected at five soil boring locations. Four Volatile Organic Compounds (VOCs) including acetone, 1,1,1-Trichloroethane (TCA), Tetrachloroethene (PCE), and toluene were detected in the soil collected from two soil borings.

Three Semi-Volatile Organic Compounds (SVOCs) including pyrene, bis(2-ethylhexyl) phthalate, and benzo(b)fluoranthene were detected in soil samples collected from two soil borings. The concentration ranges of the positively detected TCL organic compounds are as follows:

Constituent	Concentration Range (ug/kg)
4,4'-DDE	13 to 650
4,4'-DDT	3.3J to 570
Acetone	16
1,1,1-TCA	1J
PCE	21
Toluene	2J
Pyrene	59J
Bis(2-ethylhexyl) phthalate	71J
Benzo(b)fluoranthene	46J

J - Represents that the value is estimated either for a tentatively identified compound or when a compound is present but the value is below the contract required quantitation limit.

Fifteen of the 23 TAL inorganics were detected in the surface soils. Antimony, arsenic, beryllium, cadmium, nickel, selenium, silver, and thallium were not detected in any of the surface soil samples. The concentration ranges of the positively detected TAL inorganics are as follows:

Constituent	Concentration Range (mg/kg)
Aluminum	1,510 to 4,510
Barium	4.9JB to 8.9B
Calcium	179B to 47,100
Chromium	1.7B to 5.1
Cobalt	0.5JB to 0.85JB
Copper	0.93JB to 2.8JB
Iron	813 to 1,260
Lead	4.1 to 25.7
Magnesium	64B to 811B

Manganese	4.1 to 14.7
Mercury	0.02B to 0.03B
Potassium	20.6JB to 152B
Sodium	106JB
Vanadium	2.7JB to 4.8B
Zinc	6.8 to 18.1

B - Represents that the value is above the instrument detection limit but is below the contract required quantitation limit.

2.4.3.2 Site 6 (Lot 201)

TCL organic and TAL inorganic chemicals were detected in the surface soil samples collected from Lot 201. Of the organics detected at the site, six were pesticides, two were PCBs, three were VOCs and twelve were SVOCs. The concentration ranges of the positively detected TCL organics are as follows:

Constituent	Concentration Range (ug/kg)
Dieldrin	5.6J to 4.6
4,4'-DDE	4J to 17,000J
4,4'-DDD	0.98J to 180,000J
4,4'-DDT	3J to 1,200,000
Alpha chlordane	8.9
Gamma chlordane	8J
PCB-1248	1,800
PCB-1260	31J to 36J
Methylene chloride	4J
Acetone	7J to 37J
1,1,1-TCA	2J to 42
1,4-Dichlorobenzene	37J to 38J
Phenanthrene	36J
Di-n-butyl phthalate	89J
Fluoranthene	43J to 94J
Pyrene	38J to 99J
Benzo(a)anthracene	47J

Chrysene	39J to 88J
Bis(2-ethylhexyl)phthalate	68J to 310J
Di-n-octyl phthalate	44J
Benzo(b)fluoranthene	61J to 160J
Benzo(k)fluoranthene	46J
Benzo(a)pyrene	78J

Nineteen of the 23 TAL inorganics were detected in the surface soils. Antimony, mercury, silver, and thallium were not detected in any of the surface soil samples. The concentration ranges of the positively detected TAL inorganics are as follows:

Constituent	Concentration Range (mg/kg)
Aluminum	245 to 5,520
Arsenic	0.91B to 9.7J
Barium	3.5JB to 16.5B
Beryllium	0.22B
Cadmium	0.51JB to 1.5J
Calcium	402B to 286,000
Chromium	3.5 to 21.6
Cobalt	1.3JB
Copper	0.75JB to 27.8
Iron	238 to 4,260
Lead	1J to 78
Magnesium	26B to 3,980
Manganese	4.2J to 204J
Nickel	3.7B to 6.4JB
Potassium	30.6JB to 567B
Selenium	2.2J
Sodium	41.6JB to 312JB
Vanadium	1.6B to 18.3
Zinc	4.6 to 135J

2.4.3.3 Site 6 (Lot 203)

TCL organic and TAL inorganic chemicals were detected in the surface soil samples collected at Lot 203. The TCL organics detected at the site included eight pesticides, three PCBs, three VOCs, and 23 SVOCs. The concentration ranges of the positively detected TCL organics are as follows:

Constituent	Concentration Range (ug/kg)
Dieldrin	3.6J to 270J
4,4'-DDE	3.8J to 2,100
Endrin	21 to 130J
Endosulfan II	4.4J
4,4'-DDD	4.5J to 180J
4,4'-DDT	3.4J to 1,500J
Alpha chlordane	2.3J to 72J
Gamma chlordane	160J
PCB-1248	580J
PCB-1254	2100J
PCB-1260	17J to 42,000J
Acetone	4J to 15
1,1,1-TCA	2J to 15
Toluene	7J
1,4-Dichlorobenzene	34J to 160J
1,2-Dichlorobenzene	160J
Napthalene	1,400J
2-Methylnaphthalene	3,100J
Acenaphthene	250J to 9,500J
Dibenzofuran	140J to 890J
Fluorene	220J to 940J
Pentachlorophenol	520
Phenanthrene	60J to 2,000
Anthracene	55J to 440J
Fluoranthene	39J to 2,300
Carbazole	390J to 910J
Pyrene	42J to 2,800
Butyl benzyl phthalate	83J

3,3-Dichlorobenzidine	540
Benzo(a)anthracene	47J to 1,600
Chrysene	50J to 1,300
Bis(2-ethylhexyl)phthalate	52J to 1,300
Benzo(b)fluoranthene	88J to 2,700
Benzo(k)fluoranthene	30J to 1,100
Benzo(a)pyrene	49J to 1,800
Indeno(1,2,3-cd)pyrene	42J to 1,000
Benzo(g,h,i)perylene	41J to 1,000J

Twenty of the 23 TAL inorganics were detected in the surface soils at Lot 203. Selenium, silver, and thallium were not detected in any of the surface soil samples. The concentration ranges of the positively detected TAL inorganics are as follows:

Constituent	Concentration Range (mg/kg)
Aluminum	495 to 4,170
Antimony	13.5J to 51.2
Arsenic	0.39B to 4.9
Barium	2.7JB to 47.8
Beryllium	0.21B
Cadmium	0.48JB to 9.3
Calcium	44.4B to 92,100
Chromium	1.1B to 25.2
Cobalt	0.39JB to 2.2B
Copper	1JB to 75
Iron	241 to 12,900
Lead	4.1 to 4,010J
Magnesium	12B to 1,680
Manganese	1.9JB to 182
Mercury	0.03B to 1.1
Nickel	1.8JB to 13.2
Potassium	27.7JB to 195B
Sodium	9.2B to 460JB
Vanadium	1.1B to 8.2JB
Zinc	1.1B to 604

2.4.3.4 Sites 6 (Wooded and Ravine Areas) and 82

TCL organics and TAL inorganics were detected in the surface soil samples collected at Sites 6 and 82. Samples collected from the ravine are also discussed in Section 3.4 (Sediment Investigation).

TCL organics detected at the site included six pesticides and one PCB. Eleven VOCs including methylene chloride, bromomethane, acetone, 1,2-dichloroethene, PCE, 1,1,1-TCA, trichloroethene (TCE), benzene, 1,1,2,2-tetrachloroethene, toluene, and styrene were detected at Site 6 in the surface soil samples. Twenty-five SVOCs were also detected in the soil samples. The concentration ranges of the positively detected TCL organics are as follows:

Constituent	Concentration Range (ug/kg)
Dieldrin	4.6 to 87J
4,4'-DDE	2.2J to 4,200
Endrin	5.6J to 2,40J
4,4'-DDD	10J to 12,000
4,4'-DDT	3.4J to 400
Alpha chlordane	3.6J
PCB-1260	28J to 26,000J
Chloromethane	620J to 9,800
Bromomethane	670J to 3,700J
Acetone	5J to 14J
1,2-Dichloroethane	1,500J
1,1,1-TCA	1J to 2J
TCE	4,600
Benzene	850J
PCE	2,600J to 7,000J
1,1,2,2-Tetrachloroethene	55,000
Toluene	120J
Styrene	2J
Phenol	37J to 160J
1,4-Dichlorobenzene	39J to 74J
4-Methylphenol	120J

Napthalene	71J to 140J
2-Methylnaphthalene	42J
Acenaphthylene	84J
Acenaphthene	36J to 370
Dibenzofuran	82J to 120J
Fluorene	130J to 200J
Phenanthrene	46J to 1,500
Anthracene	41J to 260J
Fluoranthene	40J to 2,000J
Carbazole	73J to 190J
Pyrene	72J to 2,700
Butyl benzyl phthalate	140J
Benzo(a)anthracene	39J to 2,200
Chrysene	44J to 1,600
Bis(2-ethylhexyl)phthalate	35J to 320J
Di-n-octyl phthalate	40J
Benzo(b)fluoranthene	54J to 2,200
Benzo(k)fluoranthene	25J to 490
Benzo(a)pyrene	40J to 1,500
Indeno(1,2,3-cd)pyrene	45J to 1,300
Dibenz(a,h)anthracene	43J to 380J
Benzo(g,h,i)perylene	40J to 1,300J

All 23 of the TAL inorganics were found at the sites. The concentration ranges of the positively detected TAL inorganics are as follows:

Constituent	Concentration Range (mg/kg)
Aluminum	177J to 19,200J
Antimony	3.5JB to 13.2JB
Arsenic	0.49B to 26.3
Barium	1.1JB to 1,410
Beryllium	0.06B to 2.2
Cadmium	0.4JB to 51.9
Calcium	59.6B to 174,000J
Chromium	0.72B to 54.6

Cobalt	0.34B to 13.7
Copper	0.39JB to 348
Iron	113 to 149,000
Lead	2 to 1710
Magnesium	12.3B to 2,580J
Manganese	1.1JB to 700
Mercury	0.02B to 3.9
Nickel	1.7B to 79.4
Potassium	15JB to 2,560
Selenium	0.9 to 5.8
Silver	0.47JB to 0.49JB
Sodium	9.6JB to 809JB
Thallium	0.35B to 0.57JB
Vanadium	0.36JB to 35.7
Zinc	1.6B to 16,600

2.4.4 Groundwater Investigation

Organic and inorganic contamination identified at OU No. 2 appears to have resulted from past disposal practices and recent site activities. The data suggest that these occurrences have impacted soil, groundwater, sediment, and surface water, in particular at Sites 6 and 82. Contaminant distribution patterns at Sites 6 and 82 for all of the media suggest that there is a significant source of contamination (i.e., TCL organic) present which appears to be located in the wooded area north of Lot 203. The nature and extent of this source, however, have not been fully evaluated. Moreover, many other sources of contamination also exist (e.g., the ravine, Site 6) which have contributed to the overall environmental impact.

Migration of contaminants, especially TCL organics, has resulted in wide spread environmental impact at Site 82. The data suggest that a primary contaminant plume (i.e., chlorinated hydrocarbons) is migrating away from the wooded area north of Lot 203 toward Wallace Creek. TCL organic contaminants are impacting the surface water and sediments of Wallace Creek. Migration of contaminants from the ravine (Site 6) area also appears to be impacting Wallace Creek. Moreover, TAL inorganic contamination (the potential source appears to be numerous battery packs) also appears to be migrating from the ravine.

Other source areas within Site 6 have been identified. The contaminant magnitude at these other areas of concern is not as significant, however, as the primary occurrence at Site 82. These impacted areas appear to be isolated and not widespread. The sources of the contamination within these areas may be the result of small disposal pits or spills from drums.

3.0 SURFACE WATER/SEDIMENT INVESTIGATION

This section discusses the surface water and sediment investigations conducted at OU No. 2. Included in this section are the sampling methodologies, procedures, locations, and results of the surface water and sediment sampling.

3.1 Surface Water and Sediment Sampling Methodology

Surface water and sediment sampling was conducted to determine if contamination attributable to OU No. 2 exists in Wallace Creek, Bear Head Creek, or the ravine which had an intermittent tributary to Wallace Creek. Surface water samples were collected at twenty-four stations at OU No. 2, while sediment samples were collected at twenty-six stations (see Figure 3-1). The majority of the samples were collected from August 22 to August 30, 1992, with one sample collected on October 23, 1992 due to site access problems.

The following information from each station was recorded in the field logbook:

- Project location, date and time
- Weather
- Sample location number and identification number
- Flow conditions (i.e., high, low, in flood, etc.)
- On-site water quality measurements
- Visual description of water (i.e., clear, cloudy, muddy, etc.)
- Description of biotic community (i.e., flora, fauna, etc.)
- Sketch of sampling location including boundaries of the water body, sample location (and depth), relative position with respect to the site, location of wood identifier stake
- Names of sampling personnel
- Sampling technique, procedure, and equipment used

The on-site water quality measurements consisted of temperature, pH, specific conductance, salinity, and dissolved oxygen. These measurements were collected immediately following sample collection.

3.1.1 Surface Water

The following sections describe the stations where surface water samples were collected and the procedures used for collecting the samples.

3.1.1.1 Station Locations

Forty-eight surface water samples were collected from twenty-four stations at OU No. 2 (see Figure 3-1 for station locations). Twenty-eight samples (eleven stations) were collected from Wallace Creek, fourteen samples (seven stations) were collected from Bear Head Creek, and six samples (six stations) were collected from the ravine (two other ravine sampling stations were dry at the time samples were collected). Tables 3-1, 3-2 and 3-3 contain a summary of the station numbers and locations, and sample numbers for the surface water samples collected at those stations.

The surface water sample numbers were designated as 6-WC"X"-SW-06B; the 6 indicates that the samples were collected at OU No. 2, WC stands for Wallace Creek (BH stands for Bear Head Creek and RV stands for the ravine), "X" stands for the station number, SW stands for surface water, 06 stands for a sample collected at the surface (312 stands for a sample collected at the surface water/sediment interface), and B stands for a sample collected at the creek bank (M stands for a sample collected in the middle of the creek).

3.1.1.2 Sampling Procedures

At stations where the water was more than three feet deep, samples were collected at the surface by dipping the sample bottles directly into the water and at one foot above the sediment by using a kemmerer sampler. To determine the designated depth, a marked weighted line was lowered into the water with the depth to the sediments recorded. At stations where the water was less than three feet deep, samples were collected at the approximate vertical mid-point by dipping the sample bottles directly into the water.

Care was taken when collecting samples for analysis of VOCs to avoid excessive agitation that could result in loss of VOCs. Samples for the VOC analysis were collected prior to the collection of the samples for analysis of the other parameters.

The samples were collected in clean containers provided by the analytical laboratory. Sampling personnel wore clean PVC gloves at each sampling station. For those sample bottles already containing preservative (e.g., sulfuric acid), the water was collected in a clean container and then slowly poured into the sample bottle. All sample containers not containing preservative were rinsed at least once with the sample water prior to sample collection.

The downstream water samples were collected first, with subsequent samples taken while moving upstream. Any sediment or biological samples were collected after the water samples were taken to minimize sediment resuspension that might contaminate the water samples.

The sampling locations were marked by placing a wooden stake and bright colored flagging at the nearest bank or shore. The sample number was marked on the stake with indelible ink. Photographs were taken to document the physical and biological characteristics of the sampling location.

3.1.2 Sediment

The following sections describe the stations where sediment samples were collected and the procedures used for collecting the samples.

3.1.2.1 Station Locations

Sixty-three sediment samples were collected from twenty-six stations at OU No. 2 (see Figure 3-1 for station locations); thirty-two samples (eleven stations) were located in Wallace Creek, twenty samples (seven stations) were located in Bear Head Creek, and eleven samples (eight stations) were located in the ravine. Tables 3-1, 3-2 and 3-3 contain a summary of the station numbers and locations, and sample numbers for the sediment samples collected at those stations.

The sediment sample numbers were designated as 6-WC"X"-SD-06B; the 6 indicates that the samples were collected at OU No. 2, WC stands for Wallace Creek (BH stands for Bear Head Creek and RV stands for the ravine), "X" stands for the station number, SD stands for sediment, 06 stands for a sample collected from the top six inches of the sediment (612 stands for a sample collected from six to twelve inches of the sediment), and B stands for a sample collected at the creek bank (M stands for a sample collected in the middle of the creek).

3.1.2.2 Sampling Procedures

At each station, sediment samples were collected at the surface (0-6 inches) and at depth (6-12 inches) using a stainless steel hand-held coring instrument. A new disposable clear plastic liner tube, fitted with a disposable eggshell catcher to prevent sample loss, was used at each station.

The coring device was pushed into the sediments to a maximum depth of fifteen to twenty inches, or until refusal. The liner was removed from the sampler and the sediments were extruded into the appropriate sample jars using a decontaminated extruder. The liners were not cut in half as stated in the work plan because the plastic shavings may have contaminated the sediments.

3.2 Surface Water and Sediment Sampling Results

Surface water and sediment samples were collected from three areas at OU No. 2: Wallace Creek north of Site 82, Bear Head Creek south of site Site 6, and the ravine located on the northern portion of Site 6 (see Figure 3-1). Water quality measurements were conducted at each station using field instruments. Appendix C contains the field data sheets for the surface water and sediment samples.

3.2.1 Field Measurements

During the collection of the surface water and sediment samples, water quality measurements (i.e., salinity, conductivity, dissolved oxygen, and pH) were conducted using field instruments. Table 3-4 summarizes these measurements.

A salt wedge was observed at Stations 6-WC07, 6-WC08, 6-WC09, 6-WC10, 6-WC11, and 6-BH07 with the salinity of the overlying water (freshwater) ranging from 0.0 to 4.0 parts per thousand (ppt), and the salinity of the bottom water (saltwater) ranging from 6.0 to 8.5 ppt. The dissolved oxygen followed a similar trend at these stations ranging from 2.2 mg/l to 5.8 mg/l at the surface and 0.15 mg/l and 0.3 mg/l at the bottom of the salt wedge. Conductivity at these stations ranged from 300 to 7,000 microhms/cm at the surface and 500 to 14,000 microhms/cm at the bottom, and the pH ranged from 6.0 to 6.8 standard units (S.U.).

Salinity concentrations at the other stations was non-detectable, and conductivity concentrations ranged from 30 to 420 microhms/cm. Dissolved oxygen concentrations at the other stations ranged from 4.6 to 7.7 mg/l and pH values ranged from 3.9 to 6.8 S.U.

3.2.2 Surface Water

Surface water samples were collected at OU No. 2 in Wallace Creek, Bear Head Creek, and the ravine (see Figure 3-1). This sampling was performed to determine the extent of contamination in the surface water due to past disposal activities at OU No. 2. The extent of contamination is discussed in Section 3.3 of this report. In addition, potential source areas are discussed in Section 2.2 of this report. The surface water sampling activities are described in Section 3.1.1.

At some of the mid-creek stations, samples were not collected due to depth of water and restricted boat access. The bank samples from these stations were collected from shore, however, the middle stations samples could not be reached. Tables 3-1, 3-2 and 3-3 explain why samples were not collected at some of the stations.

3.2.2.1 Wallace Creek

TCL organic and TAL inorganic chemicals were detected in several surface water samples collected from Wallace Creek (see Tables 3-5 and 3-6). The data and frequency tables are provided in Appendix D. Of the TCL organics that were detected in Wallace Creek, six were VOCs (vinyl chloride, acetone, 1,2,-dichloroethene, TCE, PCE, and toluene) and two were SVOCs (2,4,6,-trichlorophenol and bis(2-ethylhexyl)phthalate). Pesticides and PCBs were not detected in any of the samples. The concentration ranges of the positively detected TCL organics and the sample number with the maximum are as follows:

Constituent	Sample Number	Concentration Range (ug/l)
Acetone	WC09-SW-312M	4J to 900J
1,2,-dichloroethene	WC07-SW-06B	2.0J to 85
PCE	WC07-SW-06M	1.0J to 4.0J
TCE	WC07-SW-06M	3J to 98
Toluene	WC07-SW-06B	1J to 3J
Vinyl chloride	WC07-SW-06B	6.0J
2,4,6-Trichlorophenol	WC10-SW-06M	1J

Bis(2-ethylhexyl) phthalate	WC11-SW-312M	1J to 2J

Nineteen of the 24 TAL inorganics were detected in the samples. Antimony, beryllium, cyanide, selenium, and thallium were not detected in any of the samples. The positively detected TAL inorganics, and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/l)
Aluminum	WC01-SW-06B	480J to 1,350
Arsenic	WC09-SW-06B	3.7B
Barium	WC05-SW-06M	16JB to 22.6B
Cadmium	WC-07-SW-312M	3.2JB to 17.4J
Calcium	WC11-SW-312M	3,640B to 64,100
Chromium	WC05-SW-312M	4.9B
Cobalt	WC05-SW-312M	2.9B
Copper	WC11-SW-312M	3B to 209
Iron	WC01 -SW-06B	477 to 1,050
Lead	WC03-SW-312M	1.2B to 10.4
Magnesium	WC11-SW-312M	632B to 174,000
Manganese	WC11-SW-312M	8.2JB to 25J
Mercury	WC11-SW-312M	0.24B to 0.52
Nickel	WC03-SW-312M	102 to 1,380
Potassium	WC11-SW-312M	341B to 1,620,000
Silver	WC08-SW-312M	2.6B
Vanadium	WC01-SW-06B	1.9JB to 3.3JB
Zinc	WC03-SW-312M	7.3B to 111

3.2.2.2 Bear Head Creek

TCL organics and TAL inorganics were detected in several surface water samples collected from Bear Head Creek (Tables 3-7 and 3-8). The data and frequency tables are provided in Appendix D. Two SVOCs (diethyl phthalate and bis (2-ethylhexyl) phthalate were positively detected in these samples. No VOCs, pesticides, or PCBs were detected in any of the samples. The concentration ranges and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/l)
Diethyl phthalate	BH07-SW-312M	2J
Bis(2-ethylhexyl) phthalate	BH05-SW-06B	1J to 2J

Sixteen of the 24 TAL inorganics were detected in the samples. Antimony, arsenic, beryllium, cadmium, cobalt, cyanide, selenium, and thallium were not detected in any of the samples. The concentration ranges of the positively detected TAL inorganic compounds, and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/l)
Aluminum	BH05-SW-06M	334 to 2,700
Barium	BH05-SW-06M	13.4B to 36B
Calcium	BH07-SW-312M	600B to 54,900
Chromium	BH05-SW-06M	4.4B to 8.0B
Copper	BH07-SW-312M	4B to 55.8
Iron	BH05-SW-06M	501 to 6,200
Lead	BH05-SW-06M	1.5JB to 8.2
Magnesium	BH07-SW-312M	588B to 13,600
Manganese	BH05-SW-06M	6.2B to 65
Mercury	BH07-SW-312M	0.05B to 0.34
Nickel	BH07-SW-312M	8.0JB to 244
Potassium	BH07-SW-312M	685B to 49,000
Silver	BH07-SW-06B	2.1B to 3.6B
Sodium	BH07-SW-312M	4,310JB to 1,260,000
Vanadium	BH03-SW-06M	2JB to 3JB
Zinc	BH07-SW-312M	6.2B to 30.7

3.2.2.3 Ravine

TCL organics and TAL inorganics were detected in several surface water samples from the ravine (Tables 3-9 and 3-10). The data and frequency tables are provided in Appendix D. Acetone (140 ug/l in sample RV5-SW-06) was the only TCL organic compound that was positively detected in these samples.

Seventeen of the 24 TAL inorganics were detected in the samples. Antimony, beryllium, cyanide, nickel, mercury, selenium, and thallium were not detected in any of the samples. The concentration ranges of the positively detected TAL inorganics, and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/l)
Aluminum	RV2-SW-06	119B to 613
Arsenic	RV8-SW-06	2.2B to 10.5
Barium	RV2-SW-06	37.1JB to 91B
Cadmium	RV5-SW-06	3.7JB to 4.3JB
Calcium	RV2-SW-06	12,300 to 102,000
Chromium	RV7-SW-06	4.2B to 6.5B
Cobalt	RV8-SW-06	2.3B
Copper	RV5-SW-06	4.7B to 9JB
Iron	RV8-SW-06	127J to 9,600
Lead	RV8-SW-06	1.9B to 12.2
Magnesium	RV2-SW-06	1,200B to 7,100
Manganese	RV5-SW-06	38.6J to 597
Potassium	RV2-SW-06	393B to 2,910B
Silver	RV6-SW-06	2.9B to 67.6
Sodium	RV8-SW-06	2,860JB to 8,960
Vanadium	RV8-SW-06	6.2B
Zinc	RV6-SW-06	72.7 to 495

3.2.3 Sediments

Sediment samples were collected at OU No. 2 in Wallace Creek, Bear Head Creek, and the Ravine (see Figure 3-1). This sampling was performed to determine the extent of contamination in the sediments due to past disposal activities at OU No. 2. The sediment sampling activities are described in Section 3.1.2.

Some of the samples could not be collected due to sampler refusal, boat access (which required samples to be collected from the shore), and flocculant sediments that would not remain in the sampler. Tables 3-1, 3-2 and 3-3 explain why samples were not collected at some of the stations.

3.2.3.1 Wallace Creek

TCL organics and TAL inorganics were detected in sediment samples collected in Wallace Creek (see Tables 3-11 and 3-12). The data and frequency tables are provided in Appendix E. The following paragraphs summarize the results of the sediment investigation.

Pesticides 4,4'-DDE, 4,4'-DDT, 4,4'-DDD, and dieldrin were detected at seven sediment sample locations. PCB-1260 was detected at seven sediment locations.

The following VOC's were detected at all eleven sediment locations: methylene chloride, acetone, carbon disulfide, 2-butanone, 1,2,-dichloroethene, TCE, toluene, and total xylenes. The following SVOCs were detected in a few of the sediment samples: phenol, diethyl phthalate, phenanthrene, fluoranthene, butyl benzyl phthalate, benzo(a)anthracene, chrysene, bis(2-ethylhexyl) phthalate, pyrene, benzo(b)fluoranthene, benzo(a)pyrene, and benzo(k)fluoranthene. The concentration ranges of the positively detected TCL organics and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/kg)
Dieldrin	WC01-SD-612D	4.8J
4,4'-DDE	WC09-SD-612M	5.9 to 8.3
4,4'-DDD	WC08-SD-06M	7.4J to 200J
4,4'-DDT	WC08-SD-06M	200J to 1,200J
PCB-1260	WC08-SD-06M	31J to 2,100J
Methylene chloride	2WC03-SD-612B	6J to 910J
Acetone	WC09-SD-612B	26 to 24,000J
Carbon Disulfide	WC10-SD-612M	2J to 24J
1,2-Dichloroethene	WC07-SD-06B	31J
2-Butanone	WC09-SD-612B	21J to 9,300
TCE	WC02-SD-06B	7J to 23
Toluene	WC06-SD-06M	4J to 5J
Total xylenes	WC03-SD-06M	26 to 120J
Phenol	WC06-SD-06B	120J to 190J
Diethyl phthalate	WC06-SD-06B	120J to 530J
Phenanthrene	WC08-SD-612M	76J
Flouranthene	WC08-SD-06B	94J to 760J

Pyrene	WC08-SD-06B	95J to 810J
Butyl benzyl phthalate	WC07-SD-06B	200J to 920J
Benzo(a)anthracene	WC08-SD-06B	67J to 210J
Chrysene	WC08-SD-06B	74J to 230J
Bis(2-ethylhexyl) phthalate	WC11-SD-06B	960J
Benzo(b)fluoranthene	WC08-SD-06B	4J to 420J
Benzo(k)fluoranthene	WC08-SD-06B	67J to 140J
Benzo(a)pyrene	WC09-SD-06B	63J to 1,600

Eighteen of 24 TAL inorganics were detected in these sediment samples. Antimony, cadmium, cyanide, mercury, selenium, and thallium were not detected in any of the samples. The concentration ranges of the positively detected TAL inorganics, and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (mg/kg)
Aluminum	WC10-SD-06M	539 to 25,400
Arsenic	WC08-SD-612M	1.0B to 10.2
Barium	WC08-SD-612M	2.5JB to 110
Beryllium	WC07-SD-06B	0.07B to 0.78B
Calcium	WC04-SD-06M	242B to 90,000J
Chromium	WC10-SD-06M	1.2B to 28.5
Cobalt	WC09-SD-06M	06JB to 3.3JB
Copper	WC-03-SD-06M	0.43JB to 53,200
Iron	WC09-SD-06M	390 to 14,600
Lead	WC03-SD-06M	1.5 to 314J
Magnesium	WC11-SD-06M	50.5B to 9840
Manganese	WC09-SD-06M	3.1 to 50.2
Nickel	WC10-SD-06M	2.7JB to 10.7JB
Potassium	WC10-SD-06M	38.5JB to 2,200B
Silver	WC03-SD-06M	7.3
Sodium	WC11-SD-06B	224JB to 18,300
Vanadium	WC10-SD-06M	0.82JB to 45.5J
Zinc	WC03-SD-06B	6.2 to 388

3.2.3.2 Bear Head Creek

TCL organics and TAL inorganics were detected in sediment samples collected in Bear Head Creek (see Tables 3-13 and 3-14). The data and frequency tables are provided in Appendix E. The following paragraphs summarize the results of the sediment investigation.

Pesticides, PCBs, VOCs, and SVOCs were all detected in some of the sediment samples taken in Bear Head Creek. The pesticides 4,4'-DDE, 4,4'-DDT, 4,4'-DDD, and alpha chlordane were detected at five sediment stations. PCB-1260 was detected at four sediment stations.

Several VOCs were detected at all seven sediment locations including methylene chloride, acetone, PCE, 2-butanone, TCE, benzene, ethlybenzene, and total xylenes. The following SVOCs were detected in several samples: 1,4-dichlorobenzene, pyrene, benzo(b)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene. The concentration ranges of the positively detected TCL organics and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/kg)
4,4'-DDE	BH06-SD-06B	5.7 to 68
4,4'-DDD	BH04-SD-612M	8.4J to 220J
4,4'-DDT	BH04-SD-612M	6.6J to 38J
Alpha chlordane	BH06-SD-06B	14J
PCB-1260	BH04-SD-612M	51 to 370J
Methylene chloride	BH03-SD-612M	2J to 7J
Acetone	BH04-SD-06B	34 to 9,900J
2-Butanone	BH05-SD-06B	3J to 2,600
TCE	BH07-SD-06M	5J to 150
Benzene	BH01-SD-06B	5J
PCE	BH03-SD-06B	3J
Ethylbenzene	BH07-SD-06M	57J
Total Xylenes	BH07-SD-06M	3J to 380
1,4-Dichlorobenzene	BH07-SD-06M	340J to 370J
Pyrene	BH06-SD-06B	60J to 76J
Benzo(b)fluoranthene	BH06-SD-06B	96J
Benzo(a)pyrene	BH06-SD-06B	93J to 640
Indeno(1,2,3-cd)pyrene	BH04-SD-06B	40J

TAL inorganics were detected in all 20 of the sediment samples collected from Bear Head Creek. Eighteen of 24 TAL inorganics were detected in these sediment samples. Antimony, cyanide, mercury, nickel, silver, and thallium were not detected in any of the samples. The concentration ranges of the positively detected TAL inorganic compounds, and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (mg/kg)
Aluminum	BH07-SD-06M	465 to 22,100J
Arsenic	BH07-SD-06B	0.54B to 6.1JB
Barium	BH03-SD-612M	7.7JB to 40.4B
Beryllium	BH03-SD-612B	0.13B to 0.97B
Cadmium	BH07-SD-06M	0.54JB to 4.7JB
Calcium	BH04-SD-06B	1,210 to 45,600
Chromium	BH07-SD-06M	2.3B to 16.4B
Cobalt	BH07-SD-06M	1.7JB to 4B
Copper	BH07-SD-06B	1.2JB to 28.1B
Iron	BH07-SD-06	442 to 17,100J
Lead	BH07-SD-06M	2.5 to 70.4J
Magnesium	BH07-SD-06M	57.6B to 10,500J
Manganese	BH07-SD-06M	3.8J to 48.6
Potassium	BH07-SD-06B	121B to 1,930B
Selenium	BH02-SD-612M	2.9
Sodium	BH07-SD-06B	86.5JB to 36,200J
Vanadium	BH07-SD-06M	1.5JB to 54.1B
Zinc	BH07-SD-06M	6.4B to 82.4

3.2.3.3 Ravine

TCL organics and TAL inorganics were detected in sediment samples collected from the ravine (see Tables 3-15 and 3-16). The data and frequency tables are provided in Appendix E. The following paragraphs summarize the results of the sediment investigation.

Pesticides 4,4'-DDE, 4,4'-DDT, 4,4'-DDD, endrin, endrin aldehyde, and dieldrin were detected at all eight sediment locations. PCB-1260 was detected at five sediment locations.

Two VOCs (acetone and 2-butanone) were detected at several sediment stations. Twenty different SVOCs were detected in sediment samples. The concentration ranges of the positively detected TCL organic compounds and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (ug/kg)
Dieldrin	RV1-SD-06	8.1J to 43J
4,4'-DDE	RV2-SD-06	23J to 120J
Endrin	RV1-SD-06	5.1J
4,4'-DDD	RV2-SD-06	4.1J to 45J
4,4'-DDT	RV3-SD-06	14J to 210J
Endrin Aldehyde	RV1-SD-06	7.8
PCB-1260	RV1-SD-06	29J to 360J
Acetone	RV4-SD-612	62 to 9,100J
2-Butanone	RV4-SD-612	2300 to 2,400J
Naphthalene	RV2-SD-06	54J
2-Methylnaphthalene	RV2-SD-06	44J
Acenaphthene	RV2-SD-06	220J
Dibenzofuran	RV2-SD-06	110J
Fluorene	RV2-SD-06	250J
Phenanthrene	RV2-SD-06	50J to 1,600
Anthracene	RV2-SD-06	480
Di-n-butyl phthalate	RV7-SD-612	52J
Fluoranthene	RV2-SD-06	84J to 1,500J
Carbazole	RV2-SD-06	170J
Pyrene	RV2-SD-06	96J to 2,100

Benzo(a)anthracene	RV2-SD-06	43J to 1,100
Chrysene	RV2-SD-06	59J to 1,100
Bis(2-ethylhexyl) phthalate	RV3-SD-06	200J
Benzo(b)fluoranthene	RV2-SD-06	54J to 1,200
Benzo(k)fluoranthene	RV7-SD-06	440
Benzo(a)pyrene	RV2-SD-06	70J to 1,000
Indeno(1,2,3-cd)pyrene	RV2-SD-06	57J to 710
Dibenz(a,h)anthracene	RV2-SD-06	83J
Benzo(g,h,i)perylene	RV8-SD-06	57J to 680

Nineteen of 24 TAL inorganics were detected in these samples. Antimony, cyanide, selenium, sodium, and thallium were not detected in any of the samples. The concentration ranges of the positively detected TAL inorganics and the sample number with the maximum detection are as follows:

Constituent	Sample Number	Concentration Range (mg/kg)
Aluminum	RV1-SD-06	739 to 10,300
Arsenic	RV1-SD-06	0.61B to 4.3
Barium	RV1-SD-06	2.9JB to 61.5
Beryllium	RV8-SD-06	0.06B to 0.25B
Cadmium	RV1-SD-06	0.53JB to 5.9J
Calcium	RV6-SD-06	148B to 10,100
Chromium	RV1-SD-06	2B to 17.7
Cobalt	RV1-SD-06	0.72B to 2.1JB
Copper	RV1-SD-06	2.6JB to 67.5
Iron	RV1-SD-06	420 to 7,590
Lead	RV8-SD-06	2.1B to 105J
Magnesium	RV1-SD-06	24.5B to 402B
Manganese	RV1-SD-06	3.4J to 288
Mercury	RV1-SD-06	0.03B to 0.75
Nickel	RV1-SD-06	2.1B to 7.7JB
Potassium	RV1-SD-06	29.5B to 361B
Silver	RV8-SD-06	0.56B to 1.2B
Vanadium	RV1-SD-06	1.2B to 19
Zinc	RV1-SD-06	20.3 to 408

3.3 Extent of Contamination

The following sections describe the extent of surface water and sediment contamination in Wallace Creek, Bear Head Creek, and the ravine.

3.3.1. Surface Water

The following discusses the extent of the contaminants detected in the surface water samples collected from Wallace Creek, Bear Head Creek, and the ravine. Several TCL organics and TAL inorganics were detected in samples collected from these areas.

3.3.1.1 Wallace Creek

VOCs and/or SVOCs were detected in Wallace Creek in sample stations 6-WC3 through 6-WC11. The VOCs were generally detected in higher frequencies and higher concentrations at stations 6-WC7, 6-WC8, and 6-WC9 while the SVOCs were only detected at stations 6-WC5 and 6-WC10. The VOCs in the surface water may be related to contaminated groundwater discharging to Wallace Creek between stations 6-WC6 and 6-WC7. However, the VOC contamination either ends or becomes diluted below detection levels by station 6-WC10. The SVOCs do not appear to be associated with Sites 6 or 82 because they are in low concentrations at two distinct stations.

The following TAL inorganics were detected in similar concentrations in both the upstream and downstream samples: aluminum, iron, manganese, and vanadium. The following TAL inorganics were detected in higher concentrations in the downstream samples, however, this increase is probably due to the increase in saltwater at these stations: calcium, magnesium, potassium, and sodium. The following TAL inorganics were detected in four or less samples and a trend could not be established: arsenic, cadmium, chromium, cobalt, mercury, nickel and silver. The following TAL inorganics were only detected at stations upstream of station 6-WC6: barium and lead. Finally, the following TAL inorganics only were detected at stations 6-WC5, 6-WC10, and 6-WC11: copper and zinc. Overall, there does not appear to be any association of the TAL inorganics in the surface water with contaminants from Sites 6 or 82.

3.3.1.2 Bear Head Creek

Two SVOCs were detected at low concentrations in Bear Head Creek. One SVOC was detected at one station (6-BH07) while the other SVOC was detected at three stations (6-BH01, 6-BH04, and 6-BH05). The SVOCs do not appear to be associated with this site because of the low frequency of detection and the low concentrations.

TAL inorganics were detected at every sampling station at Bear Head Creek. The following TAL inorganics were detected at both upstream and downstream sampling locations and at similar concentrations: aluminum, barium, manganese and iron. The following TAL inorganics were detected at higher concentrations at the downstream sampling locations, however, this increase is probably due to higher saltwater content at these stations: calcium, magnesium, potassium and sodium. The following TAL inorganics were detected only downstream and at low concentrations: chromium, copper, silver, mercury, and zinc. The source of these metals may be related to contamination at OU No. 2 via surface runoff. With the exception of one sample, lead was only detected in the downstream samples. Therefore, it may be associated with contamination at OU No. 2. Vanadium was only detected upstream of 6-BH04 at a low concentration. Finally, nickel was detected in two samples and a trend could not be established. Overall, chromium, copper, lead, mercury, silver and zinc appear to be the only TAL inorganics in Bear Head Creek that may be related to contamination at OU No. 2.

3.3.1.3 Ravine

Acetone was the only VOC detected in the surface water at the ravine. It was only detected once at sampling station 6-RV5. Pesticides, PCBs, and SVOCs were not detected in any of the surface water samples collected in the ravine. Therefore, there does not appear to be any organic contamination at this site since the acetone may be related to field decontamination procedures.

Seventeen of the 23 TAL inorganics were detected in the surface water at the ravine. Eleven TAL inorganics, including aluminum, barium, calcium, copper, iron, lead, magnesium, manganese, potassium, sodium, and zinc were found at stations 6-RV2, 6-RV3, 6-RV5, 6-RV7, and 6-RV8. Barium, aluminum, magnesium, potassium, and zinc appear to have higher concentrations at the lower stations, while iron appears to have a higher concentration at the higher stations. Calcium, copper, lead, and manganese have similar concentrations at all stations. Arsenic, cadmium, chromium, cobalt, silver and vanadium were detected four or less times and a trend could not be established. The potential sources of contamination in the ravine include drums, containers and batteries observed in the ravine.

3.3.2 Sediments

The following discusses the extent of contaminants detected in the sediment samples collected from Wallace Creek, Bear Head Creek, and the ravine. Several TCL organics and TAL inorganics were detected in samples collected form the areas.

3.3.2.1 Wallace Creek

Pesticides and PCBs were detected at several stations at Wallace Creek. One pesticide (dieldrin) was detected once at an upstream location. 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected downstream at sampling locations 6-WC06 through 6-WC11. PCB-1260 was detected in the sediments at Wallace Creek at stations 6-WC04 through 6-WC11, with the highest concentrations being detected at stations 6-WC06 through 6-WC08. These pesticides and PCBs may be related to past disposal practices at OU No.2.

Eight VOCs and 12 SVOCs were detected in the sediments at Wallace Creek. The VOCs were detected both in upstream and downstream samples with the higher concentrations generally being found in the upstream samples. The SVOCs were detected mainly in downstream samples 6-WC05 through 6-WC11 with only two SVOC detections upstream (butyl-benzyl phthalate at 6-WC04 and benzo(k)fluoranthene at 6-WC01). The SVOCs may be related to the drums of petroleum products observed at OU No.2.

TAL inorganics were found at all sampling stations in Wallace Creek. The following metals were detected in several of the upstream and downstream samples: aluminum, arsenic, barium, calcium, chromium, copper, iron, lead, magnesium, manganese, potassium, sodium and vanadium. Cobalt and zinc were detected mainly in the downstream samples with higher concentrations detected at stations 6-WC08 through 6-WC11. Low concentrations of nickel were detected in one upstream sample and in three downstream samples. Silver was detected once at a low concentration at station 6-WC03. Arsenic, chromium, lead, nickel and zinc were detected in higher concentrations in the downstream samples and there presence may be related to contamination at OU No.2.

3.3.2.2 Bear Head Creek

In Bear Head Creek, pesticides and PCBs were detected in both upstream and downstream samples at stations 6-BH03 through 6-BH06. Alpha chlordane was detected once at station 6-BH07 while 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, and PCB-1260 were detected several times at all of the above stations. The highest pesticide and PCB concentrations were found at station 6-BH04. These pesticides and PCBs may be related to past disposal practices at OU No.2.

Eight VOCs and five SVOCs were detected in the sediments at Bear Head Creek. Acetone, 2-butanone, TCE and total xylenes were found in both upstream and downstream samples. Methylene chloride, benzene and PCE were detected at low concentrations only in upstream samples. The highest VOC concentrations (acetone and 2-butanone) were found at stations 6-BH04 and 6-BH05. SVOCs were detected in the downstream samples with benzo(a)pyrene being the only SVOC detected in an upstream sample. The highest SVOC concentration was detected 6-BH03. The acetone and 2-butanone may be related to field decontamination procedures. The other VOCs and SVOCs do not appear to be site related.

TAL inorganics were detected in both upstream and downstream sediment samples. The following TAL inorganics were detected both upstream and downstream with higher concentrations generally detected at the downstream stations: aluminum, arsenic, calcium, copper, iron, magnesium, manganese, potassium, sodium, vanadium, and zinc. Barium, beryllium, cadmium, chromium and lead were detected in both upstream and downstream samples at essentially constant concentrations. Cobalt was detected only in downstream samples and selenium was detected only once in an upstream sample. Overall, none of the metals in Bear Head Creek sediments appeared to be related to site contamination

3.3.2.3 Ravine

Pesticides and PCBs were detected at every sampling station at the ravine except 6-RV8. 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected at stations 6-RV2 through 6-RV7 with the highest concentrations being detected at stations 6-RV2 and 6-RV3. Endrin and endrin aldehyde were detected at low concentrations at station 6-RV2. PCB-1260 was detected at its highest concentration at stations 6-RV1 and 6-RV2. These pesticides and PCBs may be related to past disposal practices at OU No.2.

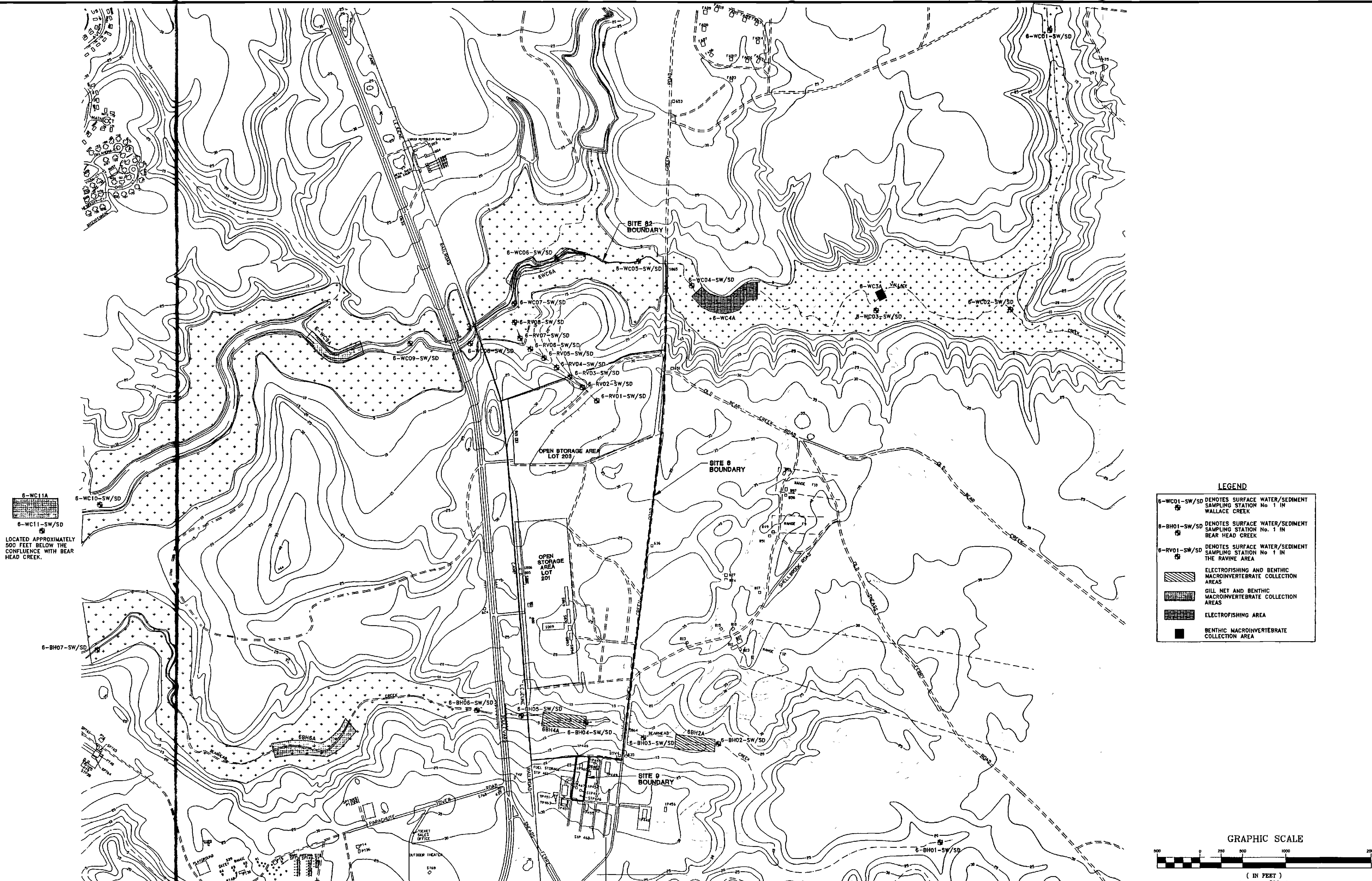
Two VOCs and 20 SVOCs were detected in the sediment at the ravine. The highest VOC concentrations (acetone and 2-butanone) were detected at stations 6-RV4 and 6-RV6. SVOCs were only detected at sampling stations 6-RV1 through 6-RV3 and 6-RV7 and 6-RV8. The highest SVOC (for each SVOC) concentrations were detected in 6-RV2. The acetone and 2-butanone may be related to field decontamination procedures. The SVOCs may be related to past disposal practices at OU No.2.

TAL inorganics were detected at all sampling stations in the ravine. The following TAL inorganics were detected at every station at varying concentrations: aluminum, copper, iron, lead, magnesium, manganese, vanadium and zinc. Cadmium, calcium, and potassium were found at almost every station at essentially constant concentrations. Chromium, mercury, and silver were found at low concentrations throughout the sediments. Arsenic, beryllium, cobalt and nickel were all detected in four or less samples and a trend could not be established. TAL inorganics may be related to past disposal practices at OU No.2.

3.4 Contaminant Distribution

The distribution of contaminants in the surface waters may vary depending on the tides and precipitation events. Concentrations of contaminants in the surface water are expected to decrease with higher tides and precipitation events because of the increased dilution. It also should be noted that the tides may transport contaminants upstream from the point of entry into tidally influenced areas of Wallace Creek and Bear Head Creek. High tide and low tide data was obtained from the National Oceanic and Atmospheric Administration (NOAA) for the New River at Jacksonville, North Carolina. The tide at Jacksonville was obtained by applying a correction factor to data collected from a NOAA tide station in Hampton Roads, Virginia. Table 3-17 contains the low tide and high tide feet and time from August 1 through September 17, 1992, while Figure 3-2 graphically displays the tide data for the days when the surface water samples were collected. In addition Table 3-18 lists if the surface water samples were collected during falling or rising tides.

Surface water samples were collected at OU No. 2 from August 22 to August 30, 1992. There was some precipitation approximately one week before the start of the sampling events, and there was no precipitation during the sampling events.



REVISIONS
SOURCE: LANTDIV, FEBRUARY 1992

DATE	JUNE 1993
SCALE	1" = 500'
DRAWN	REL
REVIEWED	RPW
S.O.#	19133-22-SRN
CADD#	133100ER

NORTH

REMEDIAL INVESTIGATION CTO-0133
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

BAKER ENVIRONMENTAL, Inc.
Coraopolis, Pennsylvania

Baker
Baker Environmental, Inc.

SURFACE WATER/SEDIMENT INVESTIGATION AREA
AND
AQUATIC/ECOLOGICAL SURVEY
OPERABLE UNIT No.2

SCALE 1" = 500'
DATE JUNE 1993

FIGURE No.
3-1

01558X01X

FIGURE 3-2
OPERABLE UNIT NO. 2
HIGH TIDE/LOW TIDE CYCLE FOR AUGUST 22-30, 1992
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

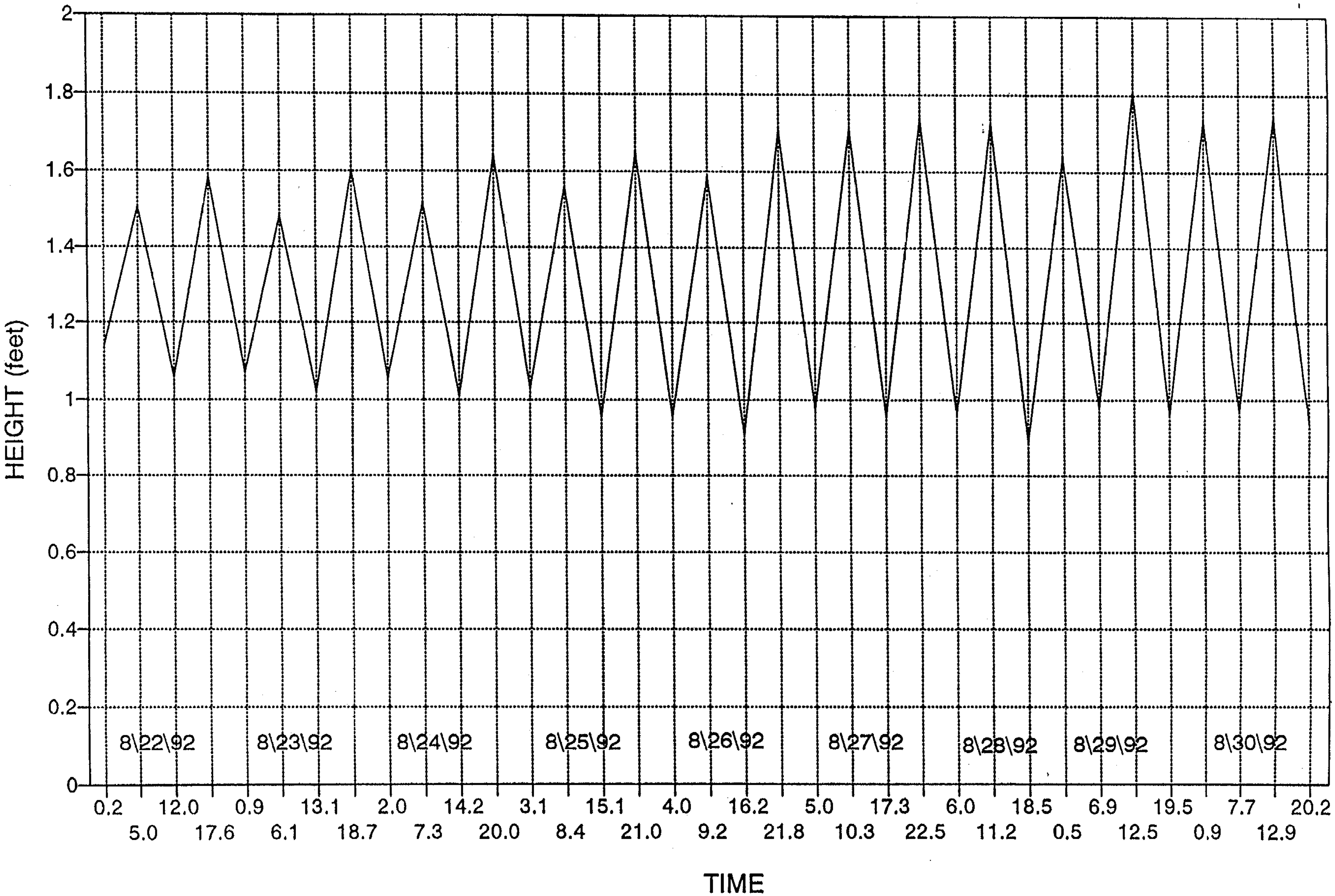


TABLE 3-1

OPERABLE UNIT NO. 2
WALLACE CREEK SURFACE WATER AND SEDIMENT
STATION SAMPLE NUMBERS AND LOCATIONS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station Number	Station Location	Surface Water Sample Number	Sediment Sample Number
6-WC01-SW/SD	North Branch of Wallace Creek	6-WC01-SW-06B 6-WC01-SW-06M (A)	6-WC01-SD-06B 6-WC01-SD-612B (B)
6-WC02-SW/SD	South Branch of Wallace Creek	6-WC02-SW-06B (B)	6-WC02-SD-06B 6-WC02-SD-612B (B)
6-WC03-SW/SD	Approx. 2000 feet downstream of north and south branch	6-WC03-SW-06B 6-WC03-SW-06M 6-WC03-SW-312M	6-WC03-SD-06B 6-WC03-SD-612B 6-WC03-SD-06M (C)
6-WC04-SW/SD	Approx. 250 feet upstream of Piney Green Road	6-WC04-SW-06B 6-WC04-SW-06M	6-WC04-SD-06B 6-WC04-SD-612B 6-WC04-SD-06M (D)
6-WC05-SW/SD	Approx. 250 feet downstream of Piney Green Road	6-WC05-SW-06B 6-WC05-SW-06M 6-WC05-SW-312M	6-WC05-SD-06B 6-WC05-SD-612B 6-WC05-SD-06M (D)
6-WC06-SW/SD	Adjacent to Sites 6 and 9	6-WC06-SW-06B 6-WC06-SW-06M	6-WC06-SD-06B 6-WC06-SD-612B 6-WC06-SD-06M 6-WC06-SD-612M
6-WC07-SW/SD	Adjacent to Sites 6 and 9	6-WC07-SW-06B 6-WC07-SW-06M 6-WC07-SW-312M	6-WC07-SD-06B (D) 6-WC07-SD-06M 6-WC07-SD-612M
6-WC08-SW/SD	Between Lejeune Railroad and Holcomb Boulevard	6-WC08-SW-06B 6-WC08-SW-06M 6-WC08-SW-312M	6-WC08-SD-06B 6-WC08-SD-612B 6-WC08-SD-06M
6-WC09-SW/SD	Approx. 1000 feet Downstream of Holcomb Boulevard	6-WC09-SW-06B 6-WC09-SW-06M 6-WC09-SW-312M	6-WC09-SD-06B 6-WC09-SD-612B 6-WC09-SD-06M 6-WC09-SD-612M

B - Sample was collected from the south bank
M - Sample was collected from the middle of the creek
SW-06 - Sample was collected from the water surface (or mid-vertical point if a deeper water sample was not collected at this station).
SW-312 - Sample was collected from the water/sediment interface
SD-06 - Sample was collected from the top six inches of the sediment
SD-612 - Sample was collected from six to twelve inches of the sediment
(A) - Samples were collected from shore; depth sample could not be collected
(B) - Samples were collected from shore; middle samples could not be collected
(C) - Sampler refusal at 3-4 inches; 6-12 inch sample could not be collected
(D) - Sediments were flocculant; 6-12 inch sample could not be collected

TABLE 3-1 (cont.)

OPERABLE UNIT NO. 2
WALLACE CREEK SURFACE WATER AND SEDIMENT
STATION SAMPLE NUMBERS AND LOCATIONS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station Number	Station Location	Surface Water Sample Number	Sediment Sample Number
6-WC10-SW/SD	Downstream of Sites 6 and 9	6-WC10-SW-06B 6-WC10-SW-06M 6-WC10-SW-312M	6-WC10-SD-06B (D) 6-WC10-SD-06M 6-WC10-SD-612M
6-WC11-SW/SD	Approx. 500 feet Downstream of Confluence with Bear Head Creek	6-WC11-SW-06B 6-WC11-SW-06M 6-WC11-SW-312M	6-WC11-SD-06B (D) 6-WC11-SD-06M (D)

B - Sample was collected from the south bank
M - Sample was collected from the middle of the creek
SW-06 - Sample was collected from the water surface (or mid-vertical point if a deeper water sample was not collected at this station).
SW-312 - Sample was collected from the water/sediment interface
SD-06 - Sample was collected from the top six inches of the sediment
SD-612 - Sample was collected from six to twelve inches of the sediment
(A) - Samples were collected from shore; depth sample could not be collected
(B) - Samples were collected from shore; middle samples could not be collected
(C) - Sampler refusal at 3-4 inches; 6-12 inch sample could not be collected
(D) - Sediments were flocculant; 6-12 inch sample could not be collected

TABLE 3-2

OPERABLE UNIT NO. 2
BEAR HEAD CREEK SURFACE WATER AND SEDIMENT
STATION SAMPLE NUMBERS AND LOCATIONS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station Number	Station Location	Surface Water Sample Number	Sediment Sample Number
6-BH01-SW/SD	Headwaters of Bear Head Creek	6-BH01-SW-06B 6-BH01-SW-06M	6-BH01-SD-06B 6-BH01-SD-612B 6-BH01-SD-06M 6-BH01-SD-612M
6-BH02-SW/SD	Upstream of Sites 6 and 9	6-BH02-SW-06M (A)	6-BH02-SD-06M 6-BH02-SD-612M (A)
6-BH03-SW/SD	Approx. 100 feet upstream of Piney Green Road	6-BH03-SW-06B 6-BH03-SW-06M	6-BH03-SD-06B 6-BH03-SD-612B 6-BH03-SD-06M 6-BH03-SD-612M
6-BH04-SW/SD	Adjacent to Sites 6 and 9	6-BH04-SW-06B 6-BH04-SW-06M	6-BH04-SD-06B 6-BH04-SD-612B 6-BH04-SD-06M 6-BH04-SD-612M
6-BH05-SW/SD	Between Lejeune Railroad and Holcomb Boulevard	6-BH05-SW-06B 6-BH05-SW-06M	6-BH05-SD-06B (B) 6-BH05-SD-06M (B)
6-BH06-SW/SD	Approx. 1000 feet Downstream of Holcomb Boulevard	6-BH06-SW-06B 6-BH06-SW-06M	6-BH06-SD-06B (B) 6-BH06-SD-06M (B)
6-BH07-SW/SD	Downstream of Sites 6 and 9	6-BH07-SW-06B 6-BH07-SW-06M 6-BH07-SW-312M	6-BH07-SD-06B (B) 6-BH07-SD-06M (B)

B - Sample was collected from the north bank
M - Sample was collected from the middle of the creek
SW-06 - Sample was collected from the water surface (or mid-vertical point if a deeper water sample was not collected at this station).
SW-312 - Sample was collected from the water/sediment interface
SD-06 - Sample was collected from the top six inches of the sediment
SD-612 - Sample was collected from six to twelve inches of the sediment
(A) - Creek was narrow and shallow; only middle sample was collected
(B) - Sediments were flocculant; 6-12 inch sample could not be collected

TABLE 3-3

OPERABLE UNIT NO. 2
RAVINE SURFACE WATER AND SEDIMENT
STATION SAMPLE NUMBERS AND LOCATIONS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station Number	Station Location	Surface Water Sample Number	Sediment Sample Number
6-RV1-SD	Ravine	(A)	6-RV1-SD-06 (B)
6-RV2-SW/SD	Ravine	6-RV2-SW-06	6-RV2-SD-06 (B)
6-RV3-SW/SD	Ravine	6-RV3-SW-06	6-RV3-SD-06 6-RV3-SD-612
6-RV4-SD	Ravine	(A)	6-RV4-SD-06 6-RV4-SD-612
6-RV5-SW/SD	Ravine	6-RV5-SW-06	6-RV5-SD-06 (B)
6-RV6-SW/SD	Ravine	6-RV6-SW-06	6-RV6-SD-06 (B)
6-RV7-SW/SD	Ravine	6-RV7-SW-06	6-RV7-SD-06 6-RV7-SD-612
6-RV8-SW/SD	Ravine	6-RV8-SW-06	6-RV8-SD-06 (B)

SW-06 - Sample was collected from the water surface
SD-06 - Sample was collected from the top six inches of the sediment
SD-612 - Sample was collected from six to twelve inches of the sediment
(A) - No water was present at this station; water sample was not collected
(B) - Sampler refusal at 6 inches; 6-12 inch sample was not collected

TABLE 3-4

OPERABLE UNIT NO. 2
FIELD CHEMISTRY FROM SEDIMENT/SURFACE WATER SAMPLES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station Number (1)	Sample Location (2)	Salinity (ppt)	Conductivity (micromho/cm)	Dissolved Oxygen (mg/l)	pH (S.U.)	Temperature (deg. C)
Wallace Creek 6-WC01-SW/SD	Bottom	0.0	30.0	5.8	3.9	21.0
6-WC02-SW/SD	Bottom	NA	NA	NA	NA	NA
6-WC03-SW/SD	Surface	0.0	85.0	6.10	6.3	22.0
	Bottom	0.0	85.0	6.05	6.3	22.0
6-WC04-SW/SD	Surface	0.0	89.1	6.0	6.6	21.8
	Bottom	0.0	89.1	6.8	6.8	21.8
6-WC05-SW/SD	Surface	0.0	83.0	6.0	6.5	22.9
	Bottom	0.0	91.0	6.0	6.5	22.5
6-WC06-SW-SD	Surface	0.0	10.0	6.15	6.7	22.5
	Bottom	0.0	85.0	6.1	NA	22.5
6-WC07-SW/SD-B	Bottom	0.0	500	NA	6.0	NA
6-WC07-SW/SD	Surface	0.0	300	5.8	6.8	23.7
	Bottom	6.0	9,000	0.2	NA	25.0
6-WC08-SW/SD-B	Bottom	0.1	500	5.25	6.2	22.8
6-WC08-SW/SD	Surface	0.0	550	5.35	6.2	22.9
	Bottom	7.5	12,500	0.15	NA	25.5
6-WC09-SW/SD-B	Bottom	1.2	2,100	4.6	6.1	22.8
6-WC09-SW/SD	Surface	0.3	900	2.25	6.1	23.0
	Bottom	8.5	14,000	0.15	NA	25.3
6-WC10-SW/SD-B	Bottom	2.5	5,000	3.0	6.3	24.2
6-WC10-SW/SD	Surface	2.9	4,900	3.2	6.3	24.9
	Bottom	8.2	14,000	0.15	NA	26.1
6-WC11-SW/SD-B	Bottom	3.5	5,500	2.2	6.1	24.0
6-WC11-SW/SD	Surface	4.0	7,000	3.2	6.3	24.2
	Bottom	8.0	13,500	0.3	NA	26.0

(1) - All samples were collected from the middle station unless designated with a B (Bank sample)
(2) - Water surface or water bottom
ppt - Parts per thousand
mg/l - Milligrams per liter
S.U. - Standard Units
deg.C - Degrees Celcius
NA - Not Analyzed
BH - Bear Head Creek Station
WC - Wallace Creek Station
RV - Ravine Station

TABLE 3-4 (cont.)

OPERABLE UNIT NO. 2
FIELD CHEMISTRY FROM SEDIMENT/SURFACE WATER SAMPLES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Sample Identification (1)	Sample Location	Salinity (ppt)	Conductivity (micromho/cm)	Dissolved Oxygen (mg/l)	pH (S.U.)	Temperature (deg. C)
Bear Head Creek						
6-BH01-SW/SD	Bottom	NA	NA	NA	NA	NA
6-BH02-SW/SD	Bottom	0.0	115	4.6	6.5	24.0
6-BH03-SW/SD	Bottom	0.0	420	7.89	6.5	27.5
6-BH04-SW/SD	Bottom	0.0	82	6.35	NA	23.0
6-BH05-SW/SD	Bottom	0.0	135	5.75	6.8	23.0
6-BH06-SW/SD	Bottom	0.0	120	5.85	6.6	23.0
6-BH07-SW/SD	Surface	1.0	2,223	3.15	6.2	25.0
	Bottom	7.5	12,500	0.3	6.6	26.5
Ravine						
6-RV01-SD	Bottom	NA	NA	NA	NA	NA
6-RV02-SW/SD	Bottom	NA	NA	NA	NA	NA
6-RV03-SW/SD	Surface	NA	NA	NA	NA	NA
6-RV04-SD	Bottom	NA	NA	NA	NA	NA
6-RV05-SW/SD	Bottom	NA	NA	NA	NA	NA
6-RV06-SW/SD	Bottom	NA	NA	NA	NA	NA
6-RV07-SW/SD	Bottom	NA	NA	NA	NA	NA
6-RV08-SW/SD	Bottom	NA	NA	NA	NA	NA

(1) - All samples were collected from the middle station unless designated with a B (Bank sample)
ppt - Parts per thousand
mg/l - Milligrams per liter
S.U. - Standard Units
deg.C - Degrees Celcius
NA - Not Analyzed
Sample Location - Water surface or water bottom
BH - Bear Head Creek Station
WC - Wallace Creek Station
RV - Ravine Station

TABLE 3 - 5
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC03-SW-312M	6-WC04-SW-06B	6-WC04-SW-06M	6-WC05-SW-312M	6-WC06-SW-06B	6-WC06-SW-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/26/92	8/25/92	8/25/92	8/25/92	8/23/92	8/23/92
	Lab Id:	00439-20	00439-21	00439-22	00437-21	00429-05	00429-06
Parameter	Units						
VOLATILES							
VINYL CHLORIDE	UG/L						
ACETONE	UG/L	46	14				4 J
1,2-DICHLOROETHENE	UG/L		4 J	4 J			
TRICHLOROETHENE	UG/L						
TETRACHLOROETHENE	UG/L						
TOLUENE	UG/L					2 J	
SEMIVOLATILES							
2,4,6-TRICHLOROPHENOL	UG/L						
BIS(2-ETHYLHEXYL)PHTH	UG/L				2 J		

N/A - Not applicable
UG/L - microgram per liter
J - value is estimated

TABLE 3 - 5
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:	6-WC07-SW-06B	6-WC07-SW-312M	6-WC08-SW-06B	6-WC08-SW-06M	6-WC08-SW-312M	6-WC09-SW-06B
Depth:	N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:	00429-10	00429-12	00429-18	00429-19	00429-20	00429-26
Parameter						
VOLATILES						
VINYL CHLORIDE	6 J					
ACETONE		5 J		6 J	27 J	
1,2-DICHLOROETHENE	85	9 J	13	23	9 J	17
TRICHLOROETHENE	98	4 J	16	28	10	22
TETRACHLOROETHENE	4 J			1 J		
TOLUENE	3 J					
SEMIVOLATILES						
2,4,6-TRICHLOROPHENOL						
BIS(2-ETHYLHEXYL)PHTH						

N/A - Not applicable
UG/L - microgram per liter
J - value is estimated

TABLE 3 - 5
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:	6-WC09-SW-06M	6-WC09-SW-312M	6-WC10-SW-06B	6-WC10-SW-06M	6-WC10-SW-312M	6-WC11-SW-06B
Depth:	N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:	8/23/92	8/23/92	8/22/92	8/22/92	8/22/92	8/22/92
Lab Id:	00429-28	00429-29	00426-06	00426-08	00426-09	00426-12
Parameter						
VOLATILES						
VINYL CHLORIDE						
ACETONE		900 J				
1,2-DICHLOROETHENE	21		4 J	6 J		2 J
TRICHLOROETHENE	28		5 J	7 J		3 J
TETRACHLOROETHENE	1 J					
TOLUENE			1 J			1 J
SEMIVOLATILES						
2,4,6-TRICHLOROPHENOL				1 J		
BIS(2-ETHYLHEXYL)PHTH				2 J	1 J	

N/A - Not applicable
UG/L - microgram per liter
J - value is estimated

TABLE 3 - 5
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:	6-WC11-SW-06M	6-WC11-SW-312M
Depth:	N/A	N/A
Date Sampled:	8/22/92	8/22/92
Lab Id:	00426-13	00426-14
Parameter		
VOLATILES		
VINYL CHLORIDE		
ACETONE	9 J	14 J
1,2-DICHLOROETHENE		2 J
TRICHLOROETHENE	3 J	4 J
TETRACHLOROETHENE		
TOLUENE		
SEMIVOLATILES		
2,4,6-TRICHLOROPHENOL		
BIS(2-ETHYLHEXYL)PHTH	2 J	2 J

N/A - Not applicable
UG/L - microgram per liter
J - value is estimated

TABLE 3 - 6
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC01-SW-06B	6-WC01-SW-06M	6-WC02-SW-06B	6-WC03-SW-06B	6-WC03-SW-06M	6-WC03-SW-312M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-25	00464-26	00445-16	00439-18	00439-19	00439-20
Parameter	Units						
ALUMINUM	UG/L	1350	1220	633	747	633	676
ARSENIC	UG/L						
BARIUM	UG/L	16 JB	16.2 JB	19.3 B			
CADMIUM	UG/L						
CALCIUM	UG/L	3640 B	3670 B	9990	9360	8890	9430
CHROMIUM	UG/L						
COBALT	UG/L						
COPPER	UG/L						129
IRON	UG/L	1050	941	844	849	756	830
LEAD	UG/L	2.3 JB	1.9 JB	1.2 B	5	5	10.4
MAGNESIUM	UG/L	632 B	639 B	1110 B	916 B	883 B	936 B
MANGANESE	UG/L			8.8 B	9.8 JB	8.2 JB	9.2 JB
MERCURY	UG/L						0.52
NICKEL	UG/L						1380
POTASSIUM	UG/L	376 B	341 B	604 B	610 B	603 B	640 B
SILVER	UG/L						
SODIUM	UG/L	3930 B	3980 B	7790	6240	6100	6500
VANADIUM	UG/L	3.3 JB	1.9 JB	2.1 JB			
ZINC	UG/L						111

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 6
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC04-SW-06B	6-WC04-SW-06M	6-WC05-SW-06B	6-WC05-SW-06M	6-WC05-SW-312M	6-WC06-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/25/92	8/25/92	8/25/92	8/23/92
Lab Id:		00439-21	00439-22	00437-19	00437-20	00437-21	00429-05
Parameter	Units						
ALUMINUM	UG/L	697	698	799	945	762	751 J
ARSENIC	UG/L						
BARIUM	UG/L			18.9 B	22.6 B	17.6 B	
CADMIUM	UG/L		3.2 JB				
CALCIUM	UG/L	9720	9520	9440	11200	8850	
CHROMIUM	UG/L					4.9 B	
COBALT	UG/L					2.9 B	
COPPER	UG/L			5.5 B	3 B	43.8	
IRON	UG/L	834	812	854	1020	818	701
LEAD	UG/L			1.8 B	2 B	3.1	
MAGNESIUM	UG/L	1080 B	995 B	1060 B	1230 B	985 B	
MANGANESE	UG/L	10 JB	10.5 JB	10.6 JB	12.2 JB	10 JB	12.5 B
MERCURY	UG/L					0.24 B	
NICKEL	UG/L					177	
POTASSIUM	UG/L	636 B	614 B	821 B	821 B	700 B	
SILVER	UG/L					2.6 B	
SODIUM	UG/L	7400 J	6810 J	7400	8430	6710	
VANADIUM	UG/L						
ZINC	UG/L			20.6	9.9 B	26.8	

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 6
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC06-SW-06M	6-WC07-SW-06B	6-WC07-SW-06M	6-WC07-SW-312M	6-WC08-SW-06B	6-WC08-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-06	00429-10	00429-11	00429-12	00429-18	00429-19
Parameter	Units						
ALUMINUM	UG/L	798 J	881 J	814 J	696 J	811 J	845 J
ARSENIC	UG/L						
BARIUM	UG/L						
CADMIUM	UG/L				17.4 J		
CALCIUM	UG/L						
CHROMIUM	UG/L						
COBALT	UG/L						
COPPER	UG/L						
IRON	UG/L	775	800	823	724	790	831
LEAD	UG/L						
MAGNESIUM	UG/L		14400				
MANGANESE	UG/L	13.8 B	17.8	17.6	14.7 B	16.2	16.9
MERCURY	UG/L						
NICKEL	UG/L						
POTASSIUM	UG/L						
SILVER	UG/L						
SODIUM	UG/L						
VANADIUM	UG/L		1.9 JB	2 JB		2.1 JB	1.9 JB
ZINC	UG/L						

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 6
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC08-SW-312M	6-WC09-SW-06B	6-WC09-SW-06M	6-WC09-SW-312M	6-WC10-SW-06B	6-WC10-SW-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
	Lab Id:	00429-20	00429-26	00429-28	00429-29	00426-06	00426-08
Parameter	Units						
ALUMINUM	UG/L	719 J	746 J	745 J	480 J	621	
ARSENIC	UG/L		3.7 B				
BARIUM	UG/L						
CADMIUM	UG/L						
CALCIUM	UG/L				56000 J	30900	32500
CHROMIUM	UG/L						
COBALT	UG/L						
COPPER	UG/L						
IRON	UG/L	749	704	740	477	599	498
LEAD	UG/L						
MAGNESIUM	UG/L	12600	18300	12800	146000	76600	83300
MANGANESE	UG/L	16.5	15.5	15.8	17.3	15 J	16 J
MERCURY	UG/L						
NICKEL	UG/L						
POTASSIUM	UG/L				53700	25500	27700
SILVER	UG/L						
SODIUM	UG/L		154000 J		1340000	661000	714000
VANADIUM	UG/L	2.5 JB		2 JB			
ZINC	UG/L					9 B	7.3 B

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 6
SITE 6 WALLACE CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC10-SW-312M	6-WC11-SW-06B	6-WC11-SW-06M	6-WC11-SW-312M
	Depth:	N/A	N/A	N/A	N/A
	Date Sampled:	8/22/92	8/22/92	8/22/92	8/22/92
	Lab Id:	00426-09	00426-12	00426-13	00426-14
Parameter	Units				
ALUMINUM	UG/L		807		682
ARSENIC	UG/L				
BARIUM	UG/L				
CADMIUM	UG/L				
CALCIUM	UG/L	53400	40300	36000	64100
CHROMIUM	UG/L				
COBALT	UG/L				
COPPER	UG/L	66			209
IRON	UG/L	494	881	546	649
LEAD	UG/L				
MAGNESIUM	UG/L	143000	98900	88200	174000
MANGANESE	UG/L	18 J	18 J	14 JB	25 J
MERCURY	UG/L				0.52
NICKEL	UG/L	102			213
POTASSIUM	UG/L	48500	32000	28000	55700
SILVER	UG/L				
SODIUM	UG/L	1620000	726000	700000	1260000
VANADIUM	UG/L				
ZINC	UG/L	30.7	8.4 B	17.6 B	95.1

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 7
SITE 6 BEAR HEAD CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH01-SW-06M	6-BH04-SW-06B	6-BH04-SW-06M	6-BH05-SW-06B	6-BH07-SW-312M
	Depth:	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	10/23/92	8/28/92	8/28/92	8/28/92	8/25/92
	Lab Id:	00591-06	00454-03	00454-04	00454-05	00437-03
Parameter	Units					
PESTICIDE/PCBS						
DIETHYL PHTHALATE	UG/L					2 J
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	1 J	1 J	1 J	2 J	

N/A - Not applicable
UG/L - microgram per liter
J - value is estimate

TABLE 3 - 8
SITE 6 BEAR HEAD CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH01-SW-06B	6-BH01-SW-06M	6-BH02-SW-06M	6-BH03-SW-06B	6-BH03-SW-06M	6-BH04-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	10/23/92	10/23/92	8/28/92	8/28/92	8/28/92	8/28/92
	Lab Id:	00591-05	00591-06	00458-04	00458-10	00458-11	00454-03
Parameter	Units						
ALUMINUM	UG/L	1210	1230	868	494	1560	
BARIUM	UG/L	13.4 JB	14 JB	25.1 JB	25.6 JB	31.3 B	22 B
CALCIUM	UG/L	612 B	600 B	16100	17200	19100	20600
CHROMIUM	UG/L						
COPPER	UG/L						
IRON	UG/L	958	818	921	989	1790	1180
LEAD	UG/L					5.9	1.8 JB
MAGNESIUM	UG/L	588 B	612 B	1010 B	1050 B	1120 B	1010 B
MANGANESE	UG/L	6.5 B	6.2 B	14 JB	16 J	23 J	17
MERCURY	UG/L						
NICKEL	UG/L				8 JB		
POTASSIUM	UG/L			685 B	713 B	721 B	
SILVER	UG/L						
SODIUM	UG/L	4680 B	4850 B	5250	5480	5620	4420 JB
VANADIUM	UG/L			2 JB	2 JB	3 JB	
ZINC	UG/L						

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 8
SITE 6 BEAR HEAD CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH04-SW-06M	6-BH05-SW-06B	6-BH05-SW-06M	6-BH06-SW-06B	6-BH06-SW-06M	6-BH07-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/28/92	8/28/92	8/28/92	8/28/92	8/28/92	8/25/92
	Lab Id:	00454-04	00454-05	00454-06	00454-07	00454-09	00437-01
Parameter	Units						
ALUMINUM	UG/L	782		2700			408
BARIUM	UG/L	24 B	22 B	36 B	24 B	27 B	20.6 B
CALCIUM	UG/L	20000	20000	22500	20100	23000	24900
CHROMIUM	UG/L			8 B	5 B		4.4 B
COPPER	UG/L						4 B
IRON	UG/L	1650	1120	6200	1150	1180	679
LEAD	UG/L	1.8 JB	1.5 JB	8.2	2 JB	2.2 JB	2.4 B
MAGNESIUM	UG/L	1060 B	1240 B	1160 B	1010 B	1130 B	37900
MANGANESE	UG/L	17	18	65	20	20	13.5 JB
MERCURY	UG/L			0.05 B			
NICKEL	UG/L						
POTASSIUM	UG/L		10100				13000
SILVER	UG/L						3.6 B
SODIUM	UG/L	4580 JB	4310 JB		5140 J	4510 JB	319000
VANADIUM	UG/L						
ZINC	UG/L						6.4 B

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 8
SITE 6 BEAR HEAD CREEK SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH07-SW-06M		6-BH07-SW-312M	
	Depth:	N/A		N/A	
	Date Sampled:	8/25/92		8/25/92	
	Lab Id:	00437-02		00437-03	
Parameter	Units				
ALUMINUM	UG/L	418		334	
BARIUM	UG/L	20.5	B	18.6	B
CALCIUM	UG/L	23900		54900	
CHROMIUM	UG/L				
COPPER	UG/L	5.2	B	55.8	
IRON	UG/L	725		501	
LEAD	UG/L	2	B	2.6	B
MAGNESIUM	UG/L	33600		136000	
MANGANESE	UG/L	13.5	JB	16.2	J
MERCURY	UG/L			0.34	
NICKEL	UG/L			244	
POTASSIUM	UG/L	11600		49000	
SILVER	UG/L	2.1	B		
SODIUM	UG/L	284000		1260000	
VANADIUM	UG/L				
ZINC	UG/L	6.2	B	30.7	

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 9
SITE 6 RAVINE SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO - 0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-RV5-SW-06
	Depth:	N/A
	Date Sampled:	8/25/92
	Lab Id:	00439-16
Parameter	Units	
VOLATILES		
ACETONE	UG/L	140

N/A - Not applicable
UG/L - microgram per liter
J - value is estimated

TABLE 3 - 10
SITE 6 RAVINE SURFACE WATER
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-RV2-SW-06	6-RV3-SW-06	6-RV5-SW-06	6-RV6-SW-06	6-RV7-SW-06	6-RV8-SW-06
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/24/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-14	00437-06	00439-16	00439-17	00437-15	00437-18
Parameter	Units						
ALUMINUM	UG/L	613	119 B	148 B	612	279	487
ARSENIC	UG/L	2.2 B		3.5 B			10.5
BARIUM	UG/L	91 B	79.1 B	37.1 JB	39.5 JB	49.6 B	56.9 B
CADMIUM	UG/L	3.7 JB		4.3 JB			
CALCIUM	UG/L	102000	79900	23100	19700	12300	15800
CHROMIUM	UG/L					6.5 B	4.2 B
COBALT	UG/L						2.3 B
COPPER	UG/L	9 JB	4.7 B	9 JB	5.7 JB	7.5 B	7.2 B
IRON	UG/L	733	127 J	641	827	1910	9600
LEAD	UG/L	6.1	1.9 B	4.8	8	2.8 B	12.2
MAGNESIUM	UG/L	7100	4650 B	1200 B	1930 B	2980 B	1790 B
MANGANESE	UG/L	319	38.6 J	597	204	267	253
POTASSIUM	UG/L	2910 B	2720 B	1620 B	393 B	607 B	844 B
SILVER	UG/L		3.6 B		67.6		2.9 B
SODIUM	UG/L	6480	4380 JB	2860 JB	5920	8260	8960
VANADIUM	UG/L						6.2 B
ZINC	UG/L	452	113	374	495	248	72.7

N/A - Not applicable
UG/L - microgram per liter
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 11
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC01-SD-06B	6-WC01-SD-612D	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
	Depth:	0 - 6"	6 - 12"	0 - 6"	6 - 12"	0 - 6"	0 - 6"
	Date Sampled:	8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
	Lab Id:	00464-22	00464-24	00445-03	00445-04	00445-05	00445-06
Parameter	Units						
DIELDRIN	UG/KG		4.8 J				
4,4'-DDE	UG/KG						
4,4'-DDD	UG/KG		16 J				
4,4'-DDT	UG/KG						
PCB-1260	UG/KG						
METHYLENE CHLORIDE	UG/KG						
ACETONE	UG/KG	26		320 J	95 J	8400 J	
CARBON DISULFIDE	UG/KG						
1,2-DICHLOROETHENE	UG/KG						
2-BUTANONE	UG/KG			21 J		4200	
TRICHLOROETHENE	UG/KG			23	7 J		
TOLUENE	UG/KG						
TOTAL XYLENES	UG/KG			70	26		120 J
PHENOL	UG/KG						
DIETHYL PHTHALATE	UG/KG						
PHENANTHRENE	UG/KG						
FLUORANTHENE	UG/KG						
PYRENE	UG/KG						
BUTYL BENZYL PHTHALATE	UG/KG						
BENZO(A)ANTHRACENE	UG/KG						
CHRYSENE	UG/KG						
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG						
BENZO(B)FLUORANTHENE	UG/KG						
BENZO(K)FLUORANTHENE	UG/KG						
BENZO(A)PYRENE	UG/KG		63 J				

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 11
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC03-SD-612B	6-WC04-SD-06B	6-WC04-SD-06M	6-WC04-SD-612B	6-WC05-SD-06B	6-WC05-SD-06M
	Depth:	6 - 12"	0 - 6"	0 - 6"	6 - 12"	0 - 6"	0 - 6"
	Date Sampled:	8/26/92	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
	Lab Id:	00445-07	00445-08	00445-09	00445-10	00445-11	00445-13
Parameter	Units						
DIELDRIN	UG/KG						
4,4'-DDE	UG/KG						
4,4'-DDD	UG/KG						
4,4'-DDT	UG/KG						
PCB-1260	UG/KG			760			330 J
METHYLENE CHLORIDE	UG/KG	910 J					
ACETONE	UG/KG	15000 J	180 J		160 J		
CARBON DISULFIDE	UG/KG						
1,2-DICHLOROETHENE	UG/KG						
2-BUTANONE	UG/KG						
TRICHLOROETHENE	UG/KG						
TOLUENE	UG/KG						
TOTAL XYLENES	UG/KG						
PHENOL	UG/KG						120 J
DIETHYL PHTHALATE	UG/KG						
PHENANTHRENE	UG/KG						
FLUORANTHENE	UG/KG						
PYRENE	UG/KG						
BUTYL BENZYL PHTHALATE	UG/KG		200 J				
BENZO(A)ANTHRACENE	UG/KG						
CHRYSENE	UG/KG						
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG						
BENZO(B)FLUORANTHENE	UG/KG						
BENZO(K)FLUORANTHENE	UG/KG						
BENZO(A)PYRENE	UG/KG					850 J	

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 11
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC05-SD-612B	6-WC06-SD-06B	6-WC06-SD-06M	6-WC06-SD-612B	6-WC06-SD-612M	6-WC07-SD-06B
	Depth:	6 - 12"	0 - 6"	0 - 6"	6 - 12"	6 - 12"	0 - 6"
	Date Sampled:	8/27/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
	Lab Id:	00445-14	00429-01	00429-02	00429-03	00429-04	00429-07
Parameter	Units						
DIELDRIN	UG/KG						
4,4'-DDE	UG/KG		25 J		16 J	7.9 J	48 J
4,4'-DDD	UG/KG		80 J				
4,4'-DDT	UG/KG		200 J				
PCB-1260	UG/KG		1300 J	400 J			
METHYLENE CHLORIDE	UG/KG						30 J
ACETONE	UG/KG			240	220		
CARBON DISULFIDE	UG/KG						
1,2-DICHLOROETHENE	UG/KG						31 J
2-BUTANONE	UG/KG						
TRICHLOROETHENE	UG/KG						
TOLUENE	UG/KG	4 J		5 J			
TOTAL XYLENES	UG/KG						
PHENOL	UG/KG		190 J				
DIETHYL PHTHALATE	UG/KG		530 J				
PHENANTHRENE	UG/KG						
FLUORANTHENE	UG/KG		290 J	100 J			
PYRENE	UG/KG		210 J	200 J			
BUTYL BENZYL PHTHALATE	UG/KG						920 J
BENZO(A)ANTHRACENE	UG/KG						
CHRYSENE	UG/KG						
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG						
BENZO(B)FLUORANTHENE	UG/KG						
BENZO(K)FLUORANTHENE	UG/KG						
BENZO(A)PYRENE	UG/KG	1600					

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 11
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC07-SD-06M	6-WC07-SD-612M	6-WC08-SD-06B	6-WC08-SD-06M	6-WC08-SD-612B	6-WC08-SD-612M
	Depth:	0 - 6"	6 - 12"	0 - 6"	0 - 6"	6 - 12"	6 - 12"
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
	Lab Id:	00429-08	00429-09	00429-13	00429-15	00429-16	00429-17
Parameter	Units						
DIELDRIN	UG/KG						
4,4'-DDE	UG/KG			47 J	18 J	27.9	7.6 J
4,4'-DDD	UG/KG		67	50 J	200 J	23 J	49
4,4'-DDT	UG/KG		220 J		1200 J		
PCB-1260	UG/KG	2000 J		310 J	2100 J	32 J	
METHYLENE CHLORIDE	UG/KG		6 J				
ACETONE	UG/KG				350	590 J	
CARBON DISULFIDE	UG/KG		2 J			5 J	
1,2-DICHLOROETHENE	UG/KG						
2-BUTANONE	UG/KG						
TRICHLOROETHENE	UG/KG						
TOLUENE	UG/KG						
TOTAL XYLENES	UG/KG						
PHENOL	UG/KG						
DIETHYL PHTHALATE	UG/KG				120 J		
PHENANTHRENE	UG/KG						76 J
FLUORANTHENE	UG/KG			760 J	250 J	180 J	94 J
PYRENE	UG/KG	95 J		810 J	220 J	350 J	130 J
BUTYL BENZYL PHTHALATE	UG/KG						
BENZO(A)ANTHRACENE	UG/KG			210 J		67 J	
CHRYSENE	UG/KG			230 J		74 J	
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG						
BENZO(B)FLUORANTHENE	UG/KG			420 J	140 J	95 J	
BENZO(K)FLUORANTHENE	UG/KG			140 J		67 J	
BENZO(A)PYRENE	UG/KG			150 J			

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 11
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC09-SD-06B	6-WC09-SD-06M	6-WC09-SD-612B	6-WC09-SD-612M	6-WC10-SD-06M	6-WC10-SD-612M
Depth:		0 - 6"	0 - 6"	6 - 12"	6 - 12"	0 - 6"	6 - 12"
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-21	00429-22	00429-23	00429-24	00426-04	00426-05
Parameter	Units						
DIELDRIN	UG/KG						
4,4'-DDE	UG/KG	5.9	69		83	32	34 J
4,4'-DDD	UG/KG	7.4 J	80 J	16 J	49 J	44	43 J
4,4'-DDT	UG/KG						
PCB-1260	UG/KG	31 J	290 J		730 J	420	160 J
METHYLENE CHLORIDE	UG/KG						
ACETONE	UG/KG	240		24000 J		140 J	200 J
CARBON DISULFIDE	UG/KG				5 J		24 J
1,2-DICHLOROETHENE	UG/KG						
2-BUTANONE	UG/KG			9300			22 J
TRICHLOROETHENE	UG/KG						
TOLUENE	UG/KG						
TOTAL XYLENES	UG/KG						
PHENOL	UG/KG						
DIETHYL PHTHALATE	UG/KG						
PHENANTHRENE	UG/KG						
FLUORANTHENE	UG/KG	330 J			250 J	260 J	330 J
PYRENE	UG/KG	410 J			190 J	300 J	230 J
BUTYL BENZYL PHTHALATE	UG/KG						
BENZO(A)ANTHRACENE	UG/KG	120 J					130 J
CHRYSENE	UG/KG	74 J					
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG						
BENZO(B)FLUORANTHENE	UG/KG	140 J		190 J			94 J
BENZO(K)FLUORANTHENE	UG/KG						
BENZO(A)PYRENE	UG/KG	75 J			480 J		

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 11
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC11-SD-06B	6-WC11-SD-06M
	Depth:	0 - 6"	0 - 6"
	Date Sampled:	8/22/92	8/22/92
	Lab Id:	00426-10	00426-11
Parameter	Units		
DIELDRIN	UG/KG		
4,4'-DDE	UG/KG		25 J
4,4'-DDD	UG/KG	35 J	42 J
4,4'-DDT	UG/KG		
PCB-1260	UG/KG		120 J
METHYLENE CHLORIDE	UG/KG		
ACETONE	UG/KG	330 J	72 J
CARBON DISULFIDE	UG/KG		15 J
1,2-DICHLOROETHENE	UG/KG		
2-BUTANONE	UG/KG		
TRICHLOROETHENE	UG/KG		
TOLUENE	UG/KG		
TOTAL XYLENES	UG/KG		
PHENOL	UG/KG		
DIETHYL PHTHALATE	UG/KG		
PHENANTHRENE	UG/KG		
FLUORANTHENE	UG/KG		200 J
PYRENE	UG/KG		120 J
BUTYL BENZYL PHTHALATE	UG/KG		
BENZO(A)ANTHRACENE	UG/KG		
CHRYSENE	UG/KG		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	960 J	
BENZO(B)FLUORANTHENE	UG/KG		
BENZO(K)FLUORANTHENE	UG/KG		
BENZO(A)PYRENE	UG/KG		

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 12
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC01-SD-06B	6-WC01-SD-612B	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
Depth:		0 - 6'	6 - 12'	0 - 6'	6 - 12'	0 - 6'	0 - 6'
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-22	00464-24	00445-03	00445-04	00445-05	00445-06
Parameter	Units						
ALUMINUM	MG/KG	2090 J	2510	6540 J	5390 J	6480 J	4780 J
ARSENIC	MG/KG	1.2 JB					
BARIUM	MG/KG	5.2 JB	15.3 B	19.6 JB	23.7 JB	15.8 JB	37.1 JB
BERYLLIUM	MG/KG						
CALCIUM	MG/KG	329 B	1060 B	1090 JB	1790 J	2850 J	22200 J
CHROMIUM	MG/KG			4.2	3.4	6.2	6.4
COBALT	MG/KG			0.6 JB	0.87 JB		1.3 JB
COPPER	MG/KG			0.43 JB	0.62 JB	5.8 JB	53200
IRON	MG/KG	724 J	1430 J	1200 J	1570 J	6870 J	6940 J
LEAD	MG/KG	9.7 J	2.3 J	4.8 J	4.8 J	9 J	314 J
MAGNESIUM	MG/KG	50.5 B	57 B	372 JB	356 JB	440 JB	852 JB
MANGANESE	MG/KG		4.7 J	8.8	6.5	9.7	23
NICKEL	MG/KG				2.8 B		
POTASSIUM	MG/KG	92.1 B	98.1 B	145 B		220 B	360 B
SILVER	MG/KG						7.3
SODIUM	MG/KG			491 JB	469 JB		489 JB
VANADIUM	MG/KG	5.7 B	4.4 B	5.8 B	7 B	11.6 B	9.1 B
ZINC	MG/KG						926

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 12
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC03-SD-612B	6-WC04-SD-06B	6-WC04-SD-06M	6-WC04-SD-612B	6-WC05-SD-06B	6-WC05-SD-06M
	Depth:	6 - 12'	0 - 6'	0 - 6'	6 - 12'	0 - 6'	0 - 6'
	Date Sampled:	8/26/92	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
	Lab Id:	00445-07	00445-08	00445-09	00445-10	00445-11	00445-13
Parameter	Units						
ALUMINUM	MG/KG	7040 J	1830 J	569 J	1950 J	8600 J	2040 J
ARSENIC	MG/KG	1.3 JB		1.3 B			
BARIUM	MG/KG	25.2 JB	4.2 JB	4.3 JB	4.8 JB	18.1 JB	4.7 JB
BERYLLIUM	MG/KG						
CALCIUM	MG/KG	4500 J	407 JB	90000 J	1090 JB	1300 JB	2430 J
CHROMIUM	MG/KG	8.3	2.7	3.7	2 B	4.3	2.4
COBALT	MG/KG				0.63 JB	1.1 JB	0.62 JB
COPPER	MG/KG	79.6	8.7 J	2.5 JB	1.8 JB	1.2 JB	1.9 JB
IRON	MG/KG	6050 J	1920 J	1160 J	2050 J	1680 J	1450 J
LEAD	MG/KG	10.3 J	3 J	4.4 J	4.4 J	6.2 J	7.1 J
MAGNESIUM	MG/KG	333 JB	160 JB	1380 J	311 JB	673 JB	209 JB
MANGANESE	MG/KG	8.3	5	18.7	5.1	6.4	7.1
NICKEL	MG/KG						
POTASSIUM	MG/KG	457 B		101 B		180 B	
SILVER	MG/KG						
SODIUM	MG/KG				621 JB	1070 JB	
VANADIUM	MG/KG	15.7 B				4.6 JB	3.5 JB
ZINC	MG/KG				15.9		

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 12
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC05-SD-612B	6-WC06-SD-06B	6-WC06-SD-06M	6-WC06-SD-612B	6-WC06-SD-612M	6-WC07-SD-06B
	Depth:	6 - 12'	0 - 6'	0 - 6'	6 - 12'	6 - 12'	0 - 6'
	Date Sampled:	8/27/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
	Lab Id:	00445-14	00429-01	00429-02	00429-03	00429-04	00429-07
Parameter	Units						
ALUMINUM	MG/KG	4130 J	9120	1990	6210	1390	8590
ARSENIC	MG/KG		3.6 B	1 B			
BARIUM	MG/KG	23.4 JB	14.8 B	4.2 JB	14.3 B	2.5 JB	12 B
BERYLLIUM	MG/KG		0.35 B	0.12 B	0.41 B	0.1 B	0.78 B
CALCIUM	MG/KG	1530 J	3590	1410 B	3930	1740	8290
CHROMIUM	MG/KG	2.4	5.4 B	1.5 B	3.2 B	1.2 B	
COBALT	MG/KG	0.89 JB			1.6 JB		
COPPER	MG/KG	0.77 JB	13.3 JB	7.3 JB	5.2 JB	1.3 JB	7.2 JB
IRON	MG/KG	1010 J	8080	1480	5410	978	3980
LEAD	MG/KG	3.4 J	70.9	19.9	12.4	5.7	18.8
MAGNESIUM	MG/KG		2250 B	438 B	1110 B	427 B	5650 B
MANGANESE	MG/KG	4.4	25.8	5.8	16.3	5.9	13.1 B
NICKEL	MG/KG						
POTASSIUM	MG/KG		533 B	99.8 JB	318 B	124 B	545 B
SILVER	MG/KG						
SODIUM	MG/KG	468 JB	4220	481 JB	1630 JB	1530 J	6020 B
VANADIUM	MG/KG	4.7 B	14.2 B	3.5 JB	9.6 JB	2.2 JB	16.7 B
ZINC	MG/KG		39.6	11.5	22.6	6.2	

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 12
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC07-SD-06M	6-WC07-SD-612M	6-WC08-SD-06B	6-WC08-SD-06M	6-WC08-SD-612B	6-WC08-SD-612M
	Depth:	0 - 6'	6 - 12'	0 - 6'	0 - 6'	6 - 12'	6 - 12'
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
	Lab Id:	00429-08	00429-09	00429-13	00429-15	00429-16	00429-17
Parameter	Units						
ALUMINUM	MG/KG	975	539	10700	9810	4470	18300
ARSENIC	MG/KG			4.9 B	3.2 B	9.7	10.2
BARIUM	MG/KG	3.6 JB	2.8 JB	12.8 B	38.4 B	5.9 JB	110
BERYLLIUM	MG/KG		0.07 B	0.49 B	0.35 B	0.21 B	0.76 B
CALCIUM	MG/KG	457 B	242 B	4560	3080	2080	5270
CHROMIUM	MG/KG			8.4	9.2	2.7 B	19.2
COBALT	MG/KG						2 JB
COPPER	MG/KG		0.89 JB	21.5	13.7 J	16.7 J	27.2
IRON	MG/KG	695	390	8680	7450	4090	11300
LEAD	MG/KG	8.7	1.5	97	44.1 J	49.7	156
MAGNESIUM	MG/KG	140 B	62.7 B	3620	1650 B	701 B	906 B
MANGANESE	MG/KG	3.7 B	3.1	27.8	21.3	12	28.4
NICKEL	MG/KG						7.4 JB
POTASSIUM	MG/KG	71.4 JB	38.5 JB	862 B	807 B	233 B	834 B
SILVER	MG/KG						
SODIUM	MG/KG	553 JB	224 JB	6740	3730	1140 JB	1150 JB
VANADIUM	MG/KG	1.7 JB	0.82 JB	21.8 B	19.1 B	8.1 JB	33.7
ZINC	MG/KG			106	67.9	29.2	132

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 12
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC09-SD-06B	6-WC09-SD-06M	6-WC09-SD-612B	6-WC09-SD-612M	6-WC10-SD-06B	6-WC10-SD-06M
Depth:		0 - 6'	0 - 6'	N/A	N/A	0 - 6'	0 - 6'
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-21	00429-22	00429-23	00429-24	00426-02	00426-04
Parameter	Units						
ALUMINUM	MG/KG	978	17200	8610	9160	4640	25400
ARSENIC	MG/KG		5.8 B		3.5 B		4.7 B
BARIUM	MG/KG	2.8 JB	19.8 B	15.4 B	10.9 B		23.6 B
BERYLLIUM	MG/KG		0.63 B	0.33 B	0.3 B		
CALCIUM	MG/KG	399 B	6150	10300	3410	6500 B	4180
CHROMIUM	MG/KG	1.7 B	17.7	8.2 B	9.6		28.5
COBALT	MG/KG	2.3 JB	3.3 JB	2.9 JB	1.6 JB		
COPPER	MG/KG	11.9 J	33.5	4.4 JB	10.7 JB		
IRON	MG/KG	789	14600	11600	7000	4610 J	13900
LEAD	MG/KG	4.9	106	8.8	37.4	22.4 J	68.9 J
MAGNESIUM	MG/KG	213 B	4520 B	730 B	1350 B	6630 B	4630
MANGANESE	MG/KG	3.2 B	50.2	42.5	20.9	11.8 JB	40.6
NICKEL	MG/KG	2.7 JB			4.3 JB		10.7 JB
POTASSIUM	MG/KG	65.5 JB	1390 B	419 B	628 B	829 B	2200 B
SILVER	MG/KG						
SODIUM	MG/KG	332 JB	8880	1380 JB	1110 JB	14900	11900
VANADIUM	MG/KG	1.9 JB	41.5 B	12.7 JB	18.5 B		45.5 J
ZINC	MG/KG	388	137	17.1	43.6	33.1 B	69.6

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 12
SITE 6 WALLACE CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC10-SD-612M	6-WC11-SD-06B	6-WC11-SD-06M
	Depth:	6 - 12'	0 - 6'	0 - 6'
	Date Sampled:	8/22/92	8/22/92	8/22/92
	Lab Id:	00426-05	00426-10	00426-11
Parameter	Units			
ALUMINUM	MG/KG	8070	3470	12000
ARSENIC	MG/KG	1.8 B	8.9 B	4.4 JB
BARIUM	MG/KG	10.4 B		
BERYLLIUM	MG/KG			
CALCIUM	MG/KG	2560	9350	4170
CHROMIUM	MG/KG	10	7.7 B	13.5
COBALT	MG/KG			
COPPER	MG/KG			
IRON	MG/KG	6810	3940	11600
LEAD	MG/KG	13.7 J	16.7 J	31.8 J
MAGNESIUM	MG/KG	1620 B	9840	3830
MANGANESE	MG/KG	26.5	12.3 JB	38.8
NICKEL	MG/KG			
POTASSIUM	MG/KG	762 B	1040 B	1280 B
SILVER	MG/KG			
SODIUM	MG/KG	2380	18300	10300
VANADIUM	MG/KG			
ZINC	MG/KG	24.3	22.7 B	42.5

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 13
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH01-SD-06B	6-BH02-SD-06M	6-BH02-SD-612M	6-BH03-SD-06B	6-BH03-SD-06M	6-BH03-SD-612B
	Depth:	0 - 6"	0 - 6"	6 - 12"	0 - 6"	0 - 6"	6 - 12"
	Date Sampled:	10/23/92	8/28/92	8/28/92	8/28/92	8/28/92	8/28/92
	Lab Id:	00591-01	00458-02	00458-03	00458-05	00458-07	00458-08
Parameter	Units						
4,4'-DDE	UG/KG		5.7			68	
4,4'-DDD	UG/KG					25	
4,4'-DDT	UG/KG					15	
ALPHA CHLORDANE	UG/KG						
PCB-1260	UG/KG					170	
METHYLENE CHLORIDE	UG/KG			2 J	3 J		4 J
ACETONE	UG/KG		840	140	34	99	210
2-BUTANONE	UG/KG		15 J	3 J	10 J	23 J	30
TRICHLOROETHENE	UG/KG				5 J		
BENZENE	UG/KG	5 J					
TETRACHLOROETHENE	UG/KG				3 J		
ETHYLBENZENE	UG/KG						
TOTAL XYLENES	UG/KG				3 J		
1,4-DICHLOROBENZENE	UG/KG						
PYRENE	UG/KG						
BENZO(B)FLUORANTHENE	UG/KG						
BENZO(A)PYRENE	UG/KG				450 J	190 J	640
INDENO(1,2,3-CD) PYRENE	UG/KG						

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 13
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH03-SD-612M	6-BH04-SD-06B	6-BH04-SD-06M	6-BH04-SD-612B	6-BH04-SD-612M	6-BH05-SD-06B
Depth:		6 - 12"	0 - 6"	0 - 6"	6 - 12"	6 - 12"	0 - 6"
Date Sampled:		8/28/92	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00458-09	00439-01	00439-02	00439-03	00439-04	00439-05
Parameter	Units						
4,4'-DDE	UG/KG	22	14	41 J	35 J	53 J	30 J
4,4'-DDD	UG/KG	9.2 J	8.4 J	42 J	11 J	220 J	26 J
4,4'-DDT	UG/KG	6.6 J	16 J	9.4 J		38 J	
ALPHA CHLORDANE	UG/KG						
PCB-1260	UG/KG	160	51	110 J	240 J	370 J	64 J
METHYLENE CHLORIDE	UG/KG	7 J					
ACETONE	UG/KG	340	140	9900 J	50 J	91	3700 J
2-BUTANONE	UG/KG	59		2400	5 J		2600
TRICHLOROETHENE	UG/KG						
BENZENE	UG/KG						
TETRACHLOROETHENE	UG/KG						
ETHYLBENZENE	UG/KG						
TOTAL XYLENES	UG/KG						
1,4-DICHLOROBENZENE	UG/KG						
PYRENE	UG/KG					60 J	
BENZO(B)FLUORANTHENE	UG/KG						
BENZO(A)PYRENE	UG/KG	230 J			93 J	100 J	
INDENO(1,2,3-CD) PYRENE	UG/KG		40 J				

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 13
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH05-SD-06M	6-BH06-SD-06B	6-BH06-SD-06M	6-BH07-SD-06B	6-BH07-SD-06M
	Depth:	0 - 6"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
	Date Sampled:	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
	Lab Id:	00439-06	00439-07	00439-09	00445-01	00445-02
Parameter	Units					
4,4'-DDE	UG/KG	32	68 J	24 J		
4,4'-DDD	UG/KG	23	37 J	22 J		
4,4'-DDT	UG/KG	21 J	14 J	7 J		
ALPHA CHLORDANE	UG/KG		14 J			
PCB-1260	UG/KG	110 J	180 J	69 J		
METHYLENE CHLORIDE	UG/KG					
ACETONE	UG/KG	470 J	60 J	91 J		
2-BUTANONE	UG/KG	87 J				
TRICHLOROETHENE	UG/KG					150
BENZENE	UG/KG					
TETRACHLOROETHENE	UG/KG					
ETHYLBENZENE	UG/KG					57 J
TOTAL XYLENES	UG/KG					380
1,4-DICHLOROBENZENE	UG/KG				340 J	370 J
PYRENE	UG/KG		76 J			
BENZO(B)FLUORANTHENE	UG/KG		96 J			
BENZO(A)PYRENE	UG/KG					
INDENO(1,2,3-CD) PYRENE	UG/KG					

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 14
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH01-SD-612B	6-BH01-SD-612M	6-BH01-SD-06B	6-BH01-SD-06M	6-BH02-SD-06M	6-BH02-SD-612M
	Depth:	6 - 12"	6 - 12"	0 - 6"	0 - 6"	0 - 6"	6 - 12"
	Date Sampled:	10/23/92	10/23/92	10/23/92	10/23/92	8/28/92	8/28/92
	Lab Id:	00591-03	00591-04	00591-01	00591-02	00458-02	00458-03
Parameter	Units						
ALUMINUM	MG/KG	6760	7790	5610	6360	3010	7780
ARSENIC	MG/KG						1.6 JB
BARIUM	MG/KG	9.7 JB	14.4 B		9.9 JB	12.5 B	30 B
BERYLLIUM	MG/KG	0.13 B	0.17 B	0.14 B			0.33 B
CADMIUM	MG/KG					0.54 JB	1.3 JB
CALCIUM	MG/KG					1410	3890
CHROMIUM	MG/KG	5.1	4.7	4.9	3.6		9.9
COBALT	MG/KG						
COPPER	MG/KG	3.2 JB	10.1 JB	4.2 JB	6.2 JB		
IRON	MG/KG	765	1590	638	956	1240	3150
LEAD	MG/KG	8.9	12.3	11.3	10.2	6.9	8.9
MAGNESIUM	MG/KG	128 B	160 B	103 B	130 B	77.9 B	187 B
MANGANESE	MG/KG	4.9	6 B	4.7	4.9 B	4.4 J	8.6 J
POTASSIUM	MG/KG	125 B	163 B	122 B	140 B		
SELENIUM	MG/KG						2.9
SODIUM	MG/KG						
VANADIUM	MG/KG	5.7 B	6.5 B	4.8 B	4.9 B	3.3 JB	14.1 B
ZINC	MG/KG					12	12.6

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 14
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH03-SD-06B	6-BH03-SD-06M	6-BH03-SD-612B	6-BH03-SD-612M	6-BH04-SD-06B	6-BH04-SD-06M
	Depth:	0 - 6"	0 - 6"	6 - 12"	6 - 12"	0 - 6"	0 - 6"
	Date Sampled:	8/28/92	8/28/92	8/28/92	8/28/92	8/26/92	8/26/92
	Lab Id:	00458-05	00458-07	00458-08	00458-09	00439-01	00439-02
Parameter	Units						
ALUMINUM	MG/KG	13600 J	9210	15000	10800	465	570
ARSENIC	MG/KG						0.62 B
BARIUM	MG/KG	31.7 B	33.2 B	32.8 B	40.4 B		
BERYLLIUM	MG/KG	0.63 B	0.56 B	0.97 B	0.42 B		
CADMIUM	MG/KG	1.3 JB	1.1 JB	1.3 JB	1.7 JB	0.7 JB	
CALCIUM	MG/KG	3340	4850	3280	5880	45600	8560
CHROMIUM	MG/KG	11.9	8.4	13.6	10	2.4	
COBALT	MG/KG						
COPPER	MG/KG		6.7 JB		7.1 JB		
IRON	MG/KG	3050	4450	3030	4660	516	442
LEAD	MG/KG	19.1 J	45.3	20.8	46.1	2.9	7.7
MAGNESIUM	MG/KG	317 B	219 B	291 B	210 B	653 B	138 B
MANGANESE	MG/KG	11 J	14 J	8.1 J	15 J	28.7	6.3 J
POTASSIUM	MG/KG	225 B		288 B			
SELENIUM	MG/KG						
SODIUM	MG/KG					86.5 JB	
VANADIUM	MG/KG	13.8 B	12.9 B	17.8	12.5 B	1.7 JB	1.5 JB
ZINC	MG/KG	11	30.4	6.4 B	34.5		7.7

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 14
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH04-SD-612B	6-BH04-SD-612M	6-BH05-SD-06B	6-BH05-SD-06M	6-BH06-SD-06B	6-BH06-SD-06M
	Depth:	6 - 12"	6 - 12"	0 - 6"	0 - 6"	0 - 6"	0 - 6"
	Date Sampled:	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92
	Lab Id:	00439-03	00439-04	00439-05	00439-06	00439-07	00439-09
Parameter	Units						
ALUMINUM	MG/KG	1000	1300	1850	6230	3840	5260 J
ARSENIC	MG/KG		0.54 B		1.1 B	1 B	2.2 JB
BARIUM	MG/KG	8.1 JB		7.7 JB	27 B	17.9 B	25.1 JB
BERYLLIUM	MG/KG				0.3 B		
CADMIUM	MG/KG		0.73 JB		1.8 J	1.1 JB	
CALCIUM	MG/KG	7490	18000	1210	4070	4630	12300 J
CHROMIUM	MG/KG	3.4	2.8	2.3 B	6.6	5.5	9.2 J
COBALT	MG/KG				1.7 JB		
COPPER	MG/KG		1.2 JB	2.2 JB	6.2 JB	5.2 JB	8.8 JB
IRON	MG/KG	1320	995	998	6250	3060	5920 J
LEAD	MG/KG	2.5	17.8	17.6	29	42	27 J
MAGNESIUM	MG/KG	118 B	295 B	57.6 B	180 B	178 B	302 JB
MANGANESE	MG/KG	4.8 J	10.4 J	3.8 J	12.4 J	19 J	27.5 J
POTASSIUM	MG/KG				156 B	121 B	
SELENIUM	MG/KG						
SODIUM	MG/KG						93.7 JB
VANADIUM	MG/KG	1.5 JB	2.2 B	3.2 JB	10.4 B	6.5 B	9 JB
ZINC	MG/KG	6.7	11.4	13.8	36.6	24.9	50.7 J

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 14
SITE 6 BEAR HEAD CREEK SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH07-SD-06B		6-BH07-SD-06M	
	Depth:	0 - 6"		0 - 6"	
	Date Sampled:	8/27/92		8/27/92	
	Lab Id:	00445-01		00445-02	
Parameter	Units				
ALUMINUM	MG/KG	12300	J	22100	J
ARSENIC	MG/KG	6.1	JB	4.7	B
BARIUM	MG/KG	10.5	JB	22.8	JB
BERYLLIUM	MG/KG				
CADMIUM	MG/KG			4.7	JB
CALCIUM	MG/KG	9240	J	14400	J
CHROMIUM	MG/KG	10.8	B	16.4	B
COBALT	MG/KG	3.4	B	4	B
COPPER	MG/KG	28.1	B	23.8	B
IRON	MG/KG	15800	J	17100	J
LEAD	MG/KG	49.2	J	70.4	J
MAGNESIUM	MG/KG	9820	J	10500	J
MANGANESE	MG/KG	46.5		48.6	
POTASSIUM	MG/KG	1930	B	1460	B
SELENIUM	MG/KG				
SODIUM	MG/KG	36200	J	15500	J
VANADIUM	MG/KG	45.9	B	54.1	B
ZINC	MG/KG	77.1		82.4	

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 15
SITE 6 RAVINE SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
	Depth:	0 - 6"	0 - 6"	0 - 6"	6 - 12"	0 - 6"	6 - 12"
	Date Sampled:	8/25/92	8/25/92	8/24/92	8/24/92	8/24/92	8/24/92
	Lab Id:	00439-11	00439-13	00437-04	00437-05	00437-08	00437-09
Parameter	Units						
DIELDRIN	UG/KG	43 J			8.1 J		
4,4'-DDE	UG/KG		120 J		53 J		
ENDRIN	UG/KG	5.1 J					
4,4'-DDD	UG/KG		45 J			9.4 J	4.1 J
4,4'-DDT	UG/KG		130 J	210 J	51	14 J	
ENDRIN ALDEHYDE	UG/KG	7.8					
PCB-1260	UG/KG	360 J	92 J	190 J			
ACETONE	UG/KG	62				180 J	9100 J
2-BUTANONE	UG/KG						2400 J
NAPHTHALENE	UG/KG		54 J				
2-METHYLNAPHTHALENE	UG/KG		44 J				
ACENAPHTHENE	UG/KG		220 J				
DIBENZOFURAN	UG/KG		110 J				
FLUORENE	UG/KG		250 J				
PHENANTHRENE	UG/KG	50 J	1600		90 J		
ANTHRACENE	UG/KG		480				
DI-N-BUTYL PHTHALATE	UG/KG						
FLUORANTHENE	UG/KG	84 J	1500 J		130 J		
CARBAZOLE	UG/KG		170 J				
PYRENE	UG/KG	130 J	2100		96 J		
BENZO(A)ANTHRACENE	UG/KG	61 J	1100		43 J		
CHRYSENE	UG/KG	85 J	1100		59 J		
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG			200 J			
BENZO(B)FLUORANTHENE	UG/KG	120 J	1200		54 J		
BENZO(K)FLUORANTHENE	UG/KG		440				
BENZO(A)PYRENE	UG/KG	70 J	1000				
INDENO(1,2,3-CD) PYRENE	UG/KG	57 J	710				
DIBENZ(A,H)ANTHRACENE	UG/KG		83 J				
BENZO(G,H,I)PERYLENE	UG/KG	57 J	680				

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 15
SITE 6 RAVINE SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-RV5-SD-06	6-RV6-SD-06	6-RV7-SD-06	6-RV7-SD-612	6-RV8-SD-06
Depth:		0 - 6"	0 - 6"	0 - 6"	6 - 12"	0 - 6"
Date Sampled:		8/25/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-15	00437-11	00437-12	00437-14	00437-17
Parameter	Units					
DIELDRIN	UG/KG					
4,4'-DDE	UG/KG	44 J	58 J	37 J	23 J	
ENDRIN	UG/KG					
4,4'-DDD	UG/KG	9 J		36 J	34 J	
4,4'-DDT	UG/KG	19 J	170 J	60 J	19 J	
ENDRIN ALDEHYDE	UG/KG					
PCB-1260	UG/KG	79 J		29 J	41 J	
ACETONE	UG/KG		3400 J			340 J
2-BUTANONE	UG/KG		2300			
NAPHTHALENE	UG/KG					
2-METHYLNAPHTHALENE	UG/KG					
ACENAPHTHENE	UG/KG					
DIBENZOFURAN	UG/KG					
FLUORENE	UG/KG					
PHENANTHRENE	UG/KG					
ANTHRACENE	UG/KG					
DI-N-BUTYL PHTHALATE	UG/KG				52 J	
FLUORANTHENE	UG/KG					
CARBAZOLE	UG/KG					
PYRENE	UG/KG					120 J
BENZO(A)ANTHRACENE	UG/KG					
CHRYSENE	UG/KG					
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG					
BENZO(B)FLUORANTHENE	UG/KG					110 J
BENZO(K)FLUORANTHENE	UG/KG					
BENZO(A)PYRENE	UG/KG					89 J
INDENO(1,2,3-CD) PYRENE	UG/KG					
DIBENZ(A,H)ANTHRACENE	UG/KG					
BENZO(G,H,I)PERYLENE	UG/KG					

UG/KG - microgram per kilogram
J - value is estimated

TABLE 3 - 16
SITE 6 RAVINE SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
	Depth:	0 - 6"	0 - 6"	0 - 6"	6 - 12"	0 - 6"	6 - 12"
	Date Sampled:	8/25/92	8/25/92	8/24/92	8/24/92	8/24/92	8/24/92
	Lab Id:	00439-11	00439-13	00437-04	00437-05	00437-08	00437-09
Parameter	Units						
ALUMINUM	MG/KG	10300	2540	3820	1090	947	739
ARSENIC	MG/KG	4.3	0.61 B	2.1 JB			
BARIUM	MG/KG	61.5	22.9 B	18.2 JB	5.6 JB	4.2 JB	2.9 JB
BERYLLIUM	MG/KG			0.13 B			
CADMIUM	MG/KG	5.9 J	1.8 J	1.9 J	0.61 J	0.53 JB	
CALCIUM	MG/KG	3450	1490	735 B	315 B	148 B	
CHROMIUM	MG/KG	17.7	3.6	6			
COBALT	MG/KG	2.1 JB		0.72 B			
COPPER	MG/KG	67.5	12.3	18.7 J	6 J	4.2 JB	2.6 JB
IRON	MG/KG	7590	2290	2690	828	1010	420
LEAD	MG/KG	2.1 B	21.2	62.3 J	12.4 J	6.6 J	5.4 J
MAGNESIUM	MG/KG	402 B	139 B	137 B	40 B	34.7 B	24.5 B
MANGANESE	MG/KG	288	24	58.3	5.1 J	6.5 J	3.4 J
MERCURY	MG/KG	0.75	0.25	0.1	0.04 B	0.03 B	
NICKEL	MG/KG	7.7 JB		2.1 B			
POTASSIUM	MG/KG	361 B	108 B	153 B	47.5 B	35.1 B	29.5 B
SILVER	MG/KG			0.85 B		0.56 B	0.6 B
VANADIUM	MG/KG	19	6 B	7 B	2.1 B	2.5 B	1.2 B
ZINC	MG/KG	408	64.8	113	24.8	31.6	20.3

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3 - 16
SITE 6 RAVINE SEDIMENT
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-RV5-SD-06	6-RV6-SD-06	6-RV7-SD-06	6-RV7-SD-612	6-RV8-SD-06
Depth:		0 - 6"	0 - 6"	0 - 6"	6 - 12"	0 - 6"
Date Sampled:		8/25/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-15	00437-11	00437-12	00437-14	00437-17
Parameter	Units					
ALUMINUM	MG/KG	913	2100	1260	1710	7130
ARSENIC	MG/KG					2.3 B
BARIUM	MG/KG		8.5 JB	6.8 JB	12.2 JB	37.7 JB
BERYLLIUM	MG/KG		0.06 B		0.07 B	0.25 B
CADMIUM	MG/KG		1.7 J	0.64 JB	1.6 J	2.3 J
CALCIUM	MG/KG		10100	284 B	577 B	1390 B
CHROMIUM	MG/KG	2 B	3.1 J			10.5
COBALT	MG/KG					1.1 B
COPPER	MG/KG	6.5 J	8.1 J	6.9 J	45 J	35 J
IRON	MG/KG	875	2950	851	1000	3420
LEAD	MG/KG	25.6	11.2 J	13.3 J	18.5 J	105 J
MAGNESIUM	MG/KG	36.3 B	217 B	53.2 B	91.1 B	289 B
MANGANESE	MG/KG	28.9	104	25.5 J	21.6 J	24.2 J
MERCURY	MG/KG		0.15	0.09 B	0.15	0.27
NICKEL	MG/KG				2.8 B	4 B
POTASSIUM	MG/KG		83.2 B	48.2 B	60.9 B	253 B
SILVER	MG/KG			0.82 B	0.85 B	1.2 B
VANADIUM	MG/KG	1.8 JB	4 B	2.4 JB	3.7 JB	11.4 JB
ZINC	MG/KG	80.8	204	94.2	193	142

MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater than the IDL

TABLE 3-17

OPERABLE UNIT NO. 2
TIDE DATA FOR THE NEW RIVER IN JACKSONVILLE, NORTH CAROLINA
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Date	High Tide		Low Tide	
	Time	Height (feet)	Time	Height (feet)
08/01/92	13.1	1.74	7.9	0.88
	NA	NA	20.3	0.92
08/02/92	1.5	1.62	NA	NA
	14.1	1.62	8.8	0.84
	NA	NA	21.2	0.90
08/03/92	2.5	1.55	9.5	0.93
	15.0	1.64	22.2	0.92
08/04/92	3.3	1.52	10.1	0.95
	16.5	1.67	22.6	1.05
08/05/92	4.5	1.54	11.4	1.05
	16.9	1.62	NA	NA
08/06/92	NA	NA	0.4	1.02
	5.4	1.47	12.4	1.03
	18.1	1.59	NA	NA
[illegible]/92	NA	NA	1.3	1.04
	6.3	1.49	13.3	1.04
	19.0	1.59	NA	NA
08/08/92	NA	NA	2.0	1.08
	7.3	1.47	14.4	1.02
	20.1	1.58	NA	NA
08/09/92	8.6	1.44	3.4	1.02
	20.8	1.55	15.4	1.03
08/10/92	9.6	1.50	4.1	1.02
	21.8	1.59	16.2	1.01
08/11/92	10.2	1.52	4.9	1.03
	NA	NA	16.9	1.02
08/12/92	0.3	1.72	NA	NA
	11.1	1.57	5.7	0.99
	22.8	1.59	17.6	0.96
08/13/92	11.4	1.59	6.1	1.02
	NA	NA	18.0	1.06
08/14/92	.04	1.81	NA	NA
	11.9	1.76	6.4	1.19
	NA	NA	19.0	1.21
08/15/92	0.4	1.84	NA	NA
	12.6	1.79	8.0	1.27
	NA	NA	19.7	1.20
08/16/92	1.0	1.76	NA	NA
	13.0	1.73	7.7	1.22
	NA	NA	19.9	1.16

Date	High Tide		Low Tide	
	Time	Height (feet)	Time	Height (feet)
08/17/92	1.4	1.67	NA	NA
	13.7	1.66	8.2	1.11
	NA	NA	20.4	1.14
08/18/92	1.9	1.62	NA	NA
	14.5	1.65	8.6	1.09
	NA	NA	21.4	1.12
08/19/92	2.7	1.55	9.3	1.05
	15.2	1.64	22.2	1.13
08/20/92	3.7	1.54	10.0	1.12
	15.4	1.66	23.3	1.17
08/21/92	4.2	1.55	11.2	1.13
	16.6	1.64	NA	NA
08/22/92	NA	NA	0.2	1.14
	5.0	1.51	12.0	1.06
	17.6	1.58	NA	NA
08/23/92	NA	NA	0.9	1.07
	6.1	1.48	13.1	1.02
	18.7	1.60	NA	NA
08/24/92	NA	NA	2.0	1.05
	7.3	1.52	14.2	1.01
	20.0	1.64	NA	NA
08/25/92	NA	NA	3.1	1.02
	8.4	1.56	15.1	0.95
	21.0	1.65	NA	NA
08/26/92	9.2	1.59	4.0	0.95
	21.8	1.71	16.2	0.90
08/27/92	10.3	1.71	5.0	0.97
	22.5	1.74	17.3	0.95
08/28/92	11.2	1.73	6.0	0.95
	NA	NA	18.5	0.89
08/29/92	0.5	1.64	NA	NA
	12.5	1.81	6.9	0.97
	NA	NA	19.5	0.96
08/30/92	0.9	1.74	NA	NA
	12.9	1.75	7.7	0.96
	NA	NA	20.2	0.93
08/31/92	1.4	1.57	NA	NA
	14.1	1.61	8.5	0.84
	NA	NA	21.0	0.91
09/01/92	2.5	1.56	NA	NA
	NA	NA	9.2	0.96
	14.8	1.65	21.9	1.00

Date	High Tide		Low Tide	
	Time	Height (feet)	Time	Height (feet)
09/02/92	3.1	1.52	10.4	0.94
	15.6	1.59	22.8	0.98
09/03/92	4.1	1.45	11.0	0.95
	16.7	1.55	NA	NA
09/04/92	NA	NA	0.2	1.02
	4.8	1.39	12.0	0.99
	17.7	1.53	NA	NA
09/05/92	NA	NA	0.7	1.02
	6.2	1.44	13.2	1.04
	18.8	1.58	NA	NA
09/06/92	NA	NA	1.7	1.15
	7.2	1.60	14.1	1.15
	19.9	1.68	NA	NA
09/07/92	NA	NA	2.7	1.23
	8.1	1.62	14.9	1.17
	20.4	1.66	NA	NA
09/08/92	8.8	1.55	3.4	1.12
	21.1	1.59	15.7	1.08
09/09/92	9.6	1.55	4.0	1.04
	21.9	1.57	16.5	1.04
09/10/92	10.4	1.54	4.8	0.99
	22.5	1.55	17.2	1.02
09/11/92	10.8	1.66	4.8	1.05
	23.3	1.66	18.1	1.12
09/12/92	11.4	1.71	6.1	1.14
	23.7	1.64	18.5	1.12
09/13/92	12.1	1.69	6.7	1.09
	NA	NA	18.9	1.10
09/14/92	0.3	1.64	NA	NA
	12.7	1.70	7.0	1.08
	NA	NA	19.8	1.11
09/15/92	0.9	1.61	NA	NA
	13.1	1.69	7.6	1.07
	NA	NA	20.2	1.11
09/16/92	1.4	1.58	NA	NA
	13.9	1.62	8.1	1.05
	NA	NA	21.0	1.04
09/17/92	2.2	1.50	9.1	1.00
	14.6	1.57	21.8	1.02
09/18/92	2.9	1.43	9.8	0.96
	15.4	1.56	22.8	1.03

Source: NOAA Tide Station in Hampton Roads, Virginia
NA - Not Aplicable

(Note: Source data recalculated using appropriate correction factors to yield New River Data)

TABLE 3-18

OPERABLE UNIT NO. 2
SURFACE WATER SAMPLES CORRELATION WITH TIDE
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINIA

Station	Date	Time	Tide	Percent(%)*
WALLACE CREEK				
6-WC11-SW/SD	8/22/92	9:10	Falling	43
6-WC10-SW/SD	8/22/92	10:30	Falling	22
6-WC09-SW/SD	8/23/92	9:08	Falling	57
6-WC08-SW/SD	8/23/92	11:10	Falling	29
6-WC07-SW/SD	8/23/92	12:10	Falling	14
6-WC06-SW/SD	8/23/92	13:50	Rising	88
6-WC05-SW/SD	8/25/92	11:30	Falling	57
6-WC04-SW/SD	8/26/92	9:20	Falling	99
6-WC03-SW/SD	8/26/92	9:55	Falling	90
6-WC02-SW/SD	8/26/92	17:30	Rising	77
6-WC01-SW/SD	8/30/92	7:45	Low Tide	0
BEAR HEAD CREEK				
6-BH01-SW/SD	8/24/92	16:20	Rising	67
6-BH07-SW/SD	8/25/92	9:45	Falling	80
6-BH06-SW	8/28/92	7:40	Rising	67
6-BH05-SW	8/28/92	8:25	Rising	53
6-BH03-SW/SD	8/28/92	13:15	Falling	73
6-BH02-SW/SD	8/28/92	14:54	Falling	47
6-BH04-SW/SD	8/29/92	9:35	Rising	54
6-BH02A-SW/SD	8/29/92	12:45	Falling	97

* Percentage to reach high/low tide.
(based on height of tide)

4.0 ECOLOGICAL INVESTIGATION

This section discusses the ecological investigation conducted at OU No. 2. Included in this section are the selection of target species; selection of ecological endpoints; the sampling methodologies, procedures, and station locations; and the sampling results. The sampling included the collection of fish and benthic macroinvertebrate species for population analysis and the collection of fish and crabs for tissue analysis.

4.1 Introduction

The ecological investigation at OU No. 2 was conducted to determine if contamination attributable to OU No. 2 is adversely impacting the ecological integrity of Wallace Creek, Bear Head Creek, or the ravine. The potential impact to the ecological integrity was evaluated by the use of ecological endpoints (described in Section 4.3) in the risk characterization (described in Section 7.0).

Three types of information are needed to evaluate potential links between the contaminants of concern (COCs) and the ecological endpoints. First, chemical analyses of the appropriate media are necessary to establish the presence, concentrations, and variabilities of the COCs. Second, ecological surveys are necessary to establish if adverse ecological effects have occurred. Finally, toxicological information is necessary to evaluate the potential effects of the COCs on the ecological receptors. The combination of all three types of data allows the assessment of the relative contribution of other potential causes of the observed effects (as measured by the ecological endpoints) unrelated to the toxic effects of the COCs, such as habitat alterations and natural variability. Therefore, confidence in cleanup and monitoring decisions is greatly enhanced when based on a combination of chemical, ecological, and toxicological data.

The investigation included the collection of fish and benthic macroinvertebrates for population statistics and fish and crabs for "body burden" analysis. The following describes the methodologies for the biosurvey field work and for the ecological endpoint evaluation.

4.2 Selection of Target Indicator Species

The following sections discuss the target indicator species that were chosen for the ecological risk assessment, and the reason they were chosen as indicator species. The four primary criteria used for the selection of the indicator species are listed below:

- Importance to ecological systems
- Sensitivity
- Availability of practical methods for prediction and measurement
- Trustee species or regulatory endpoint

4.2.1 Fish

Estuaries serve as a unique environment for many marine species of fish. Reduced salinity and lower incidence of piscivorous predators, together with a rich food supply, provide benefits to these fishes. While a few fish spend their entire life cycle in estuaries, most are seasonal members of estuarine communities or utilize this habitat strictly as a migratory pathway between feeding and spawning areas (Kennish, 1990).

Estuarine fish must have the ability to regulate their internal environment to successfully inhabit the fluctuating environment of estuaries, where sudden floods and tidal changes abruptly alter salinity. The dominant estuarine fishes have broad salinity tolerances. Marine fishes are preadapted to reduced salinities, so that when salinity gradually decreases in an estuary, many of them will have little difficulty adapting to it (Kennish, 1990).

Fish are commonly used as target indicator species of water quality conditions for the following reasons (USEPA, 1989c):

- Fish are integrators of community response to aquatic environmental quality conditions. They are the end products of most aquatic food webs and, thus, the total biomass of fishes is highly dependent on the gross primary and secondary productivity of lower organism groups.

- Fish constitute a conspicuous part of the aquatic biota and are recognized by the public for their endangered status. They also represent the end product of protection for most water pollution abatement programs.

- Fish reproduce once per year and complete their entire life cycle in the aquatic environment. Therefore, the success of each year class is dependent upon the quality of the aquatic environment which they inhabit. The success can be evaluated by determining the general condition of the fish community each summer and fall.

- Fish have a relatively high sensitivity to a variety of substances and physical conditions. Both acute toxicity (missing taxa) and stress effects (depressed growth and reproductive success) can be evaluated.

- Fish have a high capacity for bioaccumulating large amounts of chemicals that can be measured.

- Fish can be quickly identified to the species level in the field and there is an abundance of information available for many species concerning their life distribution.

4.2.2 Benthic Macroinvertebrates

Benthic macroinvertebrates are defined as organisms that are large enough to be seen by the unaided eye, and are retained by a U.S. Standard No. 30 sieve (28 meshes per inch, 0.595 mm openings) (USEPA, 1990). They live at least part of their life cycles within or upon available substrates in a body of water or water transport systems (USEPA, 1990).

Benthic macroinvertebrates are important organisms in the trophic food web. They are a primary food source for many fish species and some terrestrial and bird species. Therefore, a decrease in numbers of benthic macroinvertebrates could lead to decreased populations of fish and other species. Also, constituents that tend to bioaccumulate in organisms could be biomagnified in species that ingest benthic macroinvertebrates. The advantages of using benthic macroinvertebrates as target indicator species are as follows (USEPA, 1989c):

- Benthic macroinvertebrates generally have limited migration patterns or they are sessile for periods in their life cycle. Therefore, they are good indicators for site-specific impacts (i.e., upstream-downstream).

- Benthic macroinvertebrates have a relatively short life cycle (one year or more). Therefore, they are good indicators of short-term environmental variations because their sensitive life stages will respond quickly to various stresses, while the overall species community will respond more slowly.

- Benthic macroinvertebrates may be easily identified down to the family level by trained biologists. Degraded conditions often can be detected in the field in a very short time.

- Benthic macroinvertebrates are easily collected with one or two persons using relatively inexpensive equipment. In addition, there is no detrimental effect on the resident biota.

- Benthic macroinvertebrates are abundant in most water bodies.

4.2.3 Other Aquatic Flora and Fauna

Other aquatic fauna (e.g., zooplankton, microorganisms) and aquatic flora (e.g., submerged and floating vegetation, algae, etc.) are present in Wallace Creek and Bear Head Creek. Although these organisms are important in the ecological hierarchy, they were not collected or quantitatively evaluated in this assessment because they will be accounted for in the application of the ecological endpoints.

4.2.4 Terrestrial Fauna

As discussed earlier in this report, several terrestrial faunal species inhabit MCB Camp Lejeune. Because detailed collections and observations of these species were not conducted, population and community parameters for these species were discussed qualitatively in this evaluation. Comparisons of contaminant concentrations in soil to published plant and earthworm toxicity information was used to evaluate potential effects to flora and invertebrate terrestrial species. In addition, estimated daily intakes were calculated and compared to health-base terrestrial reference values to evaluate potential effects to vertebrate terrestrial species.

4.3 Ecological Endpoints

There are two primary types of ecological endpoints: assessment endpoints and measurement endpoints. Assessment endpoints are environmental characteristics, which, if they were found to be significantly affected, would indicate a need for remediation (e.g., decrease in sports/fisheries). Measurement endpoints are quantitative expressions of an observed or measured effect of the contamination of concern. Measurement endpoints may be identical to assessment endpoints (e.g., measurement of abundance of fish), or they may be used as surrogates for assessment endpoints (e.g., toxicity test endpoints). Both types of endpoints were used in the ecological risk evaluation.

The assessment endpoint should be well defined and operational with a subject (e.g., benthic macroinvertebrates) and a characteristic of the subject (e.g., decrease in numbers of benthic macroinvertebrate). An endpoint should be measurable (e.g., numbers of individuals) or predictable from measurements (e.g., toxicity tests), and the endpoint must be susceptible to the contaminant being assessed. Finally, the assessment endpoints should bear some logical relationship to the environmental decisions of concern.

The measurement endpoints must correspond to, or be predictive of, assessment endpoints. In addition, they must be readily measurable, preferably quickly and inexpensively, using existing techniques. Measurement endpoints must take into consideration the magnitude of the contamination (e.g., it would be inappropriate to use abundance of a deer population to assess the effects on a one acre site) and the exposure pathway. The measurement endpoint should be an indicator of effects that are temporally distributed. Low natural variability in the endpoint is preferred to aid in attributing the variability in the endpoint to the contaminant. Measurement endpoints should be diagnostic of the pollutants of interest, as well as broadly applicable to allow comparison among sites and regions. Also, measurement endpoints should be standardized (e.g., standard procedures for toxicity tests). Finally, it is desirable to use endpoints that already are being measured (if they exist) to determine baseline conditions.

Endpoints are divided into four primary ecological groups: individual, population, community, and ecosystem endpoints. Individual endpoints (e.g., death, growth, tissue concentrations) are evaluated through toxicity tests, models, and other methods used to assess the effects on individual organisms. Population endpoints (e.g., occurrence, abundance, reproductive performance) are evaluated to determine presence and absence of species through field studies. Community endpoints (e.g., number of species, species diversity) are used to describe the complexity of the community. Finally, ecosystem endpoints (e.g., biomass, productivity, nutrient dynamics) are used to determine the effects between groups of organisms, and between organisms and the environment. Individual, population and community endpoints were evaluated in this assessment. In addition to those endpoints, the following were qualitatively evaluated in this risk assessment: species that are protected under either State or Federal laws and wetlands that are protected under State and/or Federal laws.

The primary goal in deciding upon which ecological endpoints to evaluate was to determine the current effects that the contamination is having on the environment. The endpoints and the indicator species that were evaluated are discussed in the following sections.

4.3.1 Individual Endpoints

This section discusses the individual endpoints that were used in the ERA including water and sediment criteria.

4.3.1.1 Water Criteria

The North Carolina Department of Environment, Health, and Natural Resources (N.C. DEHNR) has promulgated State Water Quality Standards (WQS). These WQS meet the requirements of both Federal and State law. These standards are regulatory values and are enforceable. They are used to evaluate the quality of waters in North Carolina.

The U.S. EPA Region IV Waste Management Division (Region IV) has adopted screening values for chemicals detected at hazardous waste sites (USEPA, 1992b) based on final and draft EPA Water Quality Criteria. These values are intended as preliminary screening tools to review chemical data from hazardous waste sites. Exceedences of the screening level values indicate that there may be a need for further investigation of the site. Acute and chronic Water Quality Screening Values (WQSV) have been developed for several of the chemicals identified during the surface water investigations at OU No. 2.

Contaminant concentrations detected in the surface water at OU No. 2 were compared to both the N.C. DEHNR WQS and Region IV WQSV to determine if there were any exceedences of the established values. In addition, the upper 95% confidence limit was compared to the chronic WQSV. A ratio of greater than unity indicates a potential for adverse effects to aquatic life. The upper 95% confidence limit was used to represent the uncertainty associated with any estimate of exposure concentration over the exposure time and exposure area. If the variability in measured concentration values is great and the upper 95% confidence limit was greater than the maximum detected value, the maximum detected value was used in the comparison.

4.3.1.2 Sediment Screening Values

In addition to contaminants in surface water, aquatic organisms can be adversely affected by contaminants in sediments. Sediments tend to be a sink for certain types of toxic substances, with chemical concentrations in sediments often several orders of magnitude higher than their concentrations in the overlying water.

Currently promulgated sediment quality criteria do not exist. Until these criteria are developed, Region IV is using sediment values compiled by NOAA as screening values for evaluating the potential for chemical constituents in sediments to cause adverse biological effects (USEPA, 1992b). The lower ten percentile (Effects Range-Low (ER-L)) and the median percentile (Effects Range-Median (ER-M)) of biological effects have been developed for several of the chemicals identified during the sediment investigations at OU No. 2. If sediment contaminant concentrations are above the ER-M, adverse effects on the biota are considered probable. If contaminant concentrations are between the ER-M and ER-L, adverse effects on the biota are considered possible, and EPA recommends conducting toxicity tests as a follow-up. Finally, if contaminant concentrations are below the ER-L, adverse effects on the biota are considered unlikely (USEPA, 1992b).

Contaminant concentrations detected in the sediments at OU No. 2 were compared to the Region IV sediment screening values to determine if there were any exceedences in the established values. In addition, the upper 95% confidence limit was compared to the ER-L. A ratio of greater than unity indicates a possibility for adverse effects to aquatic life, and EPA recommends conducting toxicity tests as a follow-up. The upper 95% confidence limit was used to represent the uncertainty associated with any estimate of exposure concentration over the exposure time and exposure area. If the variability in measured concentration values is great and the upper 95% confidence limit was greater than the maximum detected value, the maximum detected value was used in the comparison.

4.3.2 Population Endpoints

The population endpoints that were evaluated in this risk assessment included species occurrence and abundance. The numbers and types of species collected from the sampling stations can qualitatively show trends of increasing or decreasing impacts. For example, if few organisms are collected at downstream stations while there is an abundant population in the upstream stations, the downstream ecosystem may be stressed.

Length-frequency distributions of fish of one age tend to follow a normal distribution pattern. By plotting the length of the fish on the X-axis and frequency on the Y-axis, a succession of peaks appears on the graph. A count of the peaks yields an approximation of age, which in many cases suffices only for the first two to four years because of the coalescing of the peaks due to increased dispersion of the data. Although the overlapping in length distribution reduces the reliability of the method for older age groups, it often is used as an effective check on the scale method of age determination. The length-frequency method suffers from several other disadvantages that affect its usage. First, a particular year class of fish may be absent or poorly represented in a sample. Second, size groupings of fish sometimes are not indicative of year classes due to irregular episodes of hatching. Third, a portion of a year class of fish may be equal in age but not in size owing to differential development under variable conditions. Fourth, fish of a certain size tend to school together.

The biological impairment of the fish community may be indicated by an abundance of tolerant species, the absence of intolerant species, and low species abundance. In addition, abnormal growths, lesions, etc., may indicate the fish community is stressed.

Biological impairment of the benthic macroinvertebrate community may be indicated by the absence of generally pollution-sensitive benthic macroinvertebrate, excess dominance by any one particular taxon, and low overall taxa richness (USEPA, 1989b). Benthic macroinvertebrates differ from each other in their relative sensitivity to pollution (e.g., chemicals) and/or natural stresses (e.g., low dissolved oxygen).

4.3.3 Community Endpoints

This section discusses the community endpoints that were used in the ERA including community similarity and species diversity.

4.3.3.1 Community Similarity

Community similarity between stations was measured using two qualitative indices of community similarity, the Jaccard coefficient (S_J) and the SΦrenson index (S_S). These indices were used to detect changes in the community structure. Stressed communities presumably will have different species than relatively non-stressed communities, given that all other factors are equal. The indices use two possible attributes of the ecosystem, that is whether a species was or was not present in the collected sample. Because these coefficients are based on the number of species collected and not the number of individuals, a few organisms from several taxa could significantly change the similarity value, whereas there may not be an overall significant difference between the communities.

The S_J is better than the S_S at discriminating between highly similar collections and has been used widely in stream pollution investigations . The S_J ranges from 0.0 (dissimilar) to 1.0 (similar) and is calculated using the following equation:

Where: $$Sj = \frac{a}{a+b+c}$$

a = number of species common to both collections
b = number of species in the first collection but not the second
c = number of species in the second collection but not in the first

The S_S places more emphasis on common attributes, and is better than the S_J at discriminating between highly dissimilar collections. The S_S ranges from 0.0 (dissimilar) to 1.0 (similar) and is calculated using the following equation:

$$Ss = \frac{2a}{2a+b+c}$$

Where a, b, and c are as described above.

4.3.3.2 Species Diversity

The fish and benthic communities were examined using a mathematical expression of community structure called a diversity index (H'). Diversity data are useful because they condense a substantial amount of data into a single value. The Shannon-Wiener function is one of the more commonly used formulas for calculating species diversity. Species diversity was calculated in logarithmic base 10 for the fish and benthic species collected during the ecological investigation using the following equation (Brower, 1977):

Where: $H' = \sum(p_i * \log(p_i))\cdot$

H' = mean species diversity

p_i = proportion of the total number of individuals occurring in species i.

Typically, in waterways that are unpolluted and contain suitable habitat for aquatic life, H' ranges from three to four, while in polluted rivers or rivers with unsuitable habitat H' generally is less than one (USEPA, 1983). The operative assumption in the interpretation of H' values is that relatively undisturbed environments tend to support communities that consist of a large number of species with no single species present in overwhelming abundance. Many forms of stress tend to reduce diversity by producing an environment that is less desirable for some taxa and therefore giving a competitive advantage to other taxa.

4.3.3.3 Macroinvertebrate Biotic Index

Most of the benthic macroinvertebrates collected during the ecological investigation have been assigned a pollution tolerance rating. The tolerances were obtained from the N.C. DEHNR DEM, Environmental Sciences Branch (Lenat 1993) and the U.S. EPA Environmental Monitoring Systems Laboratory (U.S. EPA 1990). N.C. DEHNR maintains a complete list of benthic macroinvertebrate species collected, or known to occur, in North Carolina on a database called BINDEX. BINDEX contains the species Latin name, order, biotic index (BI), and feeding group. Biotic indices have not been established for estuarine species. The BI ranges from zero to ten; a zero is assigned to taxa found only in unaltered streams of high water quality, and a ten is assigned to taxa known to occur in streams with intermediate degrees of pollution or disturbance. In addition, the U.S. EPA lists many common benthic macroinvertebrate species along with their tolerance to organic wastes, heavy metals and acids (U.S. EPA, 1990).

The Macroinvertebrate Biotic Index (MBI) was developed to provide a rapid stream quality assessment. The index is an average of BI weighted by organism abundance, and is calculated as follows:

Where: $MBI = \sum(n_i * BI)/N$

MBI = the macroinvertebrate biotic index
n_i = the number of individuals occurring in the i^{th} taxa
BI = the BI assigned to the i^{th} taxa
N = the total number of individuals in the sample

The sampled benthic macroinvertebrate population will be assigned a general stream/water quality condition based on the MBI value. The five classes and their corresponding MBI values are given below (Lenat, 1993):

Excellent Water Quality	Good Water Quality	Fair Water Quality	Poor Water Quality	Serious Water Quality Problems
3.68-5.24	5.25-5.95	5.96-6.67	6.68-7.70	7.71-9.45

The MBI for the benthic macroinvertabrate stations was calculated using the values listed in BINDEX. When a BI for a specific species was not listed, either the family BI (if available) was used or the species was not included in the MBI calculations.

4.4 Biological Sampling Methodology

Biological samples collected at OU No. 2 consisted of fish, crabs and benthic macroinvertebrates. Prior to initiating the sampling event at each station, the following information describing the site was recorded in the field log book:

- Average width, depth and velocity of the water body
- Description of substrate

- Description of "abiotic" characteristics of the reach such as pools, riffles, runs, channel shape, degree of bank erosion, and shade/sun exposure
- Description of "biotic" characteristics of the reach including aquatic and riparian vegetation and wetlands

Water quality measurements were collected during the benthic macroinvertebrate sampling, at a minimum, and during collection of some of the fish samples. On-site water quality measurements at these stations consisted of temperature, pH, specific conductance, salinity and dissolved oxygen. These measurements were conducted prior to sample collection.

The Remedial Investigation/Feasibility Study, Sampling and Analysis Plan (SAP) for Sites 6,9,48, and 69 limited the sampling references sites to two stations in the White Oak River Basin (Baker, 1992). The SAP also limited the sampling at the references sites to sampling of fish and benthic macroinvertebrate populations and did not include chemical analyses of sediment, surface water, fish tissue or crab tissue samples. One of the stations was to be used as the reference for the stations with higher salinity, and the other was to be used as the reference for the stations with lower salinity. The reference stations were selected to be as ecologically similar to the sampling stations for Site 6 and 9 and Sites 48 and 69. However, because of the wide range of environmental conditions (i.e., salinity and dissolved oxygen) found at Sites 6, 9, 48, and 69, some of the environmental conditions present at the on-site stations could not be replicated using only the two reference stations. The White Oak River reference station was not included in the OU 2 Draft ERA because salinity ranged from 15 to 26 ppt. This station was selected to be representative of the high salinity New River Stations at Site 48.

The White Oak River watershed is smaller than the New River watershed (See Figure 4-1). It begins in the Hoffman Forest and flows approximately 48 miles and empties into the Atlantic Ocean. Approximately 77 percent of the watershed is within the Hoffman Forest and the Croatan National Forest. This watershed has very little development, with Swansboro being the largest town.

The reference fish and benthic macroinvertebrate station for OU No. 2 was established in Pettiford Creek which is located in the White Oak River Basin (See Figure 4-1). This station is similar to the stations in Wallace Creek and Bear Head Creek in that it has a salinity gradient from fresh to mesohaline at its mouth.

The use of Pettiford Creek as a reference creek was based on recommendations by the N.C. DEHNR. The White Oak River watershed was recommended due to limited development. Therefore, the station should be representative of an aquatic system with relatively few impacts due to point and non-point sources of pollution of an industrial nature similar to Camp Lejeune.

The Pettiford Creek station was selected to be representative of a creek near the freshwater/saltwater interface (i.e., salt wedge). However, there are reported large fluctuations in salinity in the White Oak River watershed with measured salinities varying by 10 to 15 ppt from week to week at a given station. Therefore, the characteristics of the benthic macroinvertebrate and fish populations could reflect the variation between a freshwater and low salinity estuarine habitat. The sample results reflect the impact of the freshwater/saltwater interface in the low numbers of benthic macroinvertebrates and fish collected, demonstrating the low diversity and density of this ecotene area.

4.4.1 Fish and Crabs

This section discusses collection of the fish and crab samples in Wallace Creek, Bear Head Creek, and Pettiford Creek.

A literature review was conducted to determine the fish species that may potentially be exposed to contaminants in the surface water/sediment exposure pathway. This review included compiling information from State and Federal natural resources agencies. In addition, Baker's experience in sampling similar areas formed a basis for a database of expected species for the area.

Originally, three species of fish were to be sampled, with each species being a representative of one of three trophic (feeding) groups, which included a first order predator, a second order predator, and a third order predator. In addition, a minimum of ten individuals per specie, if available, of adult fish of preferably uniform size were to be composited and analyzed for whole body burden and fillet burden of chemicals, with the same species of fish being sampled from each station. A fish species was successfully collected if the above requirements were satisfied. These requirements were identified to Baker by the U.S. Fish and Wildlife Service as part of the Work Plan review.

Sampling variability can prevent the same species of fish from being sampled at each station because either the preferred species was not captured, or adequate numbers of uniform-size individuals were not captured. Therefore, if the preferred species was not successfully collected to satisfy the above requirements, a substitute species was collected that, if possible, exhibiting a similar trophic position in the estuarine ecosystem.

4.4.1.1 Wallace Creek

This section discusses collection of the fish and crab samples in Wallace Creek including the station locations and sampling procedures.

Station Locations

Fish and crabs were collected from four stations in Wallace Creek. One station was located upstream of OU No. 2 (6-WC4A), one station was located adjacent to OU No. 2 (6-WC6A), and two stations were located downstream of OU No. 2 (6-WC9A and 6-WC11A) (see Figure 3-1).

Station 6-WC4A was located on Wallace Creek approximately 100 feet upstream of Piney Green Road. This station was relocated downstream from the proposed station location (see the Sampling and Analysis Plan [SAP] [Baker, 1992]) because debris obstructed upstream boat access during the time of sampling. Station 6-WC6A was located on Wallace Creek between Piney Green Road and Holcomb Boulevard. Station 6-WC9A was located on Wallace Creek approximately 1000-1500 feet downstream of Holcomb Boulevard, while Station 6-WC11A was located on Wallace Creek approximately 500 feet downstream of it's confluence with Bear Head Creek.

Sampling Procedures

Fish were collected in Wallace Creek using gill nets and a boat-mounted electrofisher. The electrofisher was used when the salinity was in the appropriate salinity range. See Table 4-1 for a listing of the sampling procedure used at each station.

The fish sampling via electroshocking was conducted using a Smith-Root, Inc. electrofisher powered by a 5,000-watt portable generator. A DC current was applied utilizing the boat as a cathode and a hand-held electrode as the anode. The length of shocking time per subsection was recorded as seconds of applied current. Stunned fish were collected with one-inch mesh or smaller dip nets handled by members of the field sampling team.

The gill nets were six feet deep by 50 feet long with two-inch square mesh and an approximate twine break strength of 29 pounds. The nets were deployed approximately at the locations shown on Figure 3-1. Weights were attached to the nets to secure them on the bottom of the stream and yellow bouys marked with "Baker Environmental" were attached to the tops of the nets. The nets were deployed in the morning or evening, and they were checked for fish within twelve hours after deployment.

The collected fish species were identified, measured, and counted. The small fish (less than 20 mm) were weighed in groups of 10 or 20 because of their low individual weight; the larger fish were weighed individually. In addition, blue crabs that were captured in the gill nets were collected, measured, and weighed. The proportion of individuals as hybrids and the proportion of individuals with disease, tumors, fin damage, and skeletal anomalies was recorded at each station.

Most of the fish species were processed in the field and returned alive to the creeks. Some specimens that presented taxonomic difficulties were preserved in 10% formalin and transported to the Baker Ecological Services Laboratory for taxonomic work. At a minimum, one representative fish from each species was preserved in 10% formalin as a voucher specimen.

An attempt was made to collect ten individuals from three different species with each species being a representative of one of the three trophic groups for the tissue analysis. However this success rate was not achieved at any of the stations. The fish were placed individually into clean ziploc or plastic garbage bags and stored on ice for whole body or fillet tissue analysis. The blue crabs were placed individually into clean ziploc bags and stored on ice for whole-body analysis. The bags were labeled with the date and station location. The fish and crabs were frozen prior to being shipped to Ceimic, Inc. for chemical analysis. Table 4-2 shows the number and total weight of the fish and blue crab samples sent to Ceimic.

4.4.1.2 <u>Bear Head Creek</u>

This section discusses collection of the fish and crab samples in Bear Head Creek including the station locations and sampling procedures.

Station Locations

Fish and crabs were collected from three stations in Bear Head Creek. One station was located upstream of OU No. 2 (6-BH2A), one station was located adjacent to site OU No. 2 (6-BH4A), and one station was located downstream of OU No. 2 (6-BH6A) (see Figure 3-1).

Station 6-BH2A was located on Bear Head Creek approximately 1,000 feet upstream of Piney Green Road. This station was located further downstream than proposed in the sampling and analysis plan (Baker, 1992) because the proposed sampling location could not be accessed due to vegetation overgrowth. Station 6-BH4A was located on Bear Head Creek between Piney Green Road and Holcomb Boulevard. Finally, Station 6-BH6A was located on the Bear Head Creek approximately 1,500 to 2,000 feet downstream of Holcomb Boulevard.

Sampling Procedures

Fish were collected in Bear Head Creek using gill nets and a backpack electrofisher. The electrofisher was used when the salinity was in the appropriate salinity range for use of the electrofisher. See Table 4-1 for a listing of the sampling procedures used at each station.

The fish sampling via electroshocking was conducted using a Smith-Root, Inc. electrofisher powered by a 300-watt portable generator. A DC current was applied utilizing a "rattail" as the cathode and a hand-held electrode as the anode. Blocking seines were placed downstream and upstream of the shocking areas to aid in the collection of the fish. The length of shocking time per subsection was recorded as seconds of applied current. Stunned fish were collected with one-inch mesh or smaller dip nets handled by members of the field sampling team.

Gill nets, similar to those used in Wallace Creek, were used to collect fish in Bear Head Creek. The same sample collection and sample processing procedures used in Wallace Creek were conducted in Bear Head Creek. Fish that were collected were processed for population statistics and tissue analysis.

4.4.1.3 <u>Ravine</u>

The ravine receives only runoff from Sites 6 and 82 and therefore, it is only intermittent in nature. No fish collection was proposed for this area in the SAP (Baker, 1992).

4.4.1.4 Pettiford Creek

This section discusses collection of the fish and crab samples in Pettiford Creek including the station locations and sampling procedures.

Station Location

The fish station was located upstream on Pettiford Creek where the salinity was close to zero. See Figure 4-1 for approximate sample location. Several locations with good electrofishing potential (based on salinity) were shocked, however, the yield was very low. Gill nets were not proposed for this station in the SAP (Baker, 1992).

Sampling Procedures

Fish were collected in Pettiford Creek using a boat-mounted electrofisher. The same sample collection and sample processing procedures used in Wallace Creek were conducted at the Pettiford Creek station. All fish that were collected were processed for population statistics; no fish at this station were collected for tissue analysis.

4.4.2 Benthic Macroinvertebrate

This section discusses collection of benthic macroinvertebrate samples in Wallace Creek, Bear Head Creek, and Pettiford Creek.

4.4.2.1 Wallace Creek

This section discusses collection of the benthic macroinvertebrate samples in Wallace Creek including the station locations and sampling procedures.

Station Locations

Benthic macroinvertebrates were collected from four stations in Wallace Creek. One station was located upstream of OU No. 2 (6-WC3A), one station was located adjacent to OU No. 2 (6-WC6A), and two stations were located downstream of OU No. 2 (6-WC9A and 6-WC11A) (see Figure 3-1).

Station 6-WC3A was located on Wallace Creek approximately 3,000 to 4,000 feet upstream of Piney Green Road. At the time this sample was collected, the path in the water was not being obstructed as it was when the fish sample was collected. Station 6-WC6A was located on Wallace Creek, between Piney Green Road and Holcomb Boulevard. Station 6-WC9A was located on Wallace Creek approximately 1,000-1,500 feet downstream of Holcomb Boulevard, and Station 6-WC11A was located on Wallace Creek approximately 500 feet downstream of its confluence with Bear Head Creek.

Sampling Procedures

Benthic macroinvertebrates were collected from a boat using a standard ponar grab. The dimensions of the ponar are 23 x 23 cm (9 x 9 in.) for a sampling area of 529 cm^2 or 0.0529 m^2 (81 in^2).

The ponar was deployed from the boat, which was positioned in slightly different locations for each replicate to prevent the ponar from re-sampling the same area. After retrieving the ponar with a sediment sample, it was opened into a clean tub and the sediments were removed with a teflon spatula. The sediments were transferred to a 0.5 mm sieve that was agitated (by hand) in a tub half-full of water to remove the small particles. The remaining contents in the sieve were transferred into 16-ounce plastic sample jars. The jars were filled up to one-half full with sediments and buffered formalin solution (10% by weight) was added to the remainder of the jar to preserve the benthic macroinvertebrates contained in the sediments. A 100% cotton paper label, marked in pencil with the sample number, was placed inside the jar. The outside of the jar was labeled with the sample number using a black permanent marker to identify the sample containers.

After all the benthic sampling at OU No. 2 was completed, the sample jars were transported to the Baker Ecological Laboratory for sample processing. Sample processing included washing each sample through a 0.5 mm sieve, transferring the washed sample back into the jar, and adding 70% isopropyl alcohol, as a preservative, to the washed sample in the jar. A small amount of rose bengal was added to each jar to stain the benthic macroinvertebrates a pink-red color to aid in the sorting process. The rose bengal stains the tissue cells of the organisms and helped to distinguish them from plant and other materials in the sediments.

The benthic macroinvertebrates were stained for at least 24 hours prior to sorting under a dissecting microscope. The benthic macroinvertebrates were removed from the sediments using a pair of forceps, and placed into glass vials containing 70% isopropyl alcohol and a 100% cotton paper label marked in pencil with the sample number. A one-fourth aliquot of sample 6-WC3A was sorted because of its large sample volume. The number of individuals from that aliquot was multiplied by four to obtain the total number of individuals in the sample. The vials were sealed with cotton and placed into a jar containing 70% isopropyl alcohol. The date, sorting time, approximate number of benthic macroinvertebrates collected, and the name of the person who sorted the sample were recorded on a sample processing log sheet.

The same sorting procedures outlined above were repeated as a QA/QC measure, with any additional species identified being placed into their respective vials. A senior environmental scientist was employed to perform this QA/QC measure. Fifty-percent of a sample was resorted. If more than five percent of the individuals were missed during the initial sorting, than the rest of the sample was resorted. If less than five percent of the individuals were missed during the initial sorting, than the rest of the sample was not resorted.

The date, sorting time, number and type of additional organisms found and percent of sample that was QA/QCed were recorded on the sample processing log sheet. The vials containing the benthic macroinvertebrates were sent to RMC Environmental Services for taxonomic identification.

4.4.2.2 <u>Bear Head Creek</u>

This section discusses collection of the benthic macroinvertebrate samples in Bear Head Creek including the station location and sampling procedures.

Station Locations

Benthic macroinvertebrates were collected from three stations in Bear Head Creek. One station was located upstream of OU No. 2 (6-BH2A), one station was located adjacent to OU No. 2 (6-BH4A), and two stations were located downstream of OU No. 2 (6-BH6A) (see Figure 3-1).

Station 6-BH2A was located on Bear Head Creek approximately 1,000 feet upstream of Piney Green Road. This station was located further downstream than proposed in the SAP (Baker,

1992) because the proposed location could not be accessed due to vegetation overgrowth. Station 6-BH4A was located on Bear Head Creek between Piney Green Road and Holcomb Boulevard. Finally, Station 6-BH6A was located on Bear Head Creek, approximately 1,500-2,000 feet downstream of Holcomb Boulevard.

Sampling Procedures

Benthic macroinvertebrates were collected using the same procedures used in Wallace Creek. The only deviation from the procedures occurred at Stations 6-BH2A and 6-BH4A. The ponar samples collected at these stations were collected by standing in the creek and releasing the ponar, as opposed to deploying the ponar from the boat. The sample processing procedures remained the same for these samples.

A one-fourth aliquot of sample 6-BH6A was sorted because of its large sample volume. The number of individuals from that aliquot was multiplied by four to obtain the total number of individuals in the sample.

4.4.2.3 Pettiford Creek

This section discusses collection of the benthic macroinvertebrate samples in Pettiford Creek including the station location and sampling procedures.

Station Locations

The benthic macroinvertebrate station was located upstream on Pettiford Creek where the freshwater and saltwater interface was field measured. See Figure 4-1 for approximate sample location.

Sampling Procedures

Benthic macroinvertebrates were collected in Pettiford Creek using the ponar grab deployed from the boat. The same sample collection and sample processing procedures used in Wallace Creek were conducted at the Pettiford Creek station.

4.5 Site Specific Ecology

The following sections present the results of sampling the abiotic habitat and biotic communities from the ecological investigation.

4.5.1 Abiotic Habitat

Information describing the abiotic habitat at OU No. 2 was recorded in the field log books at each station and was later transferred to data sheets (see Appendix F). The data sheets also include representative photographs of the stations.

4.5.1.1 Fish Stations

Fish were sampled at four stations in the Wallace Creek and three stations in Bear Head Creek (see Figure 3-1). Fish also were sampled at one station in Pettiford Creek (see Figure 4-1).

Wallace Creek

The bank along Station 6-WC4A was lined with shrubs. There was some submerged aquatic vegetation (SAV) present. The water at this station was approximately 2.5 feet deep and the channel was 40 feet wide. The fish collection station consisted of an approximately 120 foot sampling reach which was fished using the boat electrofisher.

Station 6-WC6A was surrounded by deciduous trees and evergreens, with some deadfall. The water at this station was approximately 2.5 feet deep and the channel was 50 feet wide. There was a slight water flow from east to west.

Station 6-WC9A was surrounded by deciduous trees and evergreens, with some deadfall. The water at this station was approximately 12 feet deep and the channel was approximately 75 feet wide. There were no pools or riffles at this station. The water velocity was negligible due to tides.

Station 6-WC11 was surrounded by deciduous trees and evergreens, with some deadfall. The water at this station was approximately six feet deep and the channel was approximately 250 feet wide. There were no pools or riffles at this station. The water velocity was negligible due to tides.

Bear Head Creek

The fish collection station at 6-BH2A consisted of an approximately 120 foot sampling reach that was fished using the backpack electrofisher. The bank was lined with hardwood trees and dense vines. No SAV were present at this station. The water at this station was less than six inches deep and the channel was five feet wide.

The fish collection station at 6-BH4A consisted of an approximately 150 foot sampling reach that was fished using the backpack electrofisher. The bank was lined with deciduous trees. The water at this station was less than six inches deep and the channel was 12 feet wide.

The bank along Station 6-BH6A was lined primarily with deciduous trees and some pines and there was a zone of dead trees and bushes. Some SAVs were was present at this station. The water at this station was approximately 12 feet deep and the channel was approximately 75 feet wide.

Pettiford Creek

The bank along Station PC was lined primarily with conifers, hardwood trees, shrubs and Spanish moss. Some SAV were present at this station. The water at this station was approximately five feet deep and the channel was approximately 15 feet wide.

4.5.1.2 Benthic Macroinvertebrate Stations

Benthic macroinvertebrates were collected from four stations in the Wallace Creek and three stations in Bear Head Creek (see Figure 3-1). Benthic macroinvertebrates also were collected from one station in Pettiford Creek (see Figure 4-1). The following sections discuss the sediment type at each station. The abiotic habitat and biotic communities are discussed in the previous sections of this report.

Wallace Creek

Between 32 to 72 ounces of sediments were collected for the replicates at Station 6-WC3A. Approximately eight ounces of sediments were collected for the replicates at Station 6-WC6A. The sediments did not have a discernable odor. They were silty/sandy with approximately five percent woody debris.

At Station 6-WC9A, approximately eight ounces of sediments were collected in each replicate. The sediment had a strong anaerobic odor and was approximately ninety-five percent silt, with five percent detritus. A salt wedge was recorded at this station as discussed below in Section 4.5.1.

At Station 6-WC11A, approximately eight to sixteen ounces of sediments were collected in the replicates. The sediments had a slight anaerobic odor and were a very silty dark brown organic muck. A salt wedge was recorded at this station.

Bear Head Creek

Between 16 to 48 ounces of sediments were collected for the replicates at Station 6-BH2A. There was no odor to the sediments that were sandy with leaf and twig debris.

Approximately eight ounces of sediments were collected for the replicates at Station 6-BH4A. There was no odor in the sediments that were very silty/sandy.

Between 48 and 88 ounces of sediments were collected for the replicates at Station 6-BH6A. There was a slight anaerobic odor in the sediments that were approximately 60 percent silt and 40 percent organic debris.

Pettiford Creek

Approximately eight ounces of sediments were collected for the replicates at Station PC-BN. There was no odor in the sediments that were hard with approximately 50 percent silt/sand and 50 percent organic debris.

4.5.1.3 Water Quality

Table 4-3 summarizes the field water quality measurements collected at the biological stations. Water quality measurements were collected from the surface and bottom of the creek at representative stations.

A salt wedge was observed at Stations 6-WC9A and 6-WC11A with the salinity at the surface being 0.5 ppt, while the salinity at the bottom was 6 ppt and 7.5 ppt, respectively. The conductivity ranged from 900 to 1,500 micromhos/cm at the surface to 10,900 to 11,500 microhms/cm at the bottom. The dissolved oxygen also followed a similar trend at these stations being 5.1 mg/l and 4.45 mg/l at the surface and 0.13 mg/l and 0.15 mg/l at the bottom, respectively. Heavy rains occurred on the day previous to the sampling at Station 6-WC11A.

The salinity at the remaining stations was non-detectable and the conductivity ranged from 20 to 145 micromhos/cm. The dissolved oxygen at these stations ranged from 3.0 to 6.45 at the bottom and from 5.0 to 5.85 at the surface, The pH ranged from 5.5 to 6.4 S.U. at these stations, while the temperature ranged from 22 to 26 degrees C.

At Pettiford Creek, the conductivity was 270 microhoms/cm, the dissolved oxygen ranged from 3.1 to 7.95 mg/l, and the temperature was 22 degrees C. The salinity at several of the potential sampling stations in Pettiford Creek ranged from non-detectable to 1.5 ppt.

4.5.2 Biotic Community

The following sections present the results of the fish, crab and benthic macroinvertebrate sampling.

4.5.2.1 Fish

Population Statistics

A list of the fish species, the stations where they were collected, and a characterization of each species is presented in Table 4-4. The characterization includes the feeding guild, United States average length of the fish, the type of water where the species is typically found, the migration habits of the species, and the spawning periods and tolerance levels of the species.

Wallace Creek

Fish were sampled with gill nets and/or a boat-mounted electrofishier at four stations in Wallace Creek between August 28, 1992 and September 9, 1992. However, fish collection was unsuccessful at Station 6-WC9A. The fish captured in the gill nets were processed either for population statistics or tissue analysis. The quantity of fish per species, and the average, minimum and maximum length and weight of the fish per station collected from Wallace Creek are reported in Table 4-5.

Eleven fish species were collected in Wallace Creek. The percentage abundance of these species is listed below.

Common Name	Latin Name	Percent
Shiner sp.	Notropis sp.	36
Eastern mosquito	Gambusia affinis	20
Pumpkinseed	Lepomis gibbosus	17
American eel	Anguilla rostata	8
Bluespoted sunfish	Enneacanthus gloriosus	8
Spot	Leiostomas xanthurus	5
Pirate perch	Aphredoderus sayanus	2
Warmouth	Lepomis gulosus	2
Sunfish sp. varies		2 for these three species
Largemouth bass	Micropterus salmoides	
Summer flounder	Paralichthys dentatus	

The abundance of fish was highest at Station 6-WC6A. Of the eleven species that were evaluated at Wallace Creek, the average length of ten of the species was less than approximately one-half of the documented average length of that species. Spot and sunfish could not be compared to the average United States length because either the species could not be determined or the value was not available. Figures 4-2 through 4-6 graphically display the size class distribution for the predominant species in Wallace Creek (American eel, shiner, eastern mosquito, pumkinseed, spot). The distributions are skewed to the left, indicating the species populations are dominated by juveniles. The comparison of species length in Wallace Creek compared to the United States average also supports this theory.

Stations 6-WC4A and 6-WC11A demonstrated low species diversity; however, 6-WC6A had an above average species diversity value. The species diversities can be found in Table 4-6.

As the fish were being processed for population statistics or tissue analysis, they were visually inspected for any anomalies such as fin rot and skeletal abnormalities. The species in Wallace Creek did not exhibit any physical anomalies.

Bear Head Creek

Fish were collected either with gill nets and/or a backpack electrofisher at three stations in Bear Head Creek between August 27, 1992 and September 9, 1992. However, fish collection was unsuccessful at Stations 6-BH2A, and 6-BH4A. The fish captured were processed either for population statistics or tissue analysis. The quantity of fish per species, and the average, minimum and maximum length and weight of the fish per station collected from Bear Head Creek are reported in Table 4-5.

Six fish species were collected in Bear Head Creek. The percentage abundance of these species is listed below.

Common Name	Latin Name	Percent
Eastern mosquito	Gambusia affinis	82
Spot	Leiostomas xanthurus	11
Pumpkinseed	Lepomis gibbosus	4
Bluespoted sunfish	Enneacanthus gloriosus	3.0 for these
Bay anchovy	Anchoa mitchili	three species
Killifish	Fundulus sp.	

The sampling efforts at Stations 6-BH2A (upstream station) and 6-BH4A (adjacent station) were not successful. Station 6-BH6A was the only station that fish were successfully collected. Of the six species that were evaluated at Bear Head Creek, the average length of three of the species was less than approximately one-half of the documented average length of that species. Two of the species (bluespoted sunfish and killifish) were within the upper half of the average U.S. range. Spot could not be compared to the average United States length because a length was not available. Figures 4-2 through 4-6 graphically display the size class distribution for the predominant species in Bear Head Creek. A size class distribution pattern could not be distinguished due to inadequate numbers of fish. Station 6-BH6A had a species diversity of 0.29 (see Table 4-6).

As the fish were being processed for population statistics or tissue analysis, they were visually inspected for any anomalies such as fin rot and skeletal abnormalities. The species in Bear Head Creek did not exhibit any physical anomalies.

Pettiford Creek

Fish were collected with a boat-mounted electrofisher at one station in Pettiford Creek on September 15, 1992. The fish captured by electrofishing were processed for population statistics. The quantity of fish per species, and the average, minimum and maximum length and weight of the fish per station collected from Pettiford Creek are reported in Table 4-5.

Three fish species were collected in Pettiford Creek. The percentage abundance of these species is listed below.

Common Name	Latin Name	Percent
Pumpkinseed	Lepomis gibbosus	50
Shiner sp.	Notropis sp.	25
Striped mullet	Mugil cephalus	25

Of the three species that were collected in Pettiford Creek, the average length of one of the species (shiner) was less than approximately one-half of the documented average length of that species. One of the species (pumpkinseed) was within the upper half of the average United States range. The striped mullet that was captured at Station PC was above the national average for that particular species. Figures 4-2 through 4-6 graphically display the size class distribution for the predominant species in Bear Head Creek. Only a few fish were captured in the Pettiford Creek, therefore, an evaluation regarding the size class distribution could not be determined.

Station PC demonstrated a moderate species diversity. The species diversity value can be found in Table 4-6.

As the fish were being processed for population analysis, they were visually inspected for any anomalies such as fin rot and skeletal abnormalities. The species in Pettiford Creek did not exhibit any physical anomalies.

Similarity Index

The species community similarity between the stations were calculated for fish collected in Wallace Creek, Bear Head Creek and Pettiford Creek (see Table 4-7). The S_J between the Wallace Creek stations ranged from 0 (between several stations) and 0.30 (between Station 6-WC4A and Station 6-WC6A), while the S_S ranged from 0 (between several stations) and 0.46 (between Station 6-WC4A and Station 6-WC6A).

The S_J between Pettiford Creek and Wallace Creek ranged from 0 (between Station 6-WC9A and PC) and 0.25 (between Station 6-WC11A and PC), while the S_S ranged from 0 (between Station 6-WC9A and PC) and 0.33 (between Station 6-WC6A and PC). The S_J between Pettiford Creek and Bear Head Creek (Station 6-BH6A) was 0.13, while the Ss between these stations was 0.22. The S_J between Wallace Creek and Bear Head Creek ranged from 0 (between several stations) and 0.53 (between Station 6-WC6A and Station 6-BH6A), while the S_S ranged from 0 (between several stations) and 0.33 (between Station 6-WC6A and Station 6-BH6A).

The results of these similarity index calculations showed that the stations were not very similar with regards to species composition. The highest similarity (0.5 to 0.6) did not indicate very similar species compositions.

Fish and Crab Tissue Analysis

Fish and crab samples collected in Wallace Creek and Bear Head Creek were analyzed for tissue contaminant concentrations. The fish were analyzed either for fillet or whole body burden and the crabs were analyzed for whole body burden. Table 4-2 shows the number and weight of the fish and crabs sent to Chemic for chemical analysis.

Wallace Creek

Four species (warmouth, pumpkinseed, long-nosed gar, and striped mullet) from station 6-WC6A were submitted for tissue analyses. Two species (summer flounder and blue crab) from station 6-WC11A were submitted for tissue analyses.

Table 4-8 summarizes the results of the TCL organics detected in the fish and crab tissues at OU No. 2. Appendix G contains the data and frequency tables. The maximum concentration of the positively detected TCL organics in the fish or crab tissue, and the sample of the maximum detection, are as follows:

Constituent	Sample Number	Concentration (ug/kg)
Acetone	6-WC11-FL1	280J
Benzene	6-WC11-FL1	5J
2-Butanone	6-WC11-BC	15
	6-WC6-PS	15J
4,4'-DDE	6-WC6-WM1	180
4,4'-DDD	6-WC11-FL1	8.8J
4,4'-DDT	6-WC6-PS	4.9J
Dimethyl phthalate	6-WC11-FL1	86
Endrin	6-WC6-PS	5.4J
Endosulfan II	6-WC6-PS	12J
Methylene Chloride	6-WC11-BC	32
PCB-1260	6-WC06-SMF	1,000J
Phenol	6-WC11-BC	2,500
Toluene	6-WC6-PS	3J
Trichloroethene	6-WC11-BC	15
	6-WC6-SMF	5J

Table 4-9 summarizes the results of the TAL inorganics detected in the fish and crab tissues at OU No. 2. Appendix G contains the data and frequency tables for these chemicals. The maximum concentration of the positively detected TAL inorganics in the fish or crab tissue, and the sample of the maximum detection are as follows:

Constituent	Sample Number	Concentration (mg/kg)
Beryllium	6-WC11-BC	0.005B
Calcium	6-WC11-BC	29,100J
Magnesium	6-WC11-BC	1,410
Potassium	6-WC06-SMF	3,450
Selenium	6-WC11-BC	0.38
Silver	6-WC11-BC	0.18
Sodium	6-WC11-BC	2,170
Zinc	6-WC6-PS	27.3

Bear Head Creek

Station 6-BH6A was the only station on Bear Head Creek that produced enough fish for tissue analyses. One species (pumpkinseed) from station 6-BH6A-FS was submitted for whole-body tissue analyses.

Table 4-8 summarizes the results of the organic chemicals detected in the fish and crab tissues at Sites 6 and 9. Appendix G contains the data and frequency tables for these chemicals. The maximum concentration of the positively detected TCL organics in the Pumpkinseed tissue are as follows:

Constituent	Concentration (mg/kg)
Acetone	350J
Alpha chlordane	5.4J
Benzene	6J
2-Butanone	26J
4,4'-DDE	290
4,4'-DDD	72J
4,4'-DDT	9.7J
Endrin	15J
Methoxychlor	21
PCB-1260	490J
Toluene	8J

Table 4-9 summarizes the results of the TAL inorganics detected in the fish and crab tissues at OU No. 2. Appendix G contains the data and frequency tables for these chemicals. The maximum concentration of the positively detected TAL inorganics in the Pumpkinseed tissue are as follows:

Constituent	Concentration (mg/kg)
Cadmium	0.06B
Calcium	19,500J
Magnesium	453
Potassium	2,720
Selenium	0.27J
Sodium	1,370J
Zinc	23.4

Pettiford Creek

The fish collected in Pettiford Creek were not submitted for tissue analysis.

4.5.2.2 Benthic Macroinvertebrate

Table 4-10 contains a systematic listing of the all the benthic macroinvertebrates collected in Wallace Creek, Bear Head Creek, and Pettiford Creek. Individuals were keyed out to their specific genus or species classifications, where possible. However, this level of precision was not achievable in all cases due to damaged or juvenile organisms. The following sections discuss the results of the benthic macroinvertebrate sampling in each creek.

Wallace Creek

Three phyla were represented in the collections from Wallace Creek: Arthropoda, Annelida and Nematoda. Nineteen taxa of benthic macroinvertebrates from these three phyla were collected from Wallace Creek. Of these 19 taxa, 90.5 percent of the species were arthropods, 8.5 percent of the species were annelids and one percent of the species were nematodes. The most abundant species in Wallace Creek was the chironomid Tribelos jucundum with 182 individuals (47 percent), followed by the amphipod Gammarus fusciatus (29 percent) with 113 individuals.

Biological data of each replicate are given in Appendix H. Table 4-11 summarizes the raw data by combining the replicates at each station. Overall species richness (i.e., number of species) and faunal densities (i.e., individuals per square meter) are shown on these tables. The percentages of each species at each station is provided in Table 4-12.

The number of species ranged from zero at Station 6-WC9A to 12 at Station 6-WC3A. The number of individuals ranged from zero at Station 6-WC9A to 200 at Station 6-WC3A. The species density values ranged from zero individuals/m^2 at Station 6-WC9A to 1,275 individuals/m^2 at Station 6-WC3A. Species diversity ranged from zero at Station 6-WC9A to 0.510 at Station 6-WC3A.

Macroinvertebrate Biotic Index values ranged from 6.46 at Station 6-WC3A to 9.80 at Station 6-WC11A (an MBI could not be calculated for Station 6-WC9A). Table 4-13 lists the BI and U.S. EPA tolerance to organic wastes and sensitivity to metals for the benthic macroinvertebrates collected in Wallace Creek, Bear Head Creek, and Pettiford Creek. See Table 4-14 for a summary of all the above statistics.

Figures 4-7 and 4-8 graphically display the numbers of taxa from the sampling stations at each replicate, and Figures 4-9 and 4-10 graphically display the total numbers of individuals at each sampling stations. Figures 4-11 and 4-12 graphically display the faunal densities from the sampling stations, and Figures 4-13 and 4-14 graphically display the species diversity values from the sampling stations. Figures 4-15 and 4-16 graphically display the MBI values from the sampling stations.

Bear Head Creek

Four phyla were represented in the collections from Bear Head Creek: Arthropoda, Annelida Platyhelminthes, and Mollusca. Thirty-nine taxa of benthic macroinvertebrates from these four phyla were collected from Bear Head Creek. Of these thirty-nine taxa, 20 percent of the species were arthropods, 44 percent of the species were annelids and 0.4 percent of the species were platyhelminthes and 35.6 percent were molluscs. The most abundant species in Bear Head Creek was the bivalve, Pisidium casertanum with 345 individuals (34 percent), followed by the oligochaete, Isocheatides curvisetosus with 261 individuals (26 percent).

Biological data of each replicate are given in Appendix H. Table 4-11 summarizes the raw data by combining the replicates at each station. Overall species richness (i.e., number of species) and faunal densities (i.e., individuals per square meter) are shown on these tables. The percentages of each species at each station is provided in Table 4-12.

The number of species ranged from one at Station 6-BH6A to 33 at Station 6-BH2A. The number of individuals ranged from four at Station 6-BH6A to 582 at Station 6-BH2A. The species density values ranged from 25 individuals/m^2 at Station 6-BH6A to 3,709 individuals/m^2 at Station 6-BH2A. Species diversity ranged from zero at Station 6-BH6A to 0.932 at Station 6-BH2A. Macroinvertebrate Biotic Index values ranged from 7.51 at Station 6-BH2A to 7.06 at Station 6-BH4A. See Table 4-14 for a summary of all the above statistics.

Figures 4-7 and 4-8 graphically display the numbers of species from the sampling stations at each replicate, and Figures 4-9 and 4-10 graphically display the total numbers of individuals at each sampling stations. Figures 4-11 and 4-12 graphically display the faunal densities from the sampling stations, and Figures 4-13 and 4-14 graphically display the species diversity values from the sampling stations. Figures 4-15 and 4-16 graphically display the MBI values from the sampling stations.

Pettiford Creek

Two phyla were represented in the collections from Pettiford Creek: Arthropoda and Annelida. Four taxa of benthic macroinvertebrates from these two phyla were collected from Pettiford Creek. Of these four taxa, 30 percent of the species were arthropods and 70 percent of the species were annelids. The most abundant species in Pettiford Creek was the oligochaete, Limnodrilus hoffmeisteri with 23 individuals (70 percent), followed by the chironomid Tribelos jucundum with 7 individuals (21 percent).

Biological data of each replicate are given in Appendix H. Table 4-11 summarizes the raw data by combining the replicates at each station. Overall species richness (i.e., number of species) and faunal densities (i.e., individuals per square meter) are shown on these tables. The percentages of each species at each station is provided in Table 4-12.

Four species were collected in Pettiford creek, consisting of 33 individuals. The species density was 210 individuals/m^2 and the species diversity was 0.372. The MBI value was 8.84. See Table 4-14 for a summary of all the above statistics.

Figures 4-7 and 4-8 graphically display the numbers of species from the sampling stations at each replicate, and Figures 4-9 and 4-10 graphically display the total numbers of individuals at each sampling stations. Figures 4-11 and 4-12 graphically display the faunal densities from the sampling stations, and Figures 4-13 and 4-14 graphically display the species diversity values from the sampling stations. Figures 4-15 and 4-16 graphically display the MBI values from the sampling stations.

Similarity Index

The species community similarity between the stations were calculated for benthic macroinvertebrates collected in Wallace Creek, Bear Head Creek and Pettiford Creek (see Table 4-15). The S_J between the Wallace Creek stations ranged from 0 (between several stations) and 0.143 (between Station 6-WC3A and Station 6-WC6A), while the S_S ranged from 0 (between several stations) and 0.250 (between Station 6-WC3A and Station 6-WC6A). The S_J between the Bear Head Creek stations ranged from 0 (between several stations) and 0.306 (between Station 6-BH2A and Station 6-BH4A), while the S_S ranged from 0 (between several stations) and 0.468 (between Station 6-BH2A and Station 6-BH4A).

The S_J between Pettiford Creek and Wallace Creek ranged from 0 (between Station 6-WC9A and PC) and 0.545 (between Station 6-WC6A and PC), while the S_S ranged from 0 (between Station 6-WC9A and PC) and 0.375 (between Station 6-WC6A and PC). The S_J between Pettiford Creek and Bear Head Creek ranged from 0 (between Station 6-BH6A and PC) and 0.211 (between Station 6-BH4A and PC), while the Ss ranged from 0 (between Station 6-BH6A and PC) and 0.118 (between Station 6-BH4A and PC). The S_J between Wallace Creek and Bear Head Creek ranged from 0 (between several stations) and 0.333 (between Station 6-WC11A and Station 6-BH6A), while the S_S ranged from 0 (between several stations) and 0.500 (between Station 6-WC11A and Station 6-BH6A).

The results of these similarity index calculations showed that the stations were not very similar with regards to species composition. This was evident both in comparison of stations within a creek and between a creek. The highest similarity (0.5 to 0.6) was seen in comparison of stations between creeks, but the index calculated did not indicate very similar species compositions.

4.5.2.3 Terrestrial Fauna

Terrestrial fauna were not collected during this ecological investigation. Therefore, population and community ecological endpoints for terrestrial fauna could not be quantitatively evaluated in this report. The risks to terrestrial fauna discussed in the "Regional Ecology" section of this report will be quantitatively evaluated in this report by comparing estimated daily intakes to terrestrial reference values in Section 7.0 Risk Characterization/Integration.

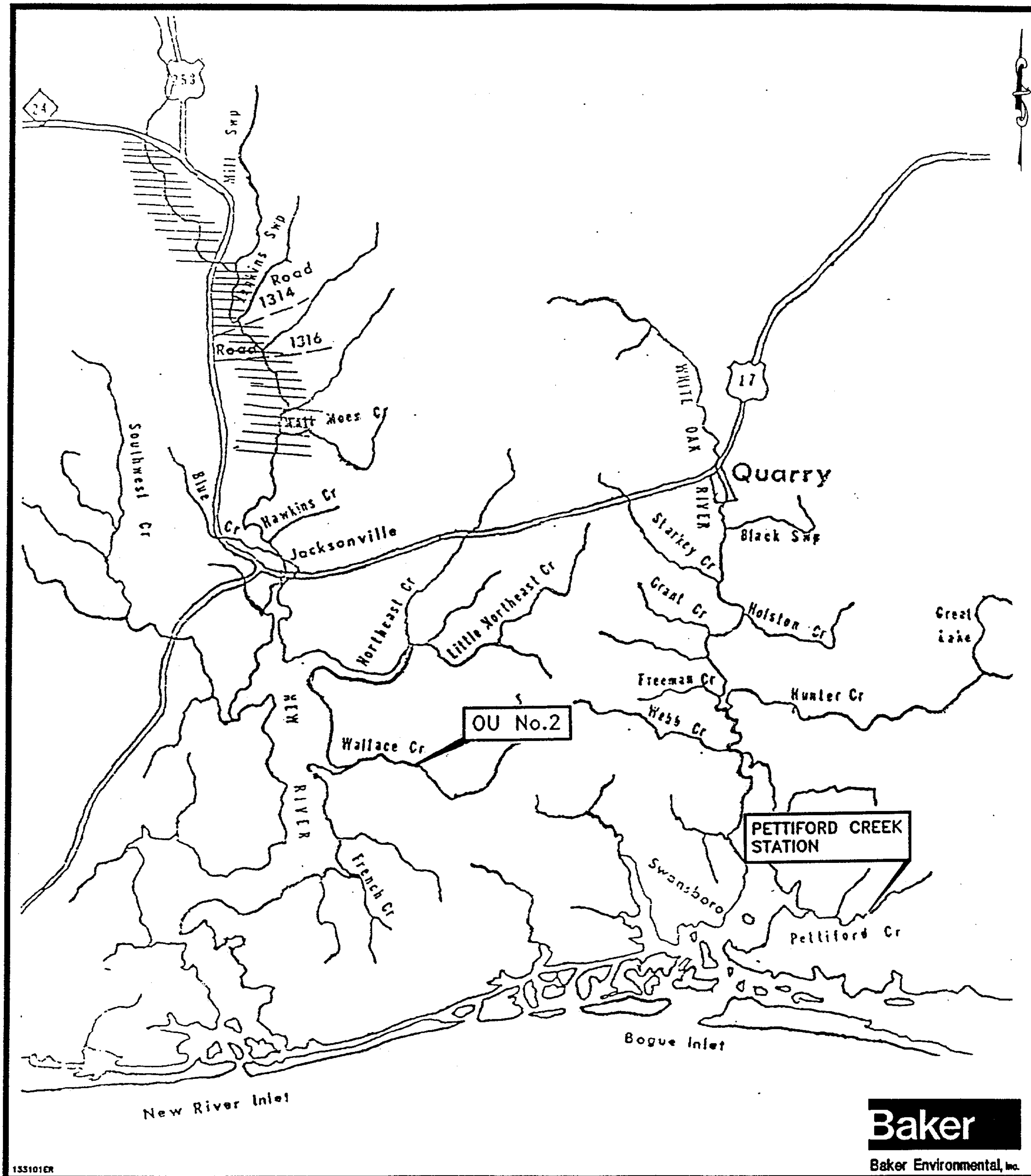


FIGURE 4-1
FISH AND BENTHIC MACROINVERTEBRATE
SAMPLING LOCATION IN PETTIFORD CREEK
REMEDIAL INVESTIGATION CTO-0133

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

SOURCE: N.C. DIVISION OF MARINE FISHERIES, REPORT AFC-9, NOV. 1975.

FIGURE 4-2
OPERABLE UNIT NO. 2
SIZE-CLASS DISTRIBUTION OF AMERICAN EEL IN BEAR HEAD CREEK AND WALLACE CREEK
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

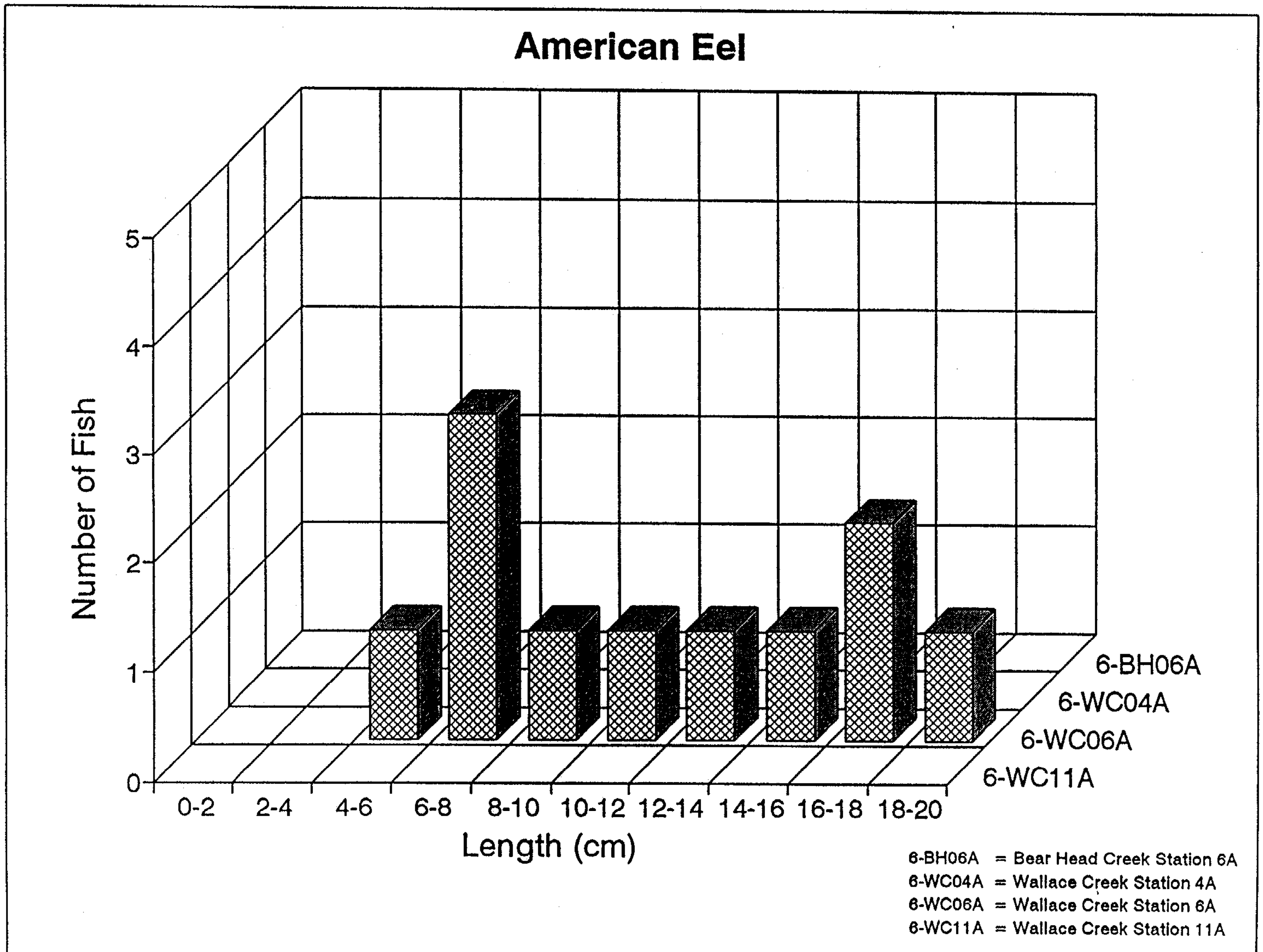


FIGURE 4-3
OPERABLE UNIT NO. 2
SIZE-CLASS DISTRIBUTION OF EASTERN MOSQUITO IN BEAR HEAD CREEK AND WALLACE CREEK
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

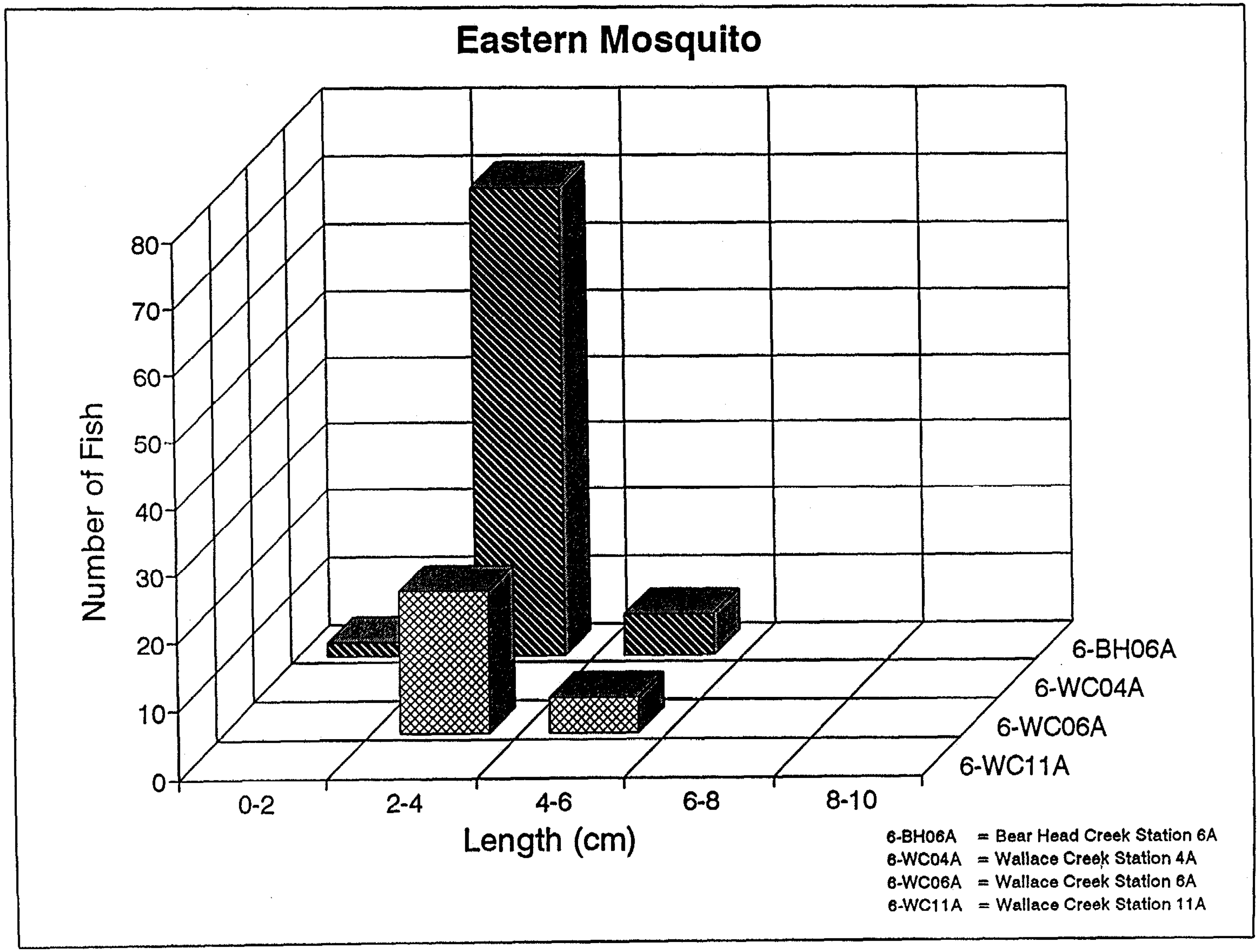


FIGURE 4-4
OPERABLE UNIT NO. 2
SIZE-CLASS DISTRIBUTION OF SHINER SP. IN BEAR HEAD CREEK AND WALLACE CREEK
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

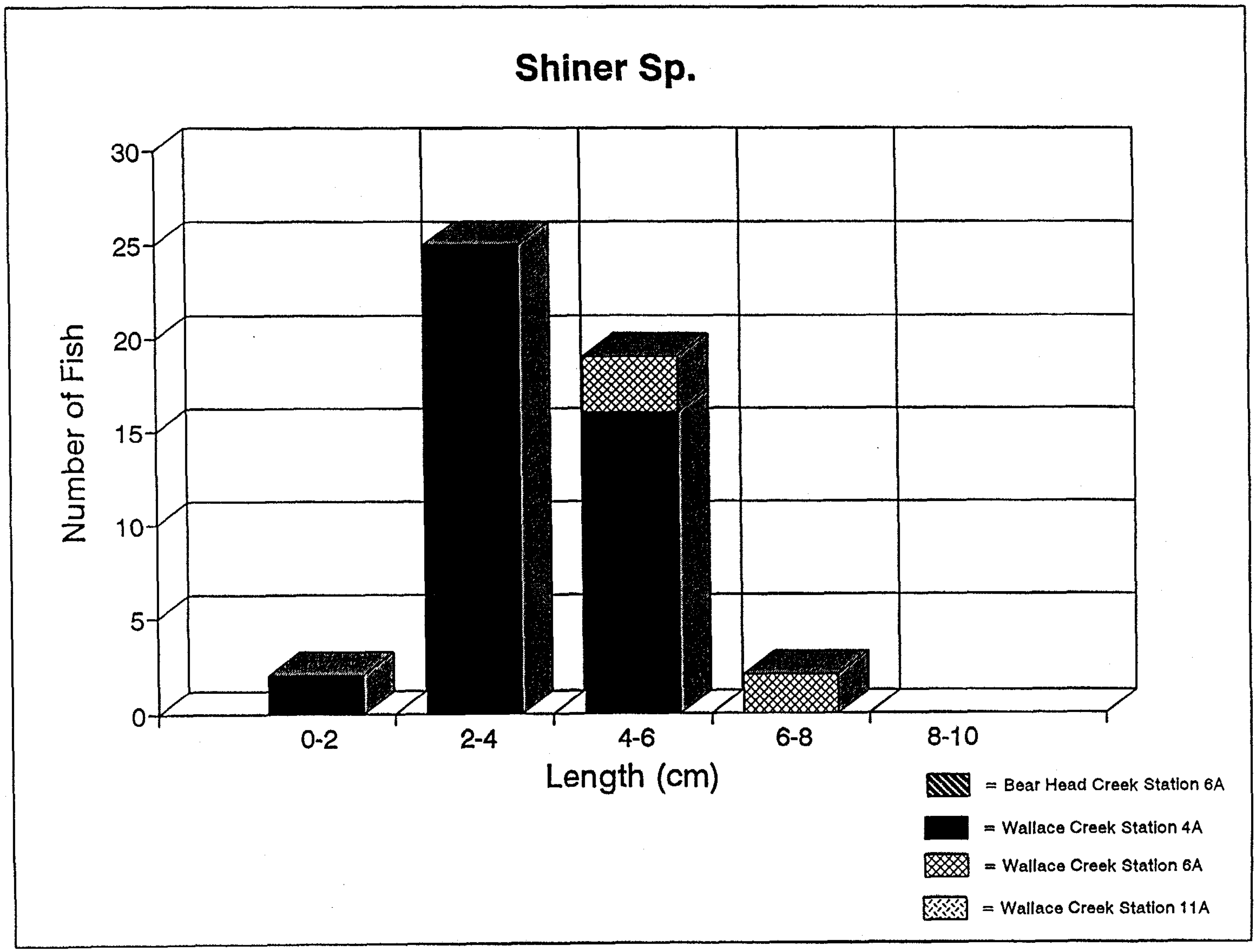


FIGURE 4-5
OPERABLE UNIT NO. 2
SIZE-CLASS DISTRIBUTION OF PUMPKINSEED IN BEAR HEAD CREEK AND WALLACE CREEK
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

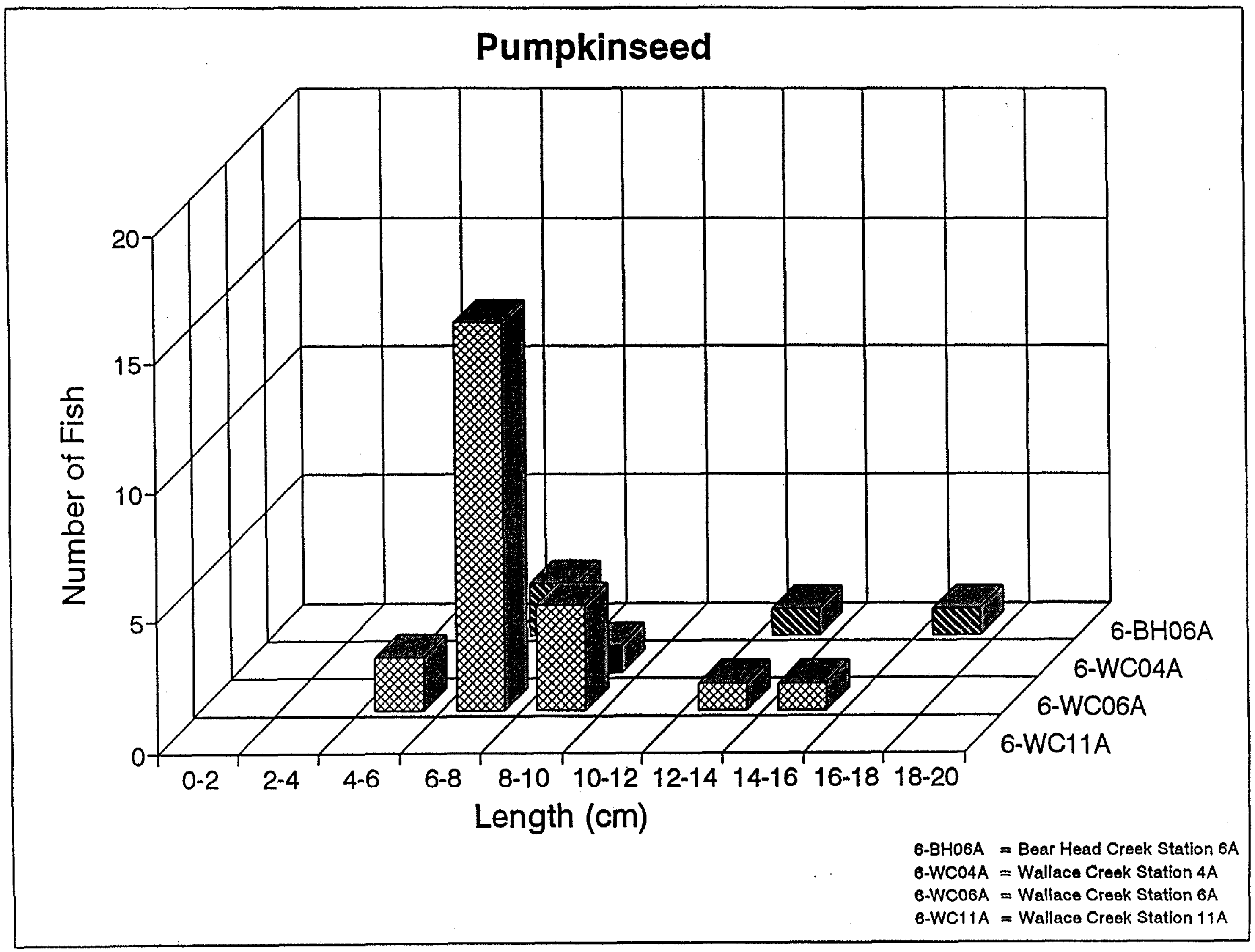
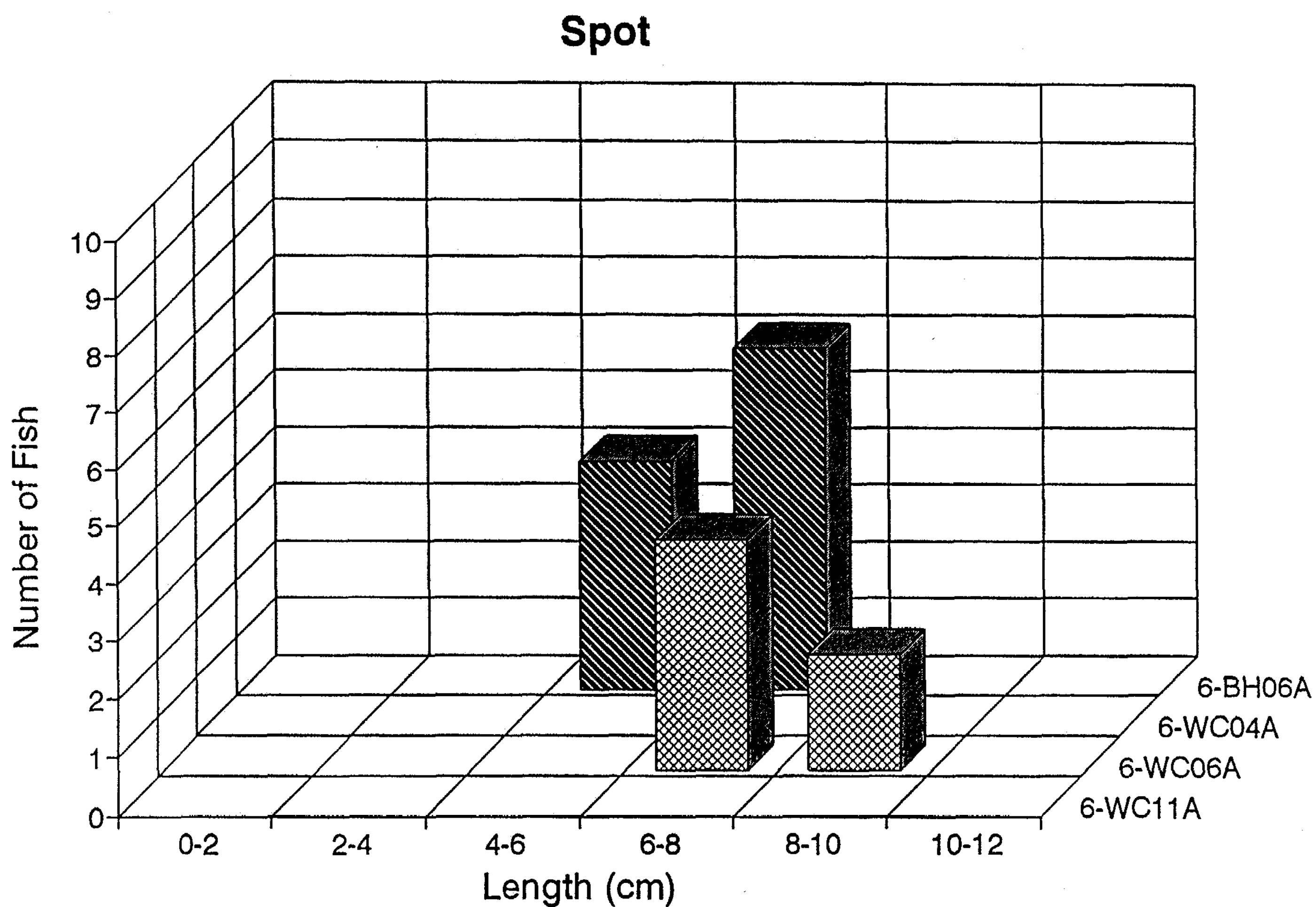
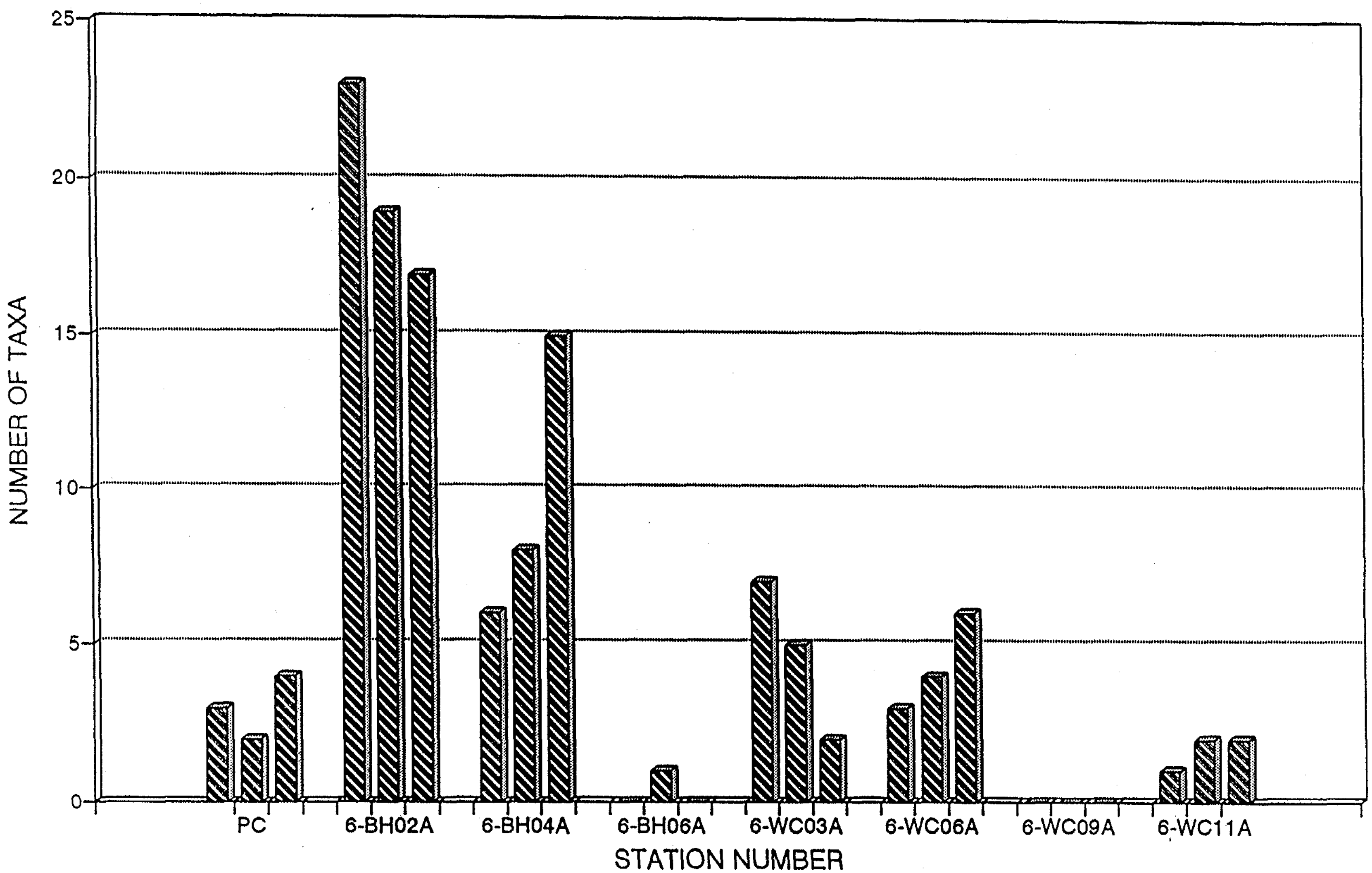


FIGURE 4-6
OPERABLE UNIT NO. 2
SIZE-CLASS DISTRIBUTION OF SPOT IN BEAR HEAD CREEK AND WALLACE CREEK
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



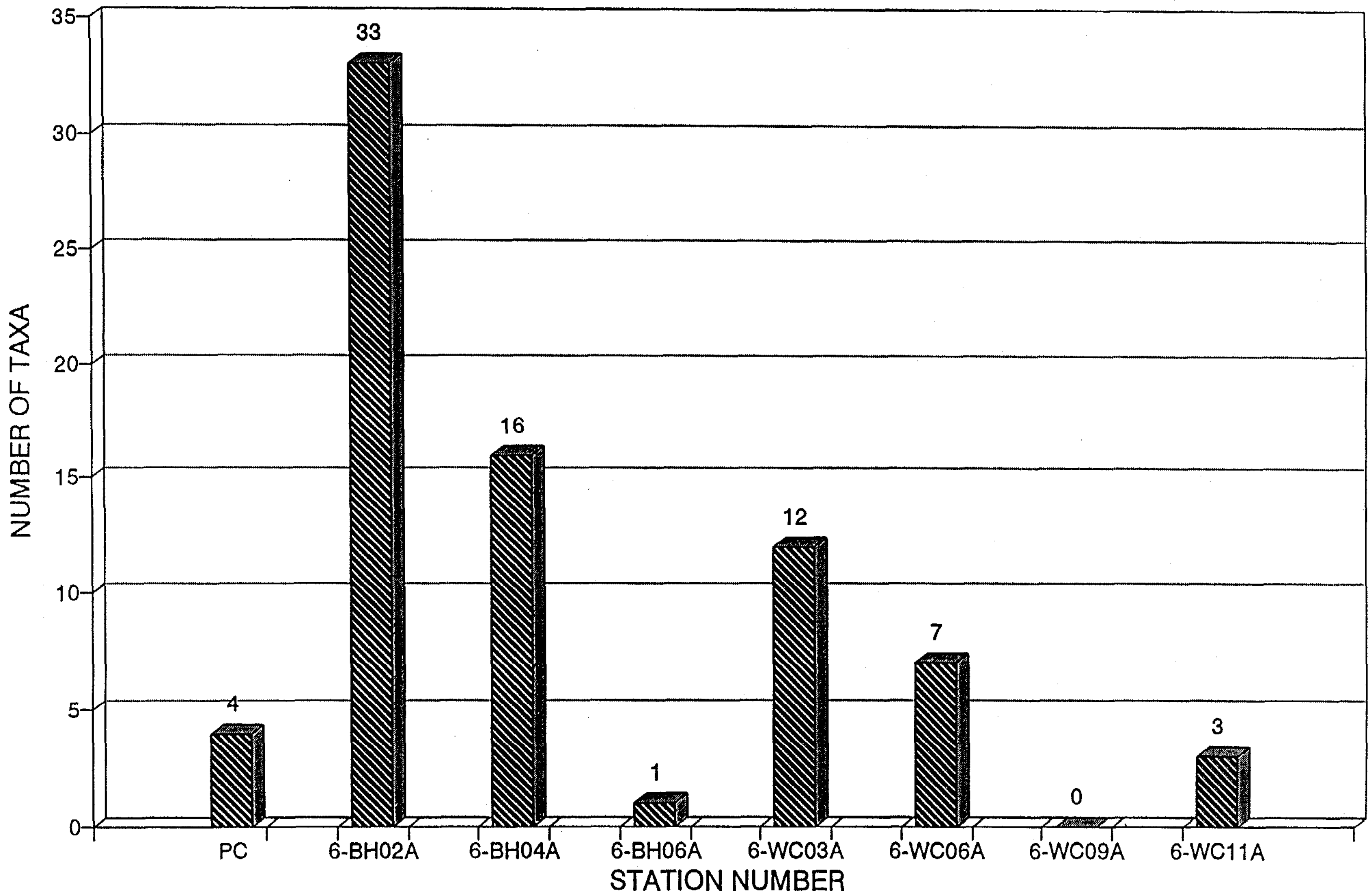
6-BH06A = Bear Head Creek Station 6A
6-WC04A = Wallace Creek Station 4A
6-WC06A = Wallace Creek Station 6A
6-WC11A = Wallace Creek Station 11A

FIGURE 4-7
OPERABLE UNIT NO. 2
NUMBER OF BENTHIC MACROINVERTEBRATE TAXA VS STATION REPLICATE DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



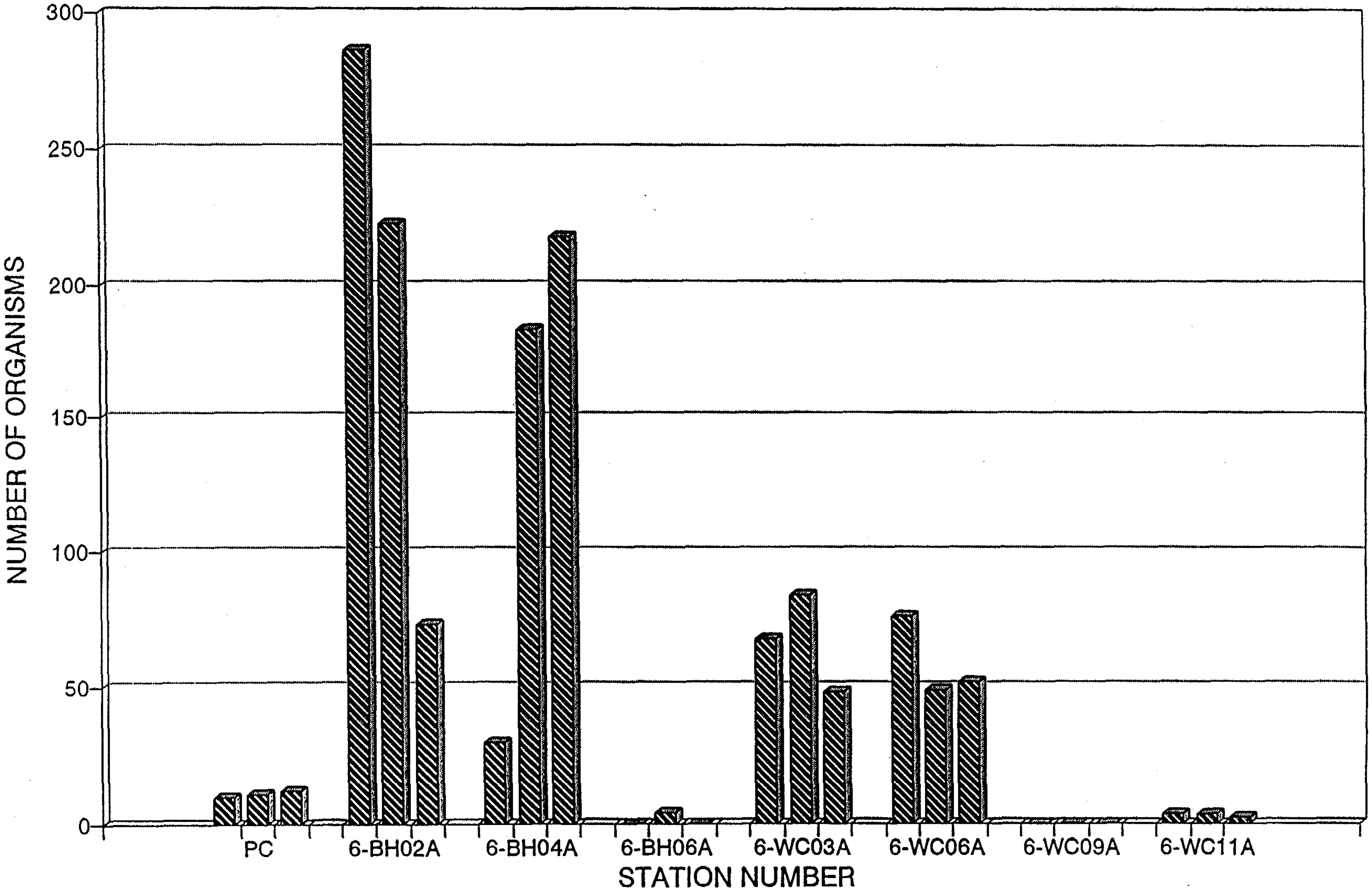
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-8
OPERABLE UNIT NO. 2
NUMBER OF BENTHIC MACROINVERTEBRATE TAXA VS STATION SUMMARY DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



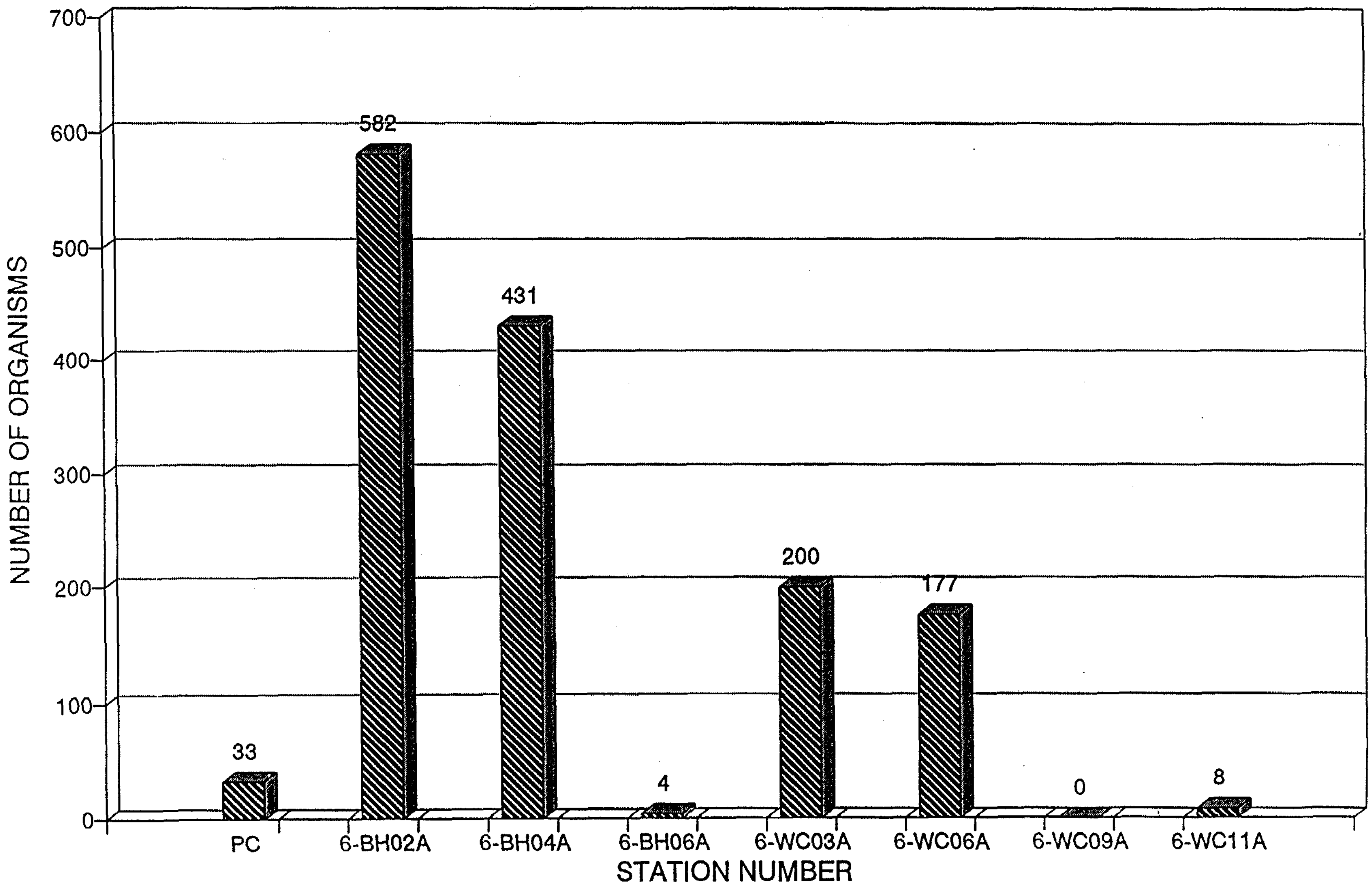
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-9
OPERABLE UNIT NO. 2
NUMBER OF BENTHIC MACROINVERTEBRATE INDIVIDUALS VS STATION REPLICATE DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



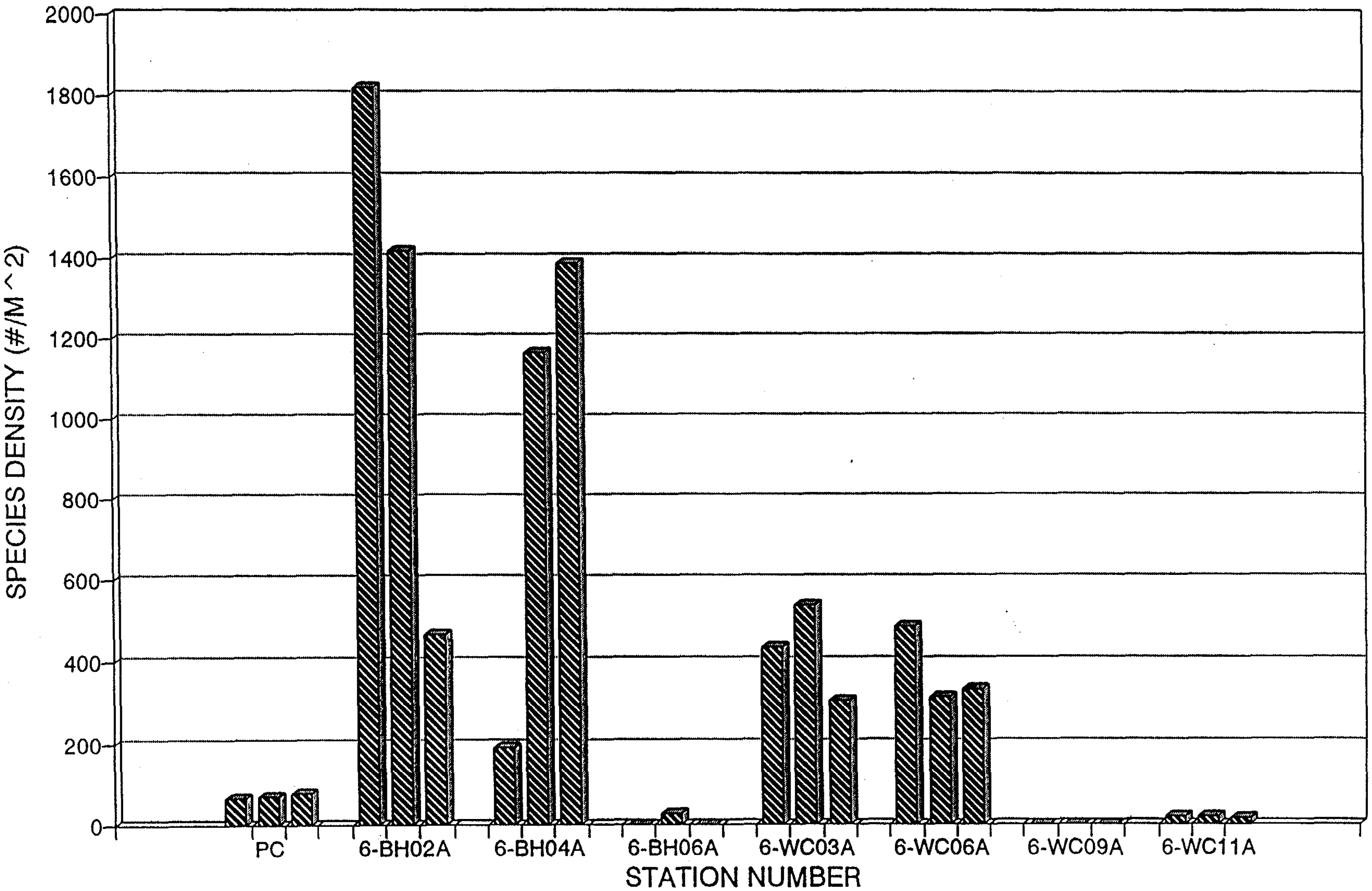
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-10
OPERABLE UNIT NO. 2
NUMBER OF BENTHIC MACROINVERTEBRATE INDIVIDUALS VS STATION SUMMARY DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



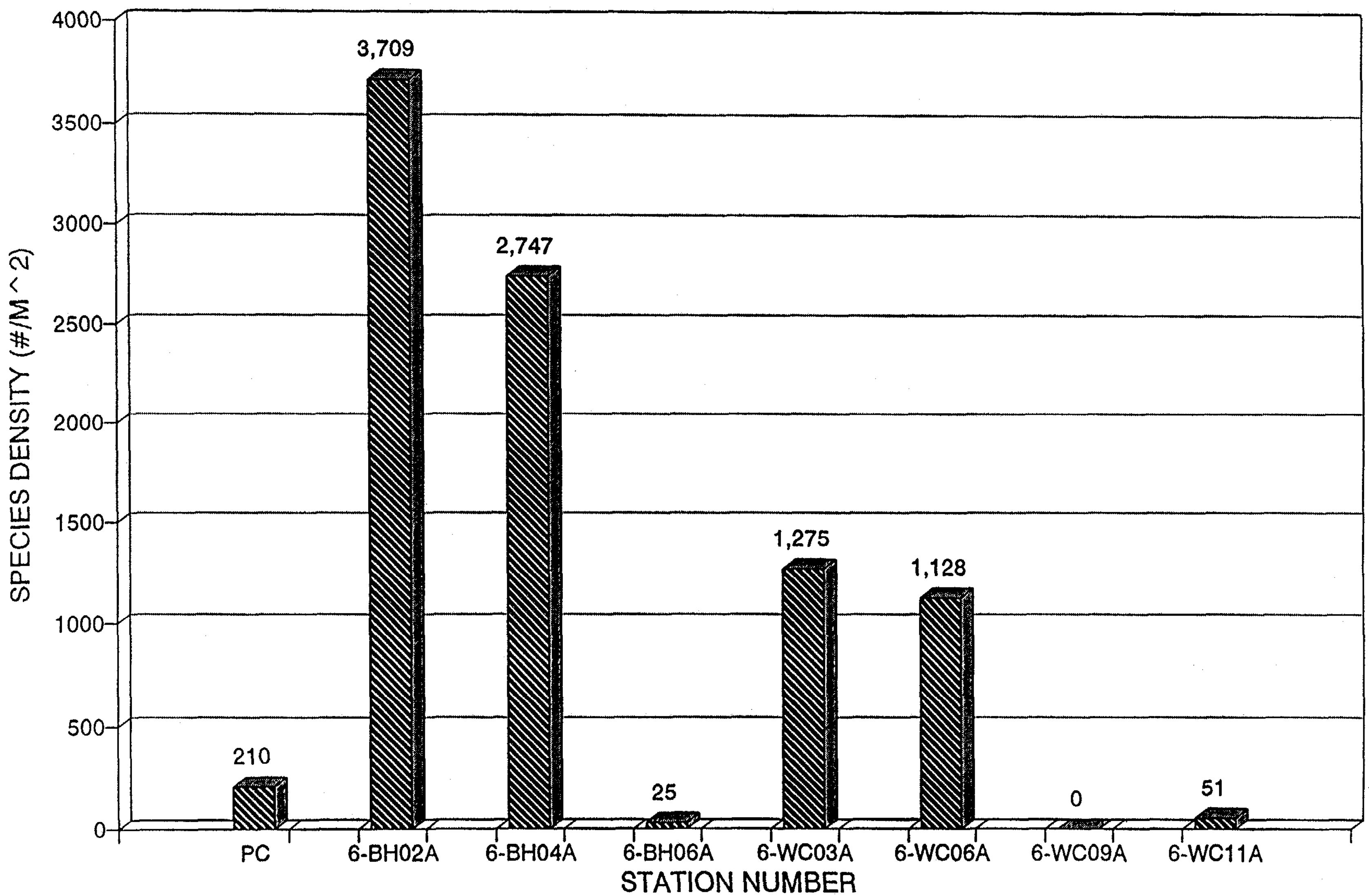
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-11
OPERABLE UNIT NO. 2
BENTHIC MACROINVERTEBRATE SPECIES DENSITY (#/M^2) VS STATION REPLICATE DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



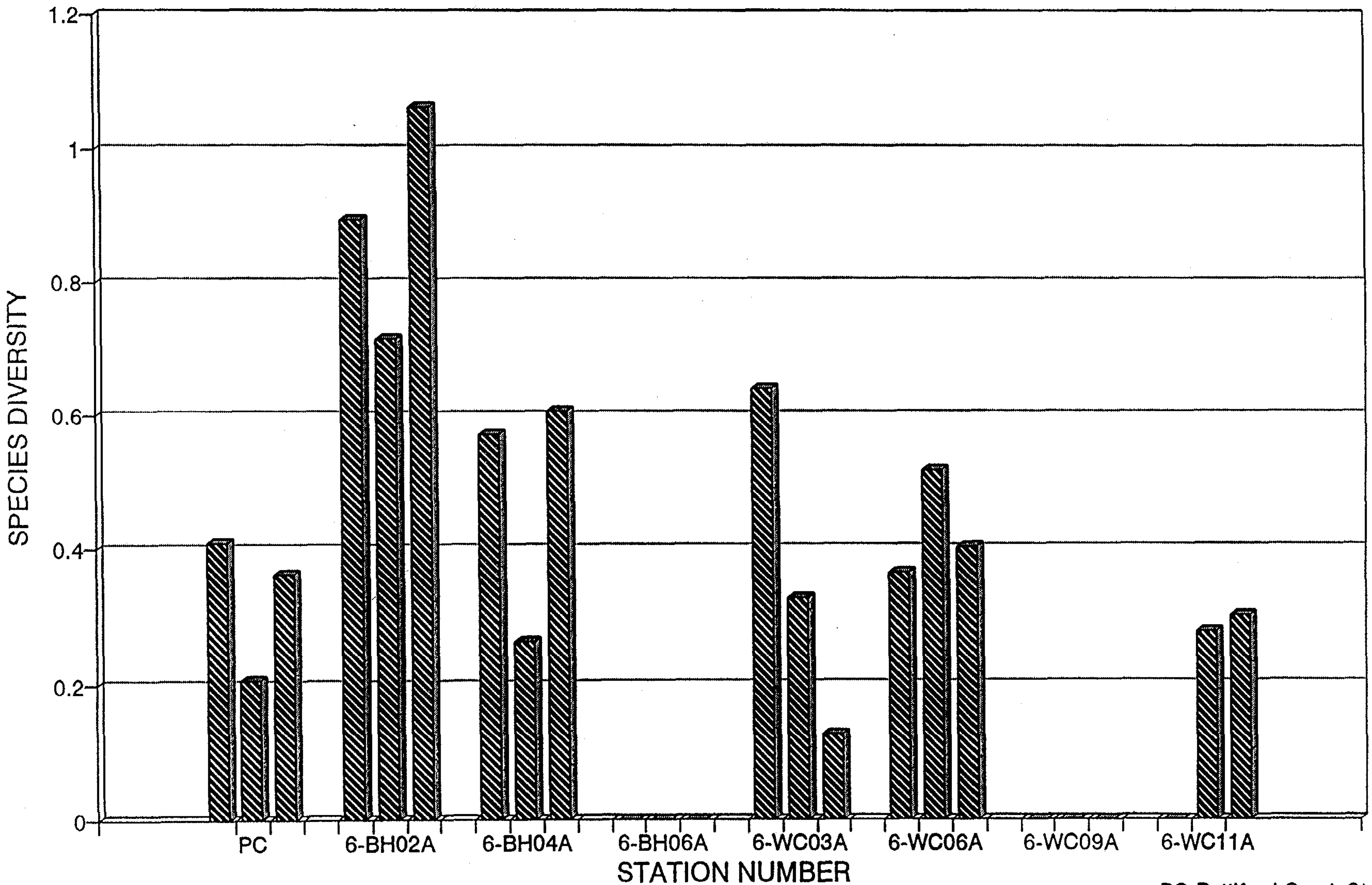
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-12
OPERABLE UNIT NO. 2
BENTHIC MACROINVERTEBRATE SPECIES DENSITY (#/M^2) VS STATION SUMMARY DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



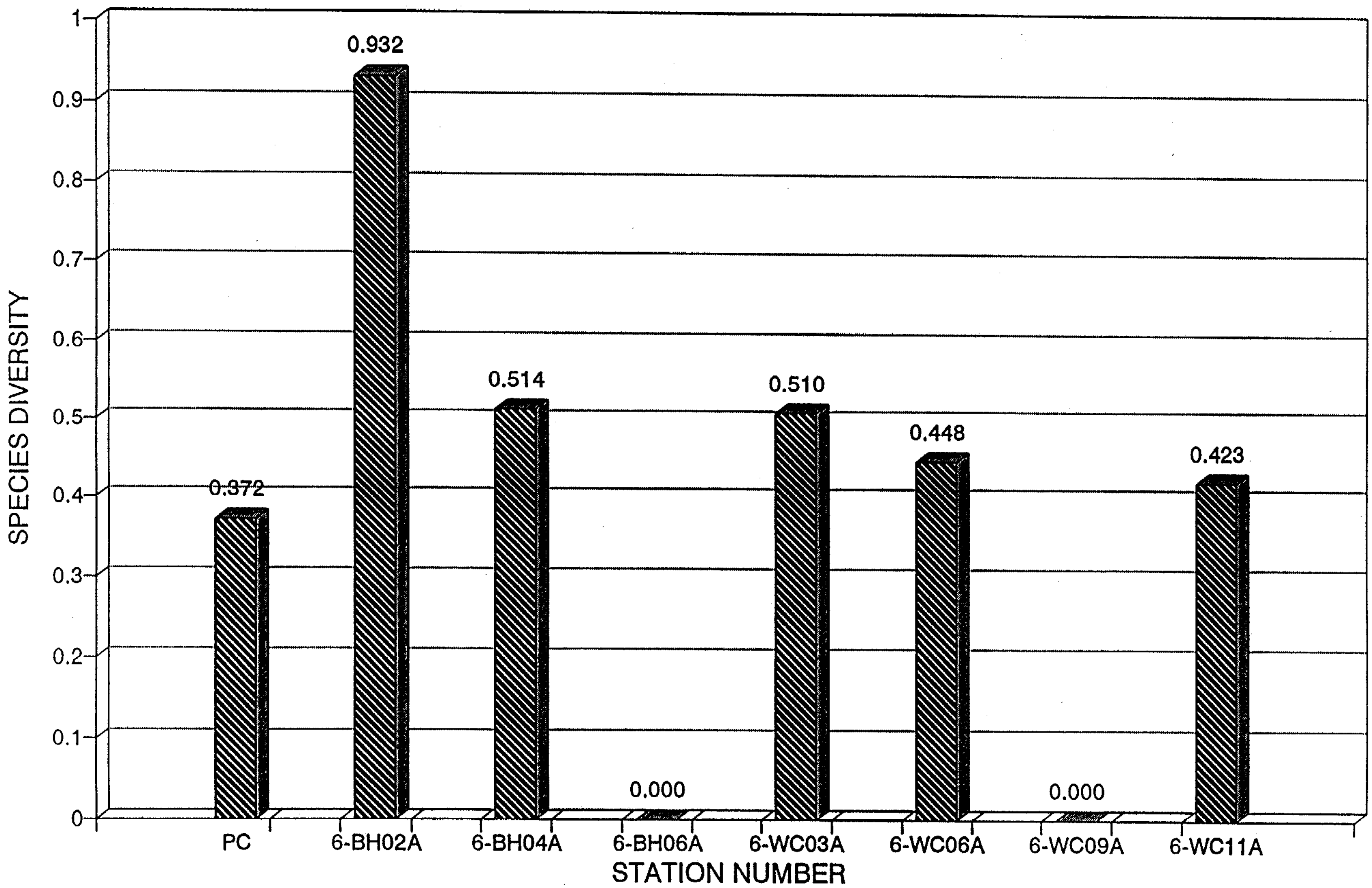
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-13
OPERABLE UNIT NO. 2
BENTHIC MACROINVERTEBRATE SPECIES DIVERSITY VS STATION REPLICATE DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



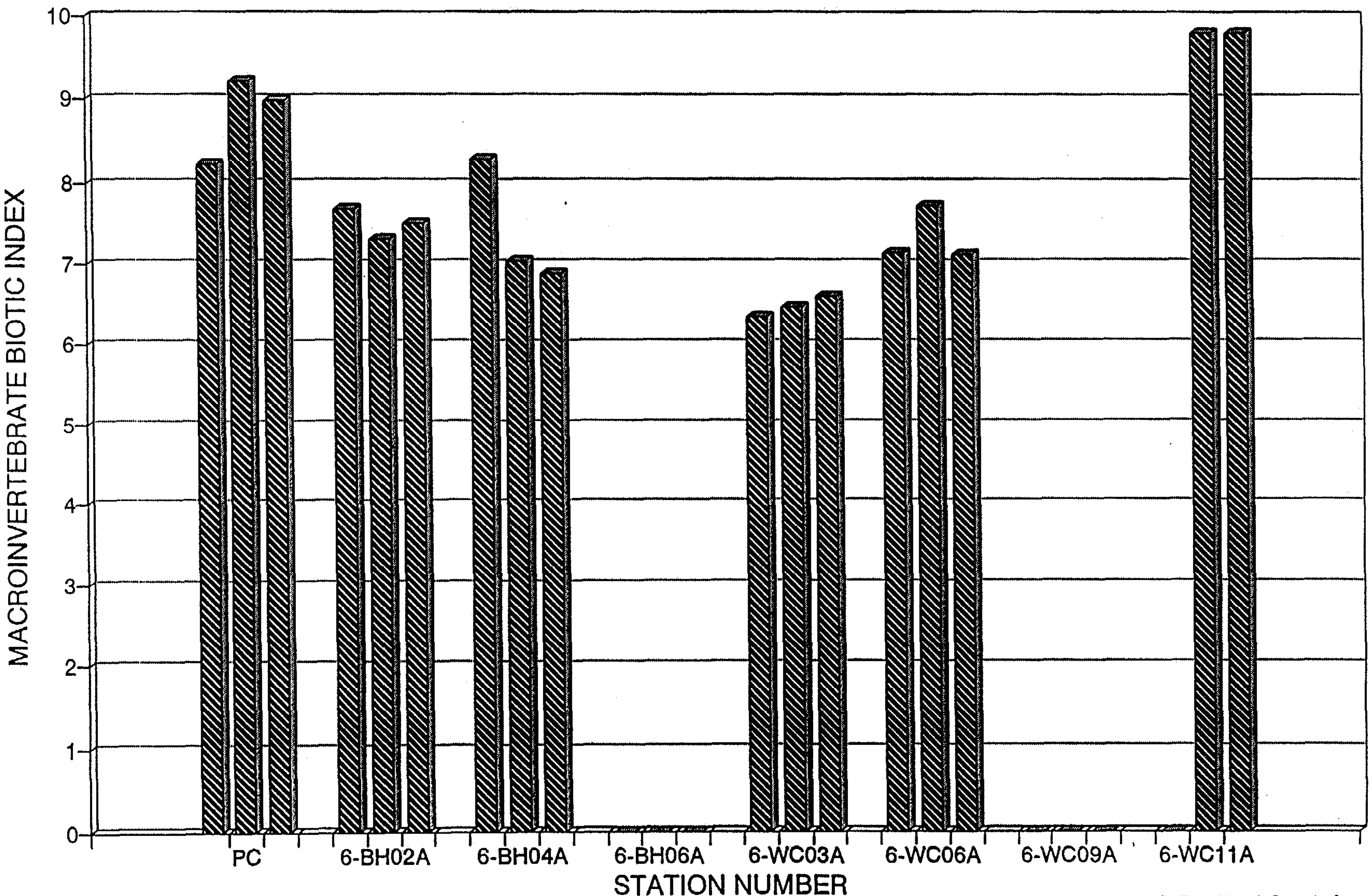
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-14
OPERABLE UNIT NO. 2
BENTHIC MACROINVERTEBRATE SPECIES DIVERSITY VS STATION SUMMARY DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



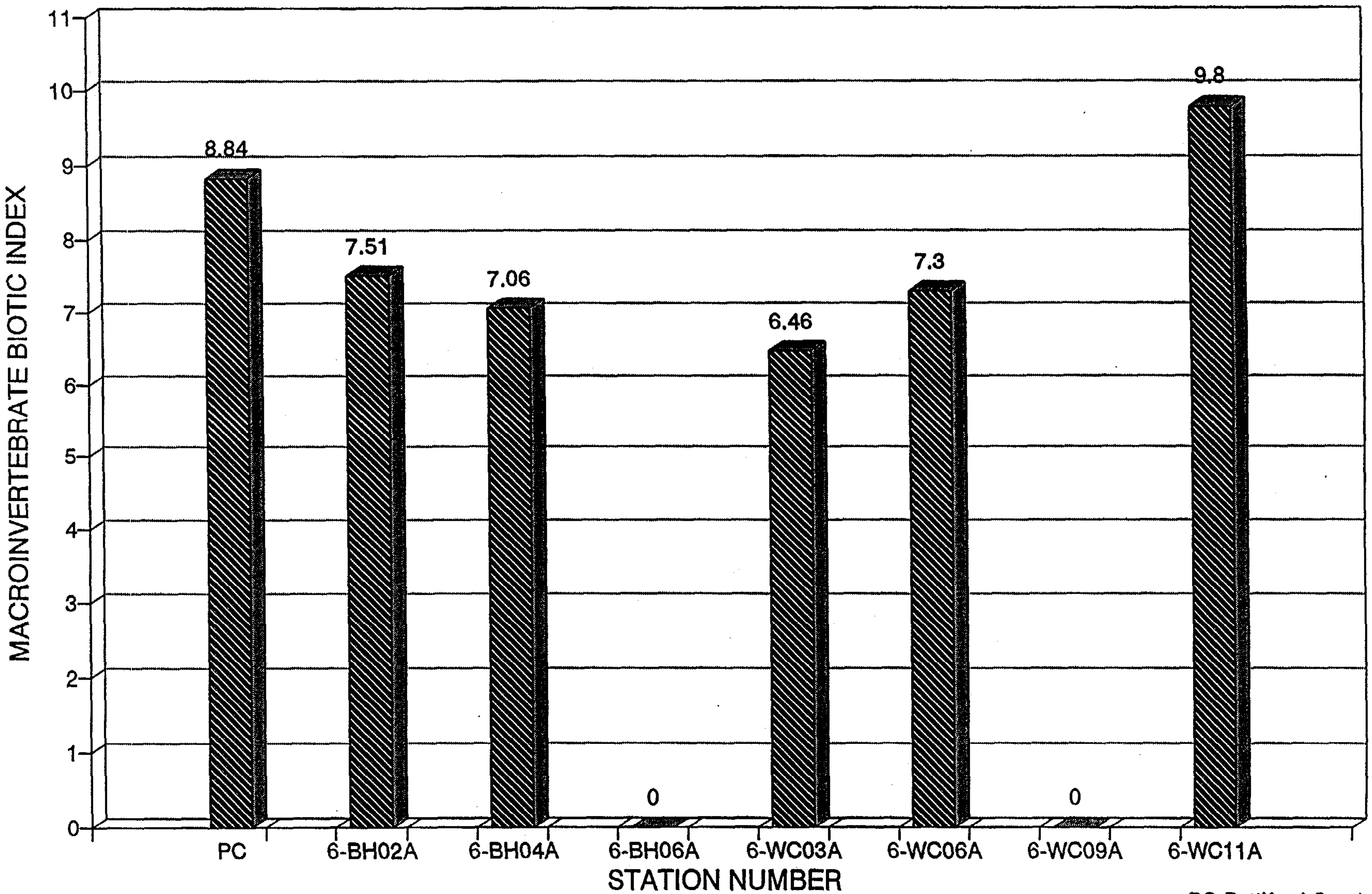
PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-15
OPERABLE UNIT NO. 2
MACROINVERTEBRATE BIOTIC INDEX VS STATION REPLICATE DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

FIGURE 4-16
OPERABLE UNIT NO. 2
MACROINVERTEBRATE BIOTIC INDEX VS STATION SUMMARY DATA
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA



PC-Pettiford Creek Station
BH-Bear Head Creek Station
WC-Wallace Creek Station

TABLE 4-1
OPERABLE UNIT NO. 2
WALLACE CREEK AND BEAR HEAD CREEK
SUMMARY OF FISH AND CRAB SAMPLING EVENTS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Date	Station Number	Sampling Procedure
Wallace Creek 8-28-92	6-WC09A	Gill Net
8-29-92	6-WC09A	Gill Net
8-29-92	6-WC06A	Gill Net
8-30-92	6-WC06A	Gill Net
8-30-92	6-WC09A	Gill Net
9-09-92	6-WC06A	Electrofishing
9-09-92	6-WC09A	Gill Net
9-09-92	6-WC11A	Gill Net
9-12-92	6-WC04A	Electrofishing
Bear Head Creek 8-27-92	6-BH04A	Electrofishing
8-29-92	6-BH06A	Gill Net
8-29-92	6-BH02A	Electrofishing
9-09-92	6-BH06A	Electrofishing
Pettiford Creek 9-15-92	PC	Electrofishing

BH - Bear Head Creek Station
WC - Wallace Creek Station
PC - Pettiford Creek Station

TABLE 4-2

OPERABLE UNIT NO. 2
SUMMARY OF FISH AND CRABS SENT TO CEIMIC FOR TISSUE ANALYSIS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Sample Identification	Number of Fish in Sample	Species	Whole Body or Fillet
Wallace Creek			
6-WC06-WM1	1	Warmouth	Whole Body
6-WC06-PS	2	Pumpkinseed	Whole Body
6-WC06-LGF	1	Long-nosed Gar	Fillet
6-WC06-SMF	2	Striped Mullet	Fillet
6-WC11-FL1	1	Summer Flounder	Whole Body
6-WC11-BC	2	Blue Crab	Whole Body
Bear Head Creek			
6-BH06-PS	2	Pumpkinseed	Whole Body

WC - Wallace Creek
BH - Bear Head Creek

TABLE 4-3

OPERABLE UNIT NO. 2
FIELD CHEMISTRY FROM BIOLOGICAL SAMPLES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Sample Identification	Sample Location	Salinity (ppt)	Conductivity (micromhos/cm)	Dissolved Oxygen (mg/l)	pH (S.U.)	Temperature (deg. C)
Wallace Creek 6-WC03A-BN	Bottom	NA	NA	NA	NA	NA
6-WC06A-BN	Surface	0.0	125	5.85	6.3	23.5
	Bottom	0.0	145	5.8	6.3	23.5
6-WC09A-BN	Surface	0.5	900	5.1	6.3	22.8
	Bottom	7	11,500	0.13	NA	25.5
6-WC11A-BN	Surface	0.5	1,500	4.45	6.3	23.3
	Bottom	7.5	10,900	0.15	NA	26.0
6-WC03A-FS	Bottom	0.0	20	NA	NA	28.0
6-WC06A-FS	Bottom	NA	NA	NA	NA	NA
6-WC09A-FS	Bottom	NA	NA	NA	NA	NA
6-WC11A-FS	Bottom	NA	NA	NA	NA	NA
Bear Head Creek 6-BH02A-BN	Bottom	0.0	6.0	6.45	5.5	24.0
6-BH04A-BN	Bottom	0.0	82	6.35	NA	23
6-BH06A-BN	Surface	0.0	135	5.0	6.3	22.9
	Bottom	0.0	140	4.95	NA	22.8
6-BH02A-FS	Bottom	0.0	115	5.0	NA	22.5
6-BH04A-FS	Bottom	0.0	112	5.7	6.4	24.0
6-BH06A-FS	Bottom	NA	NA	NA	NA	NA
Pettiford Creek PC1-BN	Bottom	1.5	270	7.95	NA	22
PC1-FS	Bottom	NA	270	3.1	NA	22

ppt - Parts per Thousand
mg/l - Milligram per Liter
S.U. - Standard Units
deg. C - Degrees Celcius
NA - Not Analyzed
Sample Location - Water Surface or Water Bottom
BN - Benthic Macroinvertebrate Sample
FS - Fish Sample
BH - Bear Head Creek Station
WC - Wallace Creek Station
PC - Pettiford Creek Station

TABLE 4-4

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
FISH DISTRIBUTION AND CHARACTERIZATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Common Name	Scientific Name	Station Number					Feed Guild	Length Atlas (cm)	Water Type	Migration Habits	Spawning	Tolerance	Family	Sources
		BH06A	WC04A	WC06A	WC11A	PC								
Eastern Mosquitofish	Gambusia affinis	x		x			Insectivore	to 6.25 cm	Freshwater and brackish water	NA	Apr to Aug Fertilization is internal	Intermediate	Poeciliidae	1,2,3,4
Shiner sp.	Notropis sp.		x	x		x	Insectivore	to 20 cm	Freshwater creeks, rivers, lakes	NA	April to August	Intermediate to intolerant	Cyprinidae	1,2,3
Pumpkinseed	Lepomis gibbosus	x	x	x		x	Lower Carnivore	8-20	Freshwater	Freshwater stray	April through October	Moderately Tolerant	Centrarchida	1,2,3,4,5
Spot	Leiostomas xanthurus	x		x			Omnivore	NA	Brackish or marine; enter freshwater	Warm water migrant	NA	NA	Sciaenidae	1,5
American Eel	Anguilla rostata			x			Omnivore	to 147.5 cm	Brackish or freshwater	Resident	Spawns at sea in December	Intermediate	Anguillidae	1,2,3,4,5

1 The Freshwater Fishes of North Carolina
2 The Audubon Society Field Guide to North American Fishes, Whales & Dolphins
3 Rapid Bioassessment Protocols for Use in Streams and Rivers - Benthic Macroinvertebrates and Fish
4 Delaware's Freshwater and Brackish Water Fishes
5 CRC - Ecologies of Estuaries, Volume II
NA - Not Available
BH - Bear Head Creek
WC - Wallace Creek
PC - Pettiford Creek

TABLE 4-4 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
FISH DISTRIBUTION AND CHARACTERIZATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Common Name	Scientific Name	Station Number					Feed Guild	Length Atlas (cm)	Water Type	Migration Habits	Spawning	Tolerance	Family	Sources
		BH06A	WC04A	WC06A	WC11A	PC								
Bluespoted Sunfish	Enneacanthus gloriosus	x	x	x			Insectivore	to 10 cm	Clear, dark, sluggish coastal streams	NA	March	Varies	Centrarchidae	1,2,3
Pirate Perch	Aphredoderus sayanus		x				Insectivore	<10 cm	Backwaters of low gradient streams, ponds and swamps abundant vegatation	Freshwater stray	Jan to March	Intermediate	Aphredoderidae	1,2,3,4,5
Warmouth	Lepomis gulosus			x			Invertivore	to 25 cm	Freshwater ponds, lakes, swamps	NA	May to August	Intermediate	Centrarchidae	1,2,3,4,5
Largemouth Bass	Micropterus salmoides			x			Piscivore	to 95 cm	Freshwater and brackish <1% salinity	NA	April through June	Tolerant	Centrarchidae	1,2,3,4

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TABLE 4-4 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
FISH DISTRIBUTION AND CHARACTERIZATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Common Name	Scientific Name	Station Number					Feed Guild	Length Atlas (cm)	Water Type	Migration Habits	Spawning	Tolerance	Family	Sources
		BH06A	WC04A	WC06A	WC11A	PC								
Sunfish Sp.	Varies			x			Insectivore	Varies	Freshwater streams, rivers, and swamps	NA	April to August	Varies	Centrarchidae	1,2
Bay Anchovy	Anchoa mitchili	x					Planktivorous	to 15 cm	Freshwater or brackish <0.5% salinity or greater	Warm-water migrant	April to July	Intermediate	Engraulidae	1,2,4,5
Killifish	Fundulus Sp.	x					Insectivore	to 7.5 cm	Fresh, brackish or marine	Freshwater stray	April to August	Intolerant	Cyprinodontidae	1,2,3,4,5
Summer Flounder	Paralichthys dentatus				x		NA	37	Brackish or marine; enters freshwater	Warm water migrant	NA	NA	Bothidae	1,5
Striped Mullet	Mugil Cephalus					x	Herbivore	23-35	Brackish or marine; enters freshwater	Warm water migrant	NA	NA	Mugilidae	1,2,5

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NA - Not Available
BH - Bear Head Creek
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TABLE 4-5

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS - 1992 SEINING RESULTS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Common Name	Station Number	Total Number	LENGTH (cm)			WEIGHT (g)		
			Average	Minimum	Maximum	Average	Minimum	Maximum
Eastern Mosquito	BH06A	78	2.89	1.90	5.60	0.26	0.26	0.26
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	26	3.14	2.00	4.80	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Shiner Sp.	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	43	3.64	1.5	5.5	2.3E-1	2.3E-1	2.3E-1
	WC06A	5	5.68	4.5	7	2	2	2
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	1	3	3	3	<1	<1	<1
Pumpkinseed	BH06A	4	10.95	6.7	16.6	32.5	7.5	85
	WC04A	1	8.9	8.9	8.9	5	5	5
	WC06A	22	7.55	5.6	14.4	15.45	7	110
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	2	16.75	14.5	19	75	10	140
Spot	BH06A	10	6.29	4.9	7.8	4.04	3.8	5
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	7	8.01	6.6	9.8	15.69	18.3	18.3
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA

BH - Bear Head Creek
WC - Wallace Creek
PC - Pettiford Creek
NA - Not Applicable

TABLE 4-5 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS - 1992 SEINING RESULTS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Common Name	Station Number	Total Number	LENGTH (cm)			WEIGHT (g)		
			Average	Minimum	Maximum	Average	Minimum	Maximum
American Eel	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	11	10.95	4	18	3.6	3.6	3.6
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Bluespoted sunfish	BH06A	1	8.9	8.9	8.9	15	15	15
	WC04A	2	5.75	5.5	6	NA	NA	NA
	WC06A	8	5.84	5	6.5	11.3	11.3	11.3
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Pirate Perch	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	3	5.8	4.2	8.5	1	1	1
	WC06A	0	NA	NA	NA	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Warmouth	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	2	14.65	9.7	19.6	117.5	75	160
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Largemouth Bass	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	1	4.7	4.7	4.7	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA

BH - Bear Head Creek
WC - Wallace Creek
PC - Pettiford Creek
NA - Not Applicable

TABLE 4-5 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS - 1992 SEINING RESULTS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Common Name	Station Number	Total Number	LENGTH (cm)			WEIGHT (g)		
			Average	Minimum	Maximum	Average	Minimum	Maximum
Sunfish	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	BH06A	1	3	3	3	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Bay Anchovy	BH06A	1	5.9	5.9	5.9	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	0	NA	NA	NA	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Killifish	BH06A	1	6.1	6.1	6.1	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	0	NA	NA	NA	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	0	NA	NA	NA	NA	NA	NA
Summer Flounder	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	0	NA	NA	NA	NA	NA	NA
	WC11A	1	27.6	27.6	27.6	200	200	200
	PC	0	NA	NA	NA	NA	NA	NA
Striped Mullet	BH06A	0	NA	NA	NA	NA	NA	NA
	WC04A	0	NA	NA	NA	NA	NA	NA
	WC06A	0	NA	NA	NA	NA	NA	NA
	WC11A	0	NA	NA	NA	NA	NA	NA
	PC	1	39.6	39.6	39.6	700	700	700

BH - Bear Head Creek
WC - Wallace Creek
PC - Pettiford Creek
NA - Not Applicable

TABLE 4-6

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
TOTAL NUMBER OF SPECIES, INDIVIDUALS AND THE SHANNON-WIENER SPECIES DIVERSITY VALUES FOR FISH
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station	Number of Species	Number of Individuals	Species Diversity
BH06A	6	95	0.29
WC04A	4	49	0.22
WC06A	9	83	0.77
WC11A	2	2	0.30
PC	3	4	0.45

BH - Bear Head Creek
WC - Wallace Creek
PC - Pettiford Creek

TABLE 4-7

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
RESULTS OF THE JACCARD COEFFICIENT (Sj) OF COMMUNITY SIMILARITY
AND SORENSON INDEX (Ss) OF COMMUNITY SIMILARITY BETWEEN FISH STATIONS
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

		Sj				
	Station	BH06A	WC04A	WC06A	WC11A	PC
Ss	BH06A	NA	0.25	0.36	0	0.13
	WC04A	0.40	NA	0.30	0	0.17
	WC06A	0.53	0.46	NA	0.10	0.20
	WC11A	0	0	0.18	NA	0.25
	PC	0.22	0.29	0.33	0.17	NA

BH - Bear Head Creek
WC - Wallace Creek
PC - Pettiford Creek
NA - Not Applicable

TABLE 4 - 8
SITE 6 FISH AND CRAB TISSUE
POSITVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH6-PS	6-WC06-LGF	6-WC06-SMF	6-WC11-BC	6-WC11-FL1	6-WC6-PS
Depth:		(PS1&2)	N/A	N/A	(BC1&2)	N/A	(PS1&2)
Date Sampled:		9/9/92	9/3/92	9/3/92	9/11/92	9/9/92	9/9/92
Lab Id:		00523-15	00489-01	00489-02	00523-13	00523-19	00523-21
Parameter	Units						
PESTICIDE/PCBS							
4,4'-DDE	UG/KG	290	130 J	87 J	15 J	26 J	28
ENDRIN	UG/KG	15 J				2.5 J	5.4 J
ENDOSULFAN II	UG/KG						12 J
4,4'-DDD	UG/KG	72 J			8.1 J	8.8 J	
4,4'-DDT	UG/KG	9.7					4.9 J
METHOXYCHLOR	UG/KG	21					
ALPHA CHLORDANE	UG/KG	5.4 J					
PCB-1260	UG/KG	490 J	150 J	1000 J		51 J	370 J
VOLATILES							
METHYLENE CHLORIDE	UG/KG				32	11	7 J
ACETONE	UG/KG	350 J	26 J	25	220 J	280 J	230 J
2-BUTANONE	UG/KG	26 J			15	10 J	15 J
TRICHLOROETHENE	UG/KG			5 J	5 J		
BENZENE	UG/KG	6 J			5 J		
TOLUENE	UG/KG	8 J			2 J		3 J
SEMIVOLATILES							
PHENOL	UG/KG				2500		
DIMETHYL PHTHALATE	UG/KG					86	

UG/KG - microgram per kilogram
J - value is estimated

TABLE 4 - 8
SITE 6 FISH AND CRAB TISSUE
POSITVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:	6-WC6-WM1
Depth:	N/A
Date Sampled:	9/11/92
Lab Id:	00523-20
Parameter	
PESTICIDE/PCBS	
4,4'-DDE	180
ENDRIN	
ENDOSULFAN II	
4,4'-DDD	
4,4'-DDT	
METHOXYCHLOR	
ALPHA CHLORDANE	
PCB-1260	370 J
VOLATILES	
METHYLENE CHLORIDE	5 J
ACETONE	35 J
2-BUTANONE	
TRICHLOROETHENE	
BENZENE	3 J
TOLUENE	2 J
SEMIVOLATILES	
PHENOL	
DIMETHYL PHTHALATE	

UG/KG - microgram per kilogram
J - value is estimated

TABLE 4 - 9
SITE 6 FISH AND CRAB TISSUE
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH6-PS	6-WC06-LGF	6-WC06-SMF	6-WC11-BC	6-WC11-FL1	6-WC6-PS
	Depth:	(PS1&2)	N/A	N/A	(BC1&2)	N/A	(PS1&2)
	Date Sampled:	9/9/92	9/3/92	9/3/92	9/10/92	9/9/92	9/9/92
	Lab Id:	00523-15	00489-01	00489-02	00523-13	00523-19	00523-21
Parameter	Units						
BERYLLIUM	MG/KG				0.005 B		
CADMIUM	MG/KG	0.06 B					
CALCIUM	MG/KG	19500 J	192 B	414 B	29100 J	3110 J	15600 J
MAGNESIUM	MG/KG	453	256	232	1410	285	405
POTASSIUM	MG/KG	2720	3260	3450	2050	3330	2830
SELENIUM	MG/KG	0.27 J	0.14	0.16	0.38	0.18 B	0.23 B
SILVER	MG/KG		0.01 JB	0.01 JB	0.18 J		
SODIUM	MG/KG	1370 J	657 J	361 J	2170	760 J	1170 J
ZINC	MG/KG	23.4		10.6	20.3		27.3

N/A - Not applicable
MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater thatn the IDL

TABLE 4 - 9
SITE 6 FISH AND CRAB TISSUE
POSITIVE DETECTION SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC6-WM1
	Depth:	N/A
	Date Sampled:	9/9/92
	Lab Id:	00523-20
Parameter	Units	
BERYLLIUM	MG/KG	
CADMIUM	MG/KG	
CALCIUM	MG/KG	10800 J
MAGNESIUM	MG/KG	381
POTASSIUM	MG/KG	3250
SELENIUM	MG/KG	0.21 B
SILVER	MG/KG	
SODIUM	MG/KG	1040
ZINC	MG/KG	11.2

N/A - Not applicable
MG/KG - milligram per kilogram
B - reported value is less than Contract Required Detection Limit (CRDL), but greater than Instrument Detection Limit (IDL)
J - value is estimated
JB - value is estimated below the CRDL, but greater thatn the IDL

TABLE 4-10

OPERABLE UNIT NO. 2
SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Systematic Classification
ARTHROPODA	Phylum
Insecta	Class
Pterygota	Subclass
Diptera	Order
Ceratopogonidae	Family
Ceratopogon sp.	Genus
Chironomidae	Family
Chironomus decorus	Genus species
Clinotanypus pinguis	Genus species
Crytochironomous sp.	Genus
Krenopelopia sp.	Genus
Microtendipes pedellus	Genus species
Paramerina sp.	Genus
Pentaneura sp.	Genus
Polypedilum falax	Genus species
Polypedilum scalaenum	Genus species
Procladius sp.	Genus
Stenochironomus sp.	Genus
Tanytarsus sp.	Genus
Tribelos jucundum	Genus species
Tipulidae	Family
Hexatoma sp.	Genus
Ormosia sp.	Genus
Dolichopodidae	Family
Paraphrosylus sp.	Genus
Syrphidae	Family
Eristalis sp.	Genus

TABLE 4-10 (cont.)

OPERABLE UNIT NO. 2
SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Systematic Classification
Tabanidae	Family
Chrysops sp.	Genus
Trichoptera	Order
Polycentropodidae	Family
Phylocentropus sp.	Genus
Leptoceridae	Family
Oecetis sp.	Genus
Hemiptera	Order
Nepomorpha	Suborder
Corixidae	Family
Sigara sp.	Genus
Odonata	Order
Anisoptera	Suborder
Corduliidae	Family
Zygoptera	Suborder
Coenagrionidae	Family
Enallagma sp.	Genus
Gomphidae	Family
Stylurus sp.	Genus
Megaloptera	Order
Sialidae	Family
Dubiraphia sp.	Genus
Coleoptera	Order
Elmidae	Family
Dubiraphia sp.	Genus
Stenelmis sp.	Genus

TABLE 4-10 (cont.)

OPERABLE UNIT NO. 2
SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Systematic Classification
Crustacea	Class
Malacostraca	Subclass
Amphipoda	Order
Gammaridae	Family
Gammarus fasciatus	Genus species
Isopoda	Order
Idoteidae	Family
Caecidotea sp.	Genus
Decapoda	Order
Palaemonidae	Family
Palaemonetes paludosus	Genus species
ANNELIDA	Phylum
Polychaeta	Class
Phyllodocida	Order
Nereidae	Family
Nereis succinea	Genus species
Capitellida	Order
Capitellidae	Family
Capitella capitata	Genus species
Terebellida	Order
Ampharetidae	Family
Hypaniola grayi	Genus species
Oligochaeta	Class
Tubificida	Order
Tubificidae	Family
Isochaetides curvisetosus	Genus species
Limnodrilus hoffmeisteri	Genus species

TABLE 4-10 (cont.)

OPERABLE UNIT NO. 2
SYSTEMATIC LIST OF BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Systematic Classification
Limnodrilus udekemianus	Genus species
Quistadrilus multisetosus	Genus species
Sparganophilidae	Family
Sparganophilus sp.	Genus
Haplotaxida	Order
Lumbriculidae	Family
Eclipidrilus sp.	Genus
PLATYHELMINTHES	Phylum
Turbellaria	Class
Tricladida	Order
Planariidae	Family
Dugesia tigrina	Genus species
NEMATODA	Phylum
MOLLUSCA	Phylum
Gastropoda	Class
Mesogastropoda	Order
Viviparidae	Family
Campeloma decisum	Genus species
Bivalvia	Class
Veneroida	Order
Sphaeriidae	Family
Pisidium casertanum	Genus species

TABLE 4-11

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
ARTHROPODA										
Insecta										
Pterygota										
Diptera										
Ceratopogonidae								2		2
Ceratopogon sp.							3			3
Chironomidae										
Chironomus decorus		12	3			15				
Clinotanypus pinguis							7			7
Crytochironomous sp.							1			1
Krenopelopia sp.		4				4	5			5
Microtendipes pedellus	1									
Paramerina sp.		4				4				
Pentaneura sp.		4				4	1			1

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Polypedilum falax							2	6		8
Polypedilum scalaenum			1			1	1	2		3
Procladius sp.							1			1
Stenochironomus sp.		4				4				
Tanytarsus sp.			1			1				
Tribelos jucundum	7	148	34			182	13			13
Tipulidae										
Hexatoma sp.							3	7		10
Ormosia sp.							8			8
Dolichopodidae										
Paraphrosylus sp.							8			8
Syrphidae										
Eristalis sp.							1			1
Tabanidae										
Chrysops sp.							21	4		25

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Trichoptera										
Polycentropodidae										
Phylocentropus sp.		4				4	3	4		7
Leptoceridae										
Oecetis sp.								1		1
Hemiptera										
Nepomorpha										
Corixidae										
Sigara sp.							16			16
Odonata										
Anisoptera										
Corduliidae		4				4	1			1
Zygoptera		4				4				
Coenagrionidae										
Enallagma sp.							1			1

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Gomphidae										
Stylurus sp.							1			1
Megaloptera										
Sialidae										
Sialis sp.							1			1
Coleoptera										
Elmidae										
Dubiraphia sp.		4				4	25	1		26
Stenelmis sp.								1		1
Crustacea										
Malacostraca										
Amphipoda										
Gammaridae										
Gammarus fasciatus	2		113			113	2	48		50
Isopoda										

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Idoteidae										
Caecidotea sp.		4				4	1			1
Decapoda										
Palaemonidae										
Palaemonetes paludosus							1			1
ANNELIDA										
Polychaeta										
Phyllodocida										
Nereidae										
Nereis succinea					4	4			4	4
Capitellida										
Capitellidae										
Capitella capitata					1	1	1			1
Terebellida										
Ampharetidae										

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Hypaniola grayi			1			1				
Oligochaeta										
Tubificida										
Tubificidae							2			2
Isochaetides curvisetosus							261			261
Limnodrilus hoffmeisteri	23		24		3	27	48	38		86
Limnodrilus udekemianus							26	6		32
Quistadrilus multisetosus							1			1
Sparganophilidae										
Sparganophilus sp.							60			60
Haplotaxida										
Lumbriculidae										
Eclipidrilus sp.								1		1
PLATYHELMINTHES										
Turbellaria										

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Tricladida										
Planariidae										
Dugesia tigrina								4		4
NEMATODA		4				4				
MOLLUSCA										
Gastropoda										
Mesogastropoda										
Viviparidae										
Campeloma decisum							12	5		17
Bivalvia										
Veneroida										
Sphaeriidae										
Pisidium casertanum							44	301		345
TOTAL SPECIES	4	12	7	0	3	19	33	16	1	39
TOTAL INDIVIDUALS	33	200	177	0	8	385	582	431	4	1,017

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-11 (cont.)

OPERABLE UNIT NO. 2
SUMMARY TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
SPECIES DENSITY (#/M^2)	210	1,275	1,128	0	51	NA	3,709	2,747	25	NA
SPECIES DIVERSITY	0.372	0.510	0.448	0	0.423	NA	0.932	0.514	0	NA

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations
NA - Not Applicable

TABLE 4-12

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
ARTHROPODA										
Insecta										
Pterygota										
Diptera										
Ceratopogonidae								0.46		2.E-1
Ceratopogon sp.							0.52			0.29
Chironomidae										
Chironomus decorus		6.00	1.69			3.90				
Clinotanypus pinguis							1.20			0.69
Crytochironomous sp.							0.17			0.10
Krenopelopia sp.		2.00				1.04	0.86			0.49
Microtendipes pedellus	3.03									
Paramerina sp.		2.00				1.04				
Pentaneura sp.		2.00				1.04	0.17			0.10
Polypedilum falax							0.34	1.39		0.79
Polypedilum scalaenum			0.56			0.26	0.17	0.46		0.29

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-12 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Procladius sp.							0.17			0.10
Stenochironomus sp.		2.00				1.04				
Tanytarsus sp.			0.56			0.26				
Tribelos jucundum	21.21	74.00	19.21			47.27	2.23			1.28
Tipulidae										
Hexatoma sp.							0.52	1.62		0.98
Ormosia sp.							1.37			0.79
Dolichopodidae										
Paraphrosylus sp.							1.37			0.79
Syrphidae										
Eristalis sp.							0.17			0.10
Tabanidae										
Chrysops sp.							3.61	0.93		2.46
Trichoptera										
Polycentropodidae										
Phylocentropus sp.		2.00				1.04	0.52	0.93		0.69

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-12 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Leptoceridae										
Oecetis sp.								0.23		0.10
Hemiptera										
Nepomorpha										
Corixidae										
Sigara sp.							2.75			1.57
Odonata										
Anisoptera										
Corduliidae						1.04				0.10
Zygoptera		2.00				1.04				
Coenagrionidae										
Enallagma sp.							0.17			0.10
Corduliidae		2.00					0.17			
Gomphidae										
Stylurus sp.							0.17			0.10
Megaloptera										

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-12 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Sialidae										
Sialis sp.							0.17			0.10
Coleoptera										
Elmidae										
Dubiraphia sp.		2.00				1.04	4.30	0.23		2.56
Stenelmis sp.								0.23		0.10
Crustacea										
Malacostraca										
Amphipoda										
Gammaridae										
Gammarus fasciatus	6.06		63.84			29.35	0.34	11.14		4.92
Isopoda										
Idoteidae										
Caecidotea sp.		2.00				1.04	0.17			0.10
Decapoda										
Palaemonidae										

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-12 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Palaemonetes paludosus							0.17			0.10
ANNELIDA										
Polychaeta										
Phyllodocida										
Nereidae										
Nereis succinea					50.00	1.04			100.00	0.39
Capitellida										
Capitellidae										
Capitella capitata					12.50	0.26	0.17			0.10
Terebellida										
Ampharetidae										
Hypaniola grayi			0.56			0.26				
Oligochaeta										
Tubificida										
Tubificidae							0.34			0.20
Isochaetides curvisetosus							44.85			25.66

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-12 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Limnodrilus hoffmeisteri	69.70		13.56		37.50	7.01	8.25	8.82		8.46
Limnodrilus udekemianus							4.47	1.39		3.15
Quistadrilus multisetosus							0.17			0.10
Sparganophilidae										
Sparganophilus sp.							10.31			5.90
Haplotaxida										
Lumbriculidae										
Eclipidrilus sp.								0.23		0.10
PLATYHELMINTHES										
Turbellaria										
Tricladida										
Planariidae										
Dugesia tigrina								0.93		0.39
NEMATODA		2.00				1.04				
MOLLUSCA										
Gastropoda										

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-12 (cont.)

OPERABLE UNIT NO. 2
WALLACE, BEAR HEAD AND PETTIFORD CREEKS
SUMMARY TABLE: PERCENT OF BENTHIC MACROINVERTEBRATE SPECIES AT EACH STATION
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	Pettiford Creek	Wallace Creek					Bear Head Creek			
	PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	Total	6-BH02A	6-BH04A	6-BH06A	Total
Mesogastropoda										
Viviparidae										
Campeloma decisum							2.06	1.16		1.67
Bivalvia										
Veneroida										
Sphaeriidae										
Pisidium casertanum							7.56	69.84		33.92

PC - Pettiford Creek Station
WC - Wallace Creek Stations
BH - Bear Head Creek Stations

TABLE 4-13

OPERABLE UNIT NO. 2
BIOTIC INDEX AND U.S. EPA TOLERANCE TO ORGANIC WASTES AND SENSITIVITY TO METALS FOR BENTHIC MACROINVERTEBRATES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

SPECIES	U.S. EPA (1)		NCDEHNR(2) BIOTIC INDEX
	Metals	Organics	
ARTHROPODA			
Insecta			
Pterygota			
Diptera			
Ceratopogonidae			
Ceratopogon sp.	NA	NA	NA
Chironomidae			
Chironomus decorus	NA	NA	9.8 (a)
Clinotanypus pinguis	S	3	9.1
Crytochironomous sp.	NA	3	9.6 (c)
Krenopelopia sp.	NA	NA	NA
Microtendipes pedellus	S	1	6.2 (a)
Paramerina sp.	NA	0	2.8
Pentaneura sp.	NA	3	4.6
Polypedilum falax	S	3	6.7
Polypedilum scalaenum	T	2	8.7
Procladius sp.	NA	3	9.3
Stenochironomus sp.	NA	1	6.4
Tanytarsus sp.	NA	3	6.7
Tribelos jucundum	S,D	1	6.6

(1) - Source: USEPA, 1990
(2) - Source: Lenat, 1993
(a) - Value is based on genus Biotic Index
(b) - Value is based on family Biotic Index
(c) - Value is calculated by doubling the previous Biotic Index
NA - Not Available
S - Sensitive to heavy metals
T - Tolerant to heavy metals
D - Intolerant to organic wastes

TABLE 4-13 (cont.)

OPERABLE UNIT NO. 2
BIOTIC INDEX AND U.S. EPA TOLERANCE TO ORGANIC WASTES AND SENSITIVITY TO METALS FOR BENTHIC MACROINVERTEBRATES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

SPECIES	U.S. EPA (1)		NCDEHNR(2) BIOTIC INDEX
	Metals	Organics	
Tipulidae			NA
Hexatoma sp.	NA	NA	4.7
Ormosia sp.	NA	NA	NA
Dolichopodidae			9.7
Paraphrosylus sp.	NA	NA	9.7 (b)
Syrphidae			
Eristalis sp.	NA	NA	10
Tabanidae			
Chrysops sp.	NA	NA	7.3
Trichoptera			
Polycentropodidae			
Phylocentropus sp.	S	2	3.5
Leptoceridae			
Oecetis sp.	NA	NA	5.7
Hemiptera			
Nepomorpha			
Corixidae			
Sigara sp.	NA	NA	8.6 (c)
Odonata			
Anisoptera			
Corduliidae			NA

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TABLE 4-13 (cont.)

OPERABLE UNIT NO. 2
BIOTIC INDEX AND U.S. EPA TOLERANCE TO ORGANIC WASTES AND SENSITIVITY TO METALS FOR BENTHIC MACROINVERTEBRATES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

SPECIES	U.S. EPA (1)		NCDEHNR(2) BIOTIC INDEX
	Metals	Organics	
Zygoptera			
Coenagrionidae			
Enallagma sp.	NA	4	9
Gomphidae			
Stylurus sp.	NA	NA	NA
Megaloptera			
Sialidae			
Sailis sp.	NA	NA	7.5
Coleoptera			
Elmidae			
Dubiraphia sp.	T	3	6.4
Stenelmis sp.	S	3	5.4
Crustacea			
Malacostraca			
Amphipoda			
Gammaridae			
Gammarus fasciatus	NA	2	6.9
Isopoda			
Idoteidae			
Caecidotea sp.	NA	NA	NA

(1) - Source: USEPA, 1990
(2) - Source: Lenat, 1993
(a) - Value is based on genus Biotic Index
(b) - Value is based on family Biotic Index
(c) - Value is calculated by doubling the previous Biotic Index
NA - Not Available
S - Sensitive to heavy metals
T - Tolerant to heavy metals
D - Intolerant to organic wastes

TABLE 4-13 (cont.)

OPERABLE UNIT NO. 2
BIOTIC INDEX AND U.S. EPA TOLERANCE TO ORGANIC WASTES AND SENSITIVITY TO METALS FOR BENTHIC MACROINVERTEBRATES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

SPECIES	U.S. EPA (1)		NCDEHNR(2) BIOTIC INDEX
	Metals	Organics	
Decapoda			
Palaemonidae			
Palaemonetes paludosus	NA	2	6.7
ANNELIDA			
Polychaeta			
Phyllodocida			
Nereidae			
Nereis succinea	NA	NA	NA
Capitellida			
Capitellidae			
Capitella capitata	NA	NA	NA
Terebellida			
Ampharetidae			
Hypaniola grayi	NA	NA	NA
Oligochaeta			
Tubificida			
Tubificidae			6.8 (c)
Isochaetides curvisetosus	NA	2	7.1
Limnodrilus hoffmeisteri	NA	5	9.8
Limnodrilus udekemianus	NA	5	9.7
Quistadrilus multisetosus	NA	4	4.8 (c)

(1) - Source: USEPA, 1990
(2) - Source: Lenat, 1993
(a) - Value is based on genus Biotic Index
(b) - Value is based on family Biotic Index
(c) - Value is calculated by doubling the previous Biotic Index
NA - Not Available
S - Sensitive to heavy metals
T - Tolerant to heavy metals
D - Intolerant to organic wastes

TABLE 4-13 (cont.)

OPERABLE UNIT NO. 2
BIOTIC INDEX AND U.S. EPA TOLERANCE TO ORGANIC WASTES AND SENSITIVITY TO METALS FOR BENTHIC MACROINVERTEBRATES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

SPECIES	U.S. EPA (1)		NCDEHNR(2) BIOTIC INDEX
	Metals	Organics	
Sparganophilidae			
Sparganophilus sp.	NA	NA	NA
Haplotaxida			
Lumbriculidae			
Eclipidrilus sp.	NA	NA	4 (c)
PLATYHELMINTHES			
Turbellaria			
Tricladida			
Planariidae			
Dugesia tigrina	NA	4	7.5
NEMATODA	NA	NA	6.2 (c)
MOLLUSCA			
Gastropoda			
Mesogastropoda			
Viviparidae			
Campeloma decisum	NA	3	6.7
Bivalvia			
Veneroida			
Sphaeriidae			
Pisidium casertanum	NA	4	6.8 (a)

(1) - Source: USEPA, 1990
(2) - Source: Lenat, 1993
(a) - Value is based on genus Biotic Index
(b) - Value is based on family Biotic Index
(c) - Value is calculated by doubling the previous Biotic Index
NA - Not Available
S - Sensitive to heavy metals
T - Tolerant to heavy metals
D - Intolerant to organic wastes

TABLE 4-14

OPERABLE UNIT NO. 2
SUMMARY STATISTICS OF BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station	Number of Taxa	Number of Organisms	Species Density (#/M^2)	Species Diversity	Macro-invertebrate Biotic Index
Wallace Creek					
6-WC03A-BN1	7	68	433	0.641	6.34
6-WC03A-BN2	5	84	535	0.326	6.47
6-WC03A-BN3	2	48	306	0.125	6.60
6-WC03A	12	200	1,275	0.510	6.46
6-WC06A-BN1	3	76	484	0.365	7.14
6-WC06A-BN2	4	49	312	0.517	7.73
6-WC06A-BN3	6	52	331	0.401	7.12
6-WC06A	7	177	1,128	0.448	7.30
6-WC09A-BN1	0	0	0	0	NA
6-WC09A-BN2	0	0	0	0	NA
6-WC09A-BN3	0	0	0	0	NA
6-WC09A	0	0	0	0	NA
6-WC11A-BN1	1	3	19	0	NA
6-WC11A-BN2	2	3	19	0.276	9.80
6-WC11A-BN3	2	2	13	0.301	9.80
6-WC11A	3	8	51	0.423	9.80
Bear Head Creek					
6-BH02A-BN1	23	286	1,823	0.896	7.69
6-BH02A-BN2	19	223	1,421	0.715	7.32
6-BH02A-BN3	17	73	465	1.065	7.51
6-BH02A	33	582	3,709	0.932	7.51
6-BH04A-BN1	6	30	191	0.572	8.28
6-BH04A-BN2	8	183	1,166	0.263	7.05

NA - Not Applicable

TABLE 4-14 (cont.)

OPERABLE UNIT NO. 2
SUMMARY STATISTICS OF BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Station	Number of Taxa	Number of Organisms	Species Density (#/M^2)	Species Diversity	Macro-invertebrate Biotic Index
6-BH04A-BN3	15	218	1,389	0.606	6.89
6-BH04A	16	431	2,747	0.514	7.06
6-BH06A-BN1	0	0	0	0	NA
6-BH06A-BN2	1	4	25	0	NA
6-BH06A-BN3	0	0	0	0	NA
6-BH06A	1	4	25	0	NA
Pettiford Creek					
PC-BN1	3	10	64	0.410	8.23
PC-BN2	2	11	70	0.206	9.22
PC-BN3	4	12	76	0.363	8.99
PC	4	33	210	0.372	8.84

NA - Not Applicable

TABLE 4-15

OPERABLE UNIT NO. 2
RESULTS OF THE JACCARD COEFFICIENT (Sj) OF COMMUNITY SIMILARITY AND SORENSON INDEX (Ss) OF COMMUNITY SIMILARITY BETWEEN BENTHIC MACROINVERTEBRATE STATIONS
BASELINE ECOLOCICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

		Ss							
		PC	6-WC03A	6-WC06A	6-WC09A	6-WC11A	6-BH02A	6-BH04A	6-BH06A
Sj	PC	NA	0.154	0.545	0	0.286	0.167	0.211	0
	6-WC03A	0.083	NA	0.250	0	0	0.293	0.167	0
	6-WC06A	0.375	0.143	NA	0	0.200	0.205	0.273	0
	6-WC09A	0	0	0	NA	0	0	0	0
	6-WC11A	0.167	0	0.111	0	NA	0.114	0.111	0.500
	6-BH02A	0.091	0.171	0.114	0	0.061	NA	0.468	0
	6-BH04A	0.118	0.091	0.158	0	0.059	0.306	NA	0
	6-BH06A	0	0	0	0	0.333	0	0	NA

NA - NOT APPLICABLE
Sj - Jaccard Coefficient
Ss - Sorenson Index

5.0 CONTAMINANTS OF CONCERN

This section discusses the procedures used to evaluate the data for inclusion in the ERA. This section also includes a comparison of chemicals detected in the surface water and sediments to the applicable water quality and sediment quality criteria and a comparison of chemicals detected in the soil to plant and invertebrate toxicology data. Finally, a brief discussion of the physical/chemical characteristics of the COCs are included in this section.

5.1 Data Evaluation

This task uses a variety of information to select a list of COCs for each medium analyzed. The following rationale were used to determine and select the contaminants of concern per media for this site:

- Contaminants that were positively detected in at least one sample with no data qualifiers, and contaminants that indicate known identities but unknown concentrations

- Contaminants that were detected at elevated levels above the levels for the same contaminant detected in associated blanks

- Contaminants that were detected at elevated levels above naturally occurring levels of the same contaminant

Eliminating contaminants can be done through several procedures including: (1) historical information; (2) the detected concentration and contaminant's toxicity; (3) the contaminant's mobility and persistence; (4) exposure routes; and, (5) comparison to ARARs.

5.1.1 Contaminants of Concern - Surface Water

Surface water samples were collected at OU No. 2 from Wallace Creek, Bear Head Creek, and the ravine. The following sections discuss which chemicals were included in the ERA and the rationale for the chemicals that were not included in the ERA.

5.1.1.1 Wallace Creek

The following TCL organics detected in the surface water samples collected in Wallace Creek were not addressed in the ERA because they are common laboratory and/or decontamination contaminants: acetone and bis(2-ethylhexyl) phthalate. In addition, 2,4,6-trichlorophenol was not addressed in the ERA because it was only detected in one sample and it was not detected in any other sample at the site.

The following TAL inorganics detected in the surface water samples collected in Wallace Creek were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: calcium, cobalt, magnesium, potassium, and sodium.

In summary, the following chemicals detected in the surface water samples collected in Wallace Creek are included in the ERA: 1,2-dichloroethane, tetrachloroethene, toluene, trichloroethene, vinyl chloride, aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc.

5.1.1.2 Bear Head Creek

The following TCL organics detected in the surface water samples collected in Bear Head Creek were not addressed in the ERA because they are common laboratory contaminants: bis(2-ethylhexyl) phthalate and diethyl phthalate. No other TCL organics were detected in the surface water in Bear Head Creek.

The following TAL inorganics detected in the surface water samples collected in Bear Head Creek were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: calcium, magnesium, potassium, and sodium.

In summary, the following chemicals detected in the surface water in Bear Head Creek were addressed in the ERA: aluminum, barium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc.

5.1.1.3 Ravine

Acetone was the only TCL organic chemical detected in the surface water samples collected in ravine and was not addressed in the ERA because it is a common laboratory and decontamination contaminant.

The following TAL inorganics detected in the surface water samples collected in the ravine were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: calcium, cobalt, magnesium, potassium, and sodium.

In summary, the following chemicals detected in surface water samples collected in the ravine were addressed in the ERA: aluminum, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, silver, vanadium, and zinc.

5.1.2 Contaminants of Concern - Sediments

Sediment samples were collected at OU No. 2 from Wallace Creek, Bear Head Creek, and the ravine. The following sections discuss which chemicals were included in the ERA, and the rationale for the chemicals that were not included in the ERA.

5.1.2.1 Wallace Creek

The following TCL organics detected in the sediment samples collected in Wallace Creek were not addressed in the ERA because they are common laboratory and/or decontamination contaminants: acetone, 2-butanone, methylene chloride, bis(2-ethylhexyl) phthalate, butyl benzyl phthalate, and diethyl phthalate.

The following TAL inorganics detected in the sediment samples collected in Wallace Creek were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: calcium, cobalt, magnesium, potassium, and sodium.

In summary, the following chemicals detected in the sediment samples collected in Wallace Creek were addressed in the ERA: 1,2-dichloroethane, total xylenes, toluene, trichloroethene, carbon disulfide, dieldrin, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, phenol, phenanthrene, flouranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, aluminum, arsenic, barium, beryllium, chromium, copper, iron, lead, manganese, nickel, silver, vanadium, and zinc.

5.1.2.2 Bear Head Creek

The following TCL organics detected in the sediment samples collected in Bear Head Creek were not addressed in the ERA because they are common laboratory and/or decontamination contaminants: acetone, 2-butanone, and methylene chloride. In addition, alpha chlordane and 1,4-dichlorobenzene were not addressed in the ERA because they had low frequencies of detection and there is limited toxicological information for those chemicals.

The following TAL inorganics detected in the sediment samples collected in Bear Head Creek were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: calcium, cobalt, magnesium, potassium, and sodium.

In summary, the following chemicals detected in the sediment samples collected in Bear Head Creek were addressed in the ERA: benzene, ethylbenzene, tetrachloroethene, trichloroethene, total xylenes, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, PCB-1260, PAHs, aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, selenium, vanadium, and zinc.

5.1.2.3 Ravine

The following TCL organics detected in the sediment samples collected in the ravine were not addressed in the ERA because they are common laboratory and/or decontamination contaminants: acetone, 2-butanone, bis(2-ethylhexyl) phthalate, and di-n-butyl phthalate. In addition, endrin aldehyde, carbazole, and dibenzofuran were not addressed in the ERA because they had low frequencies of detection and there is limited toxicological information for those chemicals.

The following TAL inorganics detected in the sediment samples collected in the ravine were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: calcium, cobalt, magnesium, potassium, and sodium.

In summary, the following chemicals detected in the sediment samples collected in the ravine were addressed in the ERA: dieldrin, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin, PCB-1260, PAHs, aluminum, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc.

5.1.3 Contaminants of Concern - Surface Soils

The following sections discuss which chemicals were included in the ERA, and the rationale for the chemicals that were not included in the ERA.

5.1.3.1 Site 9

The following TCL organics detected in the surface soil samples were not addressed in the ERA because they are common laboratory and/or decontamination contaminants: acetone, bis(2-ethylhexyl) phthalate and toluene.

The following TAL inorganics detected in the surface soil were not addressed in the ERA because of a lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: aluminum, beryllium, calcium, cobalt, iron, magnesium, manganese, potassium and vanadium.

In summary, the following chemicals detected in the surface soil samples were addressed in the ERA: 4,4'-DDE, 4,4'-DDT, 1,1,1-trichloroethane, tetrachloroethene, pyrene, benzo(b)fluoranthene, barium, chromium, copper, lead, mercury, and zinc.

5.1.3.2 Site 6 (Lot 201)

Soil samples in this area were collected from three grid areas (i.e, grid locations 201A, 201B and 201C) in order to define the extent of contamination at the suspected PCB and pesticide storage areas.

The contaminants alpha and gamma chlordane were detected in only 1 of 96 samples, and PCB-1248 was detected in 1 of 87 samples therefore, these contaminants will not be retained as COCs for further evaluation.

The volatile contaminants acetone, methylene chloride, and 1,1,1-trichloroethane were not retained as COCs due to their infrequent detection and/or presence in field or laboratory blanks.

Several PAHs were detected throughout the site. The PAHs benzo(a)anthracene, benzo(k)fluoranthene, benzo(a)pyrene, and phenanthrene were detected in 1 of 17 samples, therefore they will not be retained as COCs for further evaluation. The presence of bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, and di-n-octyl phthalate are the result of blank contamination and therefore were not retained as COCs.

The following TAL inorganics detected in the surface soil were not addressed in the ERA because of lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: aluminum, beryllium, calcium, cobalt, iron, magnesium, manganese, potassium, selenium, sodium and vanadium .

In summary, the following chemicals detected in the surface soil samples were addressed in the ERA: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, PCB-1260, chrysene, benzo(b)fluoranthene, 1,4-dichlorobenzene, fluoranthene, pyrene, arsenic, barium, cadmium, chromium, copper, lead, nickel, and zinc.

5.1.3.3 Site 6 (Lot 203)

Soil samples were collected from the area designated as Lot 203 Open Storage Area. Within this area, sampling grids (i.e. 203OSA, 203DDT, and 203PCB) were established to define areas of contamination.

Pesticides endosulfan II, alpha chlordane and gamma chlordane were detected infrequently and consequently were not retained as COCs. PCBs 1248 and 1254 were infrequently detected in this area and consequently were not retained as COCs.

The prevalence of TCL organics in this area does not warrant the retention of any of these as COCs for further evaluation. The infrequent detection and low concentrations of acetone and toluene detected in area soil samples indicate that these contaminants are blank related and not truly indicative of area-specific conditions. In addition, 1,1,1-trichloroethane was detected in 2 of 28 samples and does not warrant its retention as a COC.

Semivolatile contaminants benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, chrysene, 1,4-dichlorobenzene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene were detected at frequencies that were greater than five percent. Therefore, these contaminants have been retained as COCs. Other semivolatiles (i.e., naphthalene, carbazole, and butyl benzyl phthalate) do not warrant consideration as COCs. These contaminants were either infrequently detected or are a result of blank contamination.

The following TAL inorganics detected in the surface soil were not addressed in the ERA because of lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: aluminum, antimony beryllium, calcium, cobalt, iron, magnesium, manganese, potassium, sodium and vanadium.

In summary, the following chemicals detected in the surface soil samples were addressed in the ERA: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endrin, PCB-1260, chrysene, benzo(b)fluoranthene, benzo(a)anthracene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, 1,4-dichlorobenzene, fluoranthene, pyrene, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

5.1.3.4 Sites 6 (Wooded and Ravine Areas) and 82

The wooded and ravine areas consist of grid areas 201N (North), 201E (East), 201S (South) which bound Lot 201, and the wooded area north of Lot 203 bounded by Wallace Creek to the North, Piney Green Road to the East, and Holcomb Boulevard to the West. In addition, samples from the grid designated as 203OSA and the ravine were included as part of the wooded and ravine areas.

The pesticide alpha chlordane was detected in 1 of 83 samples in the surface soil, therefore, it was not retained as a COC.

The TCL organics acetone, bromomethane, chloromethane, 1,2-dichloroethene, trichloroethene, benzene, 1,1,2,2-tetrachloroethane, and toluene were not retained as COCs due to their infrequent occurrence in the soil and/or their presence in site or laboratory related blanks. Many of the semivolatile contaminants were not retained as COCs because they were either infrequently detected or are a result of blank contamination.

The following TAL inorganics detected in the surface soil were not addressed in the ERA because of lack of available toxicological information or they were not expected to be ecologically significant at the detected concentrations: aluminum, antimony, beryllium, calcium, cobalt, iron, magnesium, manganese, potassium, selenium, silver, sodium , thallium and vanadium.

In summary, the following chemicals detected in the surface soil samples were addressed in the ERA: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin, endrin, PCB-1260, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, chrysene, indeno(1,2,3-cd)pyrene, 1,4-dichlorobenzene, fluoranthene, phenol, pyrene, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

5.1.4 Contaminants of Concern - Fish and Crab Tissue

The following sections discuss the COCs in the fish and crabs tissues that were evaluated in the ERA.

5.1.4.1 Wallace Creek

For the tissue samples, endrin and endosulfan II were not addressed in the ERA because they were not detected in the sediment or surface water in Wallace Creek; therefore, they could not be attributed to contamination in Wallace Creek. Acetone, 2-butanone, methylene chloride, and dimethyl phthalate also were not evaluated in the ERA because they are common laboratory contaminants.

Selected TAL inorganics (calcium, magnesium, potassium and sodium) were not addressed in the ERA because they were not expected to be ecologically significant at the detected concentrations.

In summary, the following chemicals identified in the fish tissue will be addressed in the ERA: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toluene, PCB-1260, trichloroethene, phenol, benzene, silver, selenium and zinc.

5.1.4.2 Bear Head Creek

For the tissue samples, endrin, methoxychlor, and alpha chlordane were not addressed in the ERA because they were not detected in the sediment or surface water samples collected in Bear Head Creek; therefore, they could not be attributed to contamination in Bear Head Creek. Methylene chloride, acetone, 2-butanone, and dimethyl phthalate also were not evaluated in the ERA because they are common laboratory contaminants.

Selected TAL inorganics (calcium, magnesium, potassium and sodium) were not addressed in the ERA because they were not expected to be ecologically significant at the detected concentrations.

In summary, the following chemicals identified in the fish tissue will be addressed in the ERA: 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, toluene, PCB-1260, benzene, cadmium, selenium and zinc.

5.2 Water Quality Criteria

Tables 5-1 and 5-2, contain the North Carolina saltwater Water Quality Standards (WQS) and the Region IV saltwater Water Quality Screening Values (WQSV) for the COCs in Wallace Creek and Bear Head Creek. Table 5-3 contains the Freshwater WQS and WQSV for the COCs in the ravine. The COCs in the ravine are compared to the freshwater standards because the water in the ravine is not tidally influenced. The contaminants identified in the surface water were compared to these values to determine if they exceeded the published values. Tables 5-4, 5-5, and 5-6 lists the samples in which chemicals exceeded either the WQS or WQSV.

The water quality values for the following metals are water hardness dependent: cadmium, chromium III, copper, lead, nickel, silver, and zinc. In general, the higher the water hardness (in mg/l of $CaCO_3$) the higher the water quality value. A hardness concentration of 50 mg/l $CaCO_3$ was used to calculate these values.

5.2.1 Wallace Creek

Among the TAL inorganics, the WQS (5 ug/l) and the chronic (9.3 ug/l) WQSV for cadmium were exceeded in one sample (6-WC07-SW-312M), which had a cadmium concentration of 17.4J ug/l.

The WQS for copper (3 ug/l) was exceeded in five sample while the acute and chronic WQSV (2.9 ug/l) were exceeded in four samples, with the highest concentration of copper (209 ug/l) detected in sample 6-WC11-SW-312M.

The chronic WQSV for lead (5.6 ug/l) was exceeded in one sample (6-WC03-SW-312M), which had a lead concentration of 10.4 ug/l. Neither the WQS nor the acute WQSV for lead was exceeded in any of the samples. The WQS (0.025 ug/l) and chronic (0.025 ug/l) WQSV for mercury were exceeded in three samples with the highest concentration of mercury (0.52 ug/l) detected in samples 6-WC03-SW-312M and 6-WC11-SW-312M. The WQS (8.3 ug/l), the acute WQSV (789 ug/l), and the chronic WQSV (8.3 ug/l) for nickel were exceeded in four samples, with the highest concentration of nickel (1,380 ug/l) detected in sample 6-WC03-SW-312M. For silver, the WQS (0.1 ug/l), the acute (2.3 ug/l), and the chronic (0.23 ug/l) WQSVs were exceeded in one sample (6-WC05-SW-312M), which had a silver concentration of 2.6B ug/l. Finally, the WQS for zinc (86 ug/l) and the acute (95 ug/l) and chronic (86 ug/l) WQSVs were exceeded in two samples. The highest concentration of zinc was 111 ug/l detected in sample 6-WC03-SW-312M.

None of the TCL organic chemicals detected in the surface water samples collected from Wallace Creek exceeded the WQS or WQSV values.

Dissolved oxygen concentrations were less than the WQS (4.0 mg/l for an instantaneous reading) in 11 samples at seven stations. The pH value was not within the allowable WQS (6.8 to 8.5 for saltwaters) values in 20 samples, and the chronic WQSV (6.5 to 8.5) in 16 samples at ten stations.

The following chemicals detected in Wallace Creek surface water samples do not have N.C. WQS or Region IV screening values for them: aluminum, barium, iron, manganese, vanadium, 1,2-dichloroethane, tetrachloroethene, trichloroethane, and vinyl chloride. The potential impact to aquatic species from these chemicals in the surface water was evaluated using the results of acute and chronic tests obtained from the EPA Aquatic Information Retrieval (AQUIRE) database (AQUIRE, 1993). The maximum detected concentration of these chemicals in the surface water were below the adverse effects levels obtained from the database.

5.2.2 Bear Head Creek

Among the TAL inorganics, the WQS for copper (3 ug/l) and the acute (2.9 ug/l) and chronic (2.9 ug/l) WQSVs for copper were exceeded in sample 6-BH07-SW-312M (55.8 ug/l).

The chronic WQSV for lead (5.6 ug/l) was exceeded in two samples with the highest concentration of lead detected in sample 6-BH05-SW-06M (8.2 ug/l). The WQS and the chronic WQSV for mercury (0.025 ug/l) were exceeded in two samples with the highest concentration of mercury detected in sample 6-BH07-SW-312M (0.34B ug/l). This value did not exceed the acute WQSV.

The WQS (8.3 ug/l), the acute WQSV (75 ug/l), and the chronic WQSV (8.3 ug/l) for nickel were exceeded in sample 6-BH07-SW-312M (244 ug/l). Finally, the WQS (0.1 ug/l) and the chronic (0.23 ug/l) WQSV for silver were exceeded in two samples, while the acute WQSV (2.3 ug/l) was exceeded in one sample (6-BH07-SW-06B) which had a silver concentration of 3.6B ug/l.

None of the TCL organic chemicals detected in the surface water samples collected from Bear Head Creek exceeded the WQS or WQSV values.

Dissolved oxygen concentrations were less than the WQS (4.0 mg/l for an instantaneous reading) in two samples at two stations. The pH values were not within the allowable WSQ (6.8 to 8.5 for saltwaters) values in eight samples, and the chronic WQSV (6.5 to 8.5) in four samples at four stations.

The following chemicals detected in Bear Head Creek surface water samples do not have N.C. WQS or Region IV screening values for them: aluminum, barium, iron, manganese, and vanadium. The potential impact to aquatic species from these chemicals in the surface water was evaluated using the results of acute and chronic tests obtained from AQUIRE (AQUIRE, 1993). The maximum detected concentration of these chemicals in the surface water were below the adverse effects levels obtained from the database.

5.2.3 Ravine

The ravine is an intermittent tributary and usually there is water present only after a rain. Two of the proposed surface water samples could not be collected because there was not any water at the station.

Among the inorganic parameters, the chronic WQSV for aluminum (87 ug/l) was exceeded in six samples with the highest concentration of aluminum detected in sample 6-RV2-SW-06 (613 ug/l). The acute WQSV was not exceeded in any of the samples. The WQS for cadmium (2.0 ug/l) and the acute (1.79 ug/l) and chronic (0.66 ug/l) WQSVs were exceeded in two samples with the highest concentration of cadmium detected in sample 6-RV5-SW-06 (4.3JB).

The WQS for copper (7 ug/l) and the acute (9.22 ug/l) WQSV for copper were exceeded in four samples and the chronic WQSV (6.54 ug/l) was exceeded in two samples, with the highest concentration of copper detected in samples 6-RV2-SW-06 and 6-RV5-SW-06 (9JB ug/l). The WQS and the chronic WQSV for iron (1,000 ug/l) were exceeded in two samples with the highest concentration detected in sample 6-RV8-SW-06 (9,600 ug/l). The chronic WQSV for lead (1.32 ug/l) was exceeded in six samples, with the highest concentration of lead detected in sample 6-RV8-SW-06 (12.2 ug/l). None of the samples exceeded the WQS or the WQSV, 25 ug/l and 33.75 ug/l respectively, for lead.

The WQS for silver (0.06 ug/l) and the acute (1.23 ug/l) and chronic (0.012 ug/l) WQSVs for silver were exceeded in three samples with the highest concentration of silver detected in sample 6-RV6-SW-06 (67.6 ug/l). The WQS for zinc (50 ug/l) and the acute (65.04 ug/l) and chronic (58.91 ug/l) WQSVs for zinc were exceeded in six samples with the highest concentration of zinc detected in sample 6-RV6-SW-06 (495 ug/l).

None of the surface water samples collected from the ravine exceeded any established TCL organic parameter standards.

The following chemicals detected in the ravine surface water samples do not have N.C. WQS or Region IV screening values for them: barium, manganese, and vanadium. The potential impact to aquatic species from these chemicals in the surface water were evaluated using the results of acute and chronic tests obtained from AQUIRE (AQUIRE, 1993). The maximum detected concentration of these chemicals in the surface water were well below any of the adverse effects levels obtained from the database.

5.2.4 Pettiford Creek

Surface water samples were not collected from Pettiford creek for chemical analysis in accordance with the SAP (Baker, 1992). However, field water quality measurements were conducted during collection of the biological samples.

Dissolved oxygen concentrations were less than the WQS (4.0 mg/l for an instantaneous reading) in one sample. The pH was not measured in Pettiford Creek because the pH meter was not working.

5.3 Sediment Screening Values

Tables 5-7, 5-8, and 5-9 contain the Region IV sediment screening values (SQSV) for hazardous waste sites for the COCs at Site 6. The contaminants identified in the sediment were compared to these values to determine if they exceeded the published values. The NOAA ER-L values represent the lower screening values, while the NOAA ER-M Values represent the median screening values.

Tables 5-10, 5-11, and 5-12 lists the samples in which chemical concentrations exceeded the SQSV.

5.3.1 Wallace Creek

The ER-L for copper (70 mg/kg) was exceeded in two samples, while the ER-M (390 mg/kg) was exceeded in one sample with the highest concentration detected in sample 6-WC03-SD-06M (53,200 mg/kg). The ER-L for lead (35 mg/kg) was exceeded in nine samples, two of which exceeded the ER-M (110 mg/kg). The highest concentration of lead was detected in sample 6-WC03-SD-06M (314J mg/kg). The ER-L (1 mg/kg) and the ER-M (2.2 mg/kg) for silver were exceeded in sample 6-WC03-SD-06M, which had a silver concentration of 7.3 mg/kg. The ER-L for zinc (120 mg/kg) was exceeded in four samples, two of which exceeded the ER-M (270 mg/kg), with the highest concentration of zinc detected in sample 6-WC03-SD-06M (926 mg/kg).

Among TCL organics, the ER-L for 4,4'-DDE (2 ug/kg) was exceeded in fourteen samples, eleven of which exceeded the ER-M (15 ug/kg). The highest concentration of 4,4'-DDE was detected in sample 6-WC09-SD-612M (83 ug/kg). The ER-L for 4,4'-DDD (2 ug/kg) was exceeded in fifteen samples, twelve of which exceeded the ER-M (20 ug/kg). The highest concentration of 4,4'-DDD was detected in sample 6-WC08-SD-612M (200J mg/kg). The ER-L (1 ug/kg) and the ER-M (7 ug/kg) for 4,4'-DDT were exceeded in three samples with the highest concentration detected in sample 6-WC08-SD-06M (1,200J ug/kg).

The ER-L for flouranthene (600 ug/kg) was exceeded in sample 6-WC08-SD-06B (760J ug/kg) and the ER-L (350 ug/kg) for pyrene was exceeded in sample 6-WC08-SD-06B (810J ug/kg). Neither the flouranthene nor the pyrene ER-Ms, 3,600 ug/kg and 2,200 ug/kg, respectively, were exceeded in any samples. The ER-L for benzo(a)pyrene (400 ug/kg) was exceeded in three samples with the highest concentration detected in sample 6-WC05-SD-612B (1,600 ug/kg) and the ER-L for dieldrin (0.02 ug/kg) was exceeded in sample 6-WC01-SD-612D (4.8J ug/kg). Neither the benzo(a)pyrene nor the dieldrin ER-Ms, 2,500 ug/lkg and 8 ug/kg respectively, were exceeded in any samples. Finally, the ER-L for PCB-1260 (50 ug/kg) was exceeded in twelve samples, six of which exceeded the median screening value (400 ug/kg). The highest concentration of PCB-1260 was detected in sample 6-WC08-SD-06M (2,100J mg/kg).

The following chemicals detected in Wallace Creek sediments do not have Region IV screening values for them: aluminum, barium, beryllium, iron, manganese, selenium, vanadium, 1,2-dichloroethane, total xylenes, toluene, trichloroethene, carbon disulfide, benzo(b)fluoranthene, benzo(k)fluoranthene and phenol. There are either criteria or toxicity data for aquatic organisms exposed to these chemicals in water samples, however, there is limited, if any, data assessing the effects on aquatic organism exposed to these chemicals in sediment samples. Therefore, the effects of these chemicals on aquatic organisms cannot be determined. However, it should be noted that of these chemicals, only aluminum and iron exceeded state or federal water quality criteria for the surface water samples. None of these chemicals in the surface water for which criteria do not exist, exceeded the toxicity values obtained from AQUIRE. Finally, the toxicity of benzo(b)fluoranthene and benzo(k)fluoranthene are likely accounted for when the other PAHs are evaluated.

5.3.2 Bear Head Creek

Among the TAL inorganics, the ER-L for lead (35 mg/kg) was exceeded in five samples with the highest concentration of lead detected in sample 6-BH07-SD-06M (70.4J mg/kg). In no case was the ER-M exceeded.

Among the TCL organics, the ER-L for 4,4'-DDE (2 ug/kg) was exceeded in eleven samples, nine of which exceeded the ER-M (15 ug/kg). The highest concentration of 4,4'-DDE was detected in sample 6-BH03-SD-06M (68 ug/kg). The ER-L for 4,4'-DDD (2 ug/kg) was exceeded in ten samples, seven of which exceeded the ER-M (20 ug/kg). The highest concentration of 4,4'- DDD was detected in sample 6-BH04-SD-612M (220J ug/kg). The ER-L for 4,4'-DDT (1 ug/kg) was exceeded in eight samples, six of which exceeded the median screening value (7 ug/kg). The highest concentration of 4,4'-DDT was detected in sample 6-BH04-SD-612M (38J ug/kg).

The ER-L for benzo(a)pyrene (400 ug/kg) was exceeded in two samples, with the highest concentration detected in sample 6-BH03-SD-612B (640 ug/kg). Finally, the ER-L for PCB-1260 (50 ug/kg) was exceeded in ten samples with the highest concentration of PCB-1260 detected in sample 6-BH04-SD-612M (370J ug/kg). The ER-M values for benzo(a)pyrene and PCB-1260, 2,500 ug/kg and 400 ug/kg respectively, were not exceeded in any samples.

The following chemicals detected in Bear Head Creek sediments do not have Region IV screening values for them: aluminum, barium, beryllium, iron, manganese, vanadium, benzene, ethylbenzene, tetrachloroethene, trichloroethene, total xylenes, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene. There are either criteria or toxicity data for aquatic organisms exposed to these chemicals in water samples, however, there is limited, if any, data assessing the effects on aquatic organisms exposed to these chemicals in sediment samples. Therefore, the effects of these chemicals on aquatic organisms cannot be determined. However, it should be noted that of these chemicals, only aluminum and iron exceeded state or federal water quality criteria for the surface water samples. None of these chemicals in the surface water for which criteria do not exist, exceeded the toxicity values obtained from AQUIRE. Finally, the toxicity of benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene are likely accounted for when the other PAHs are evaluated.

5.3.3 Ravine

In addition to the ARAR comparison with sediment screening values, adverse ecological effects from contaminants in the ravine sediments will be compared to available toxicological data for ecological receptors exposed to contaminants in soils.

The ER-L for cadmium (5 mg/kg) was exceeded only in sample 6-RV1-SD-06 (5.9J mg/kg). The ER-L for lead (35 mg/kg) was exceeded in two samples with the highest concentration of lead detected in sample 6-RV8-SD-06 (105J mg/kg). The ER-L for mercury (0.15 mg/kg) was exceeded in three samples with the highest concentration of mercury detected in sample 6-RV1-SD-06 (0.75 mg/kg). The ER-L for silver (1 mg/kg) was exceeded only in sample 6-RV8-SD-06 (1.2 mg/kg). In no cases were the ER-M values for cadmium, lead, mercury, or silver exceeded. Finally, the ER-L for zinc (120 mg/kg) was exceeded in four samples while the ER-M (270 mg/kg) for zinc was exceeded in one sample. The highest concentration of zinc was detected in sample 6-RV1-SD-06 (408 mg/kg).

Among the TCL organics, the ER-L (2 ug/kg) and the ER-M (15 ug/kg) for 4,4'-DDE were exceeded in six samples. The highest concentration of 4,4'-DDE was detected in sample 6-RV2-SD-06 (120J ug/kg). The ER-L for 4,4'-DDD (2 ug/kg) was exceeded in six samples, three of which exceeded the ER-M (20 ug/kg). The highest concentration of 4,4'-DDD was detected in sample 6-RV2-SD-06 (45J ug/kg). The ER-L (1 ug/kg) and the ER-M (7 ug/kg) for 4,4'-DDT were exceeded in eight samples with the highest concentration of 4,4'-DDT detected in sample 6-RV3-SD-06 (210J ug/kg).

The ER-L (0.02 ug/kg) and the ER-M (8 ug/kg) for dieldrin were exceeded in two samples with the higher concentration detected in sample 6-RV1-SD-07 (43J ug/kg). The ER-L for PCB-1260 (50 ug/kg) was exceeded in four samples with the the highest concentration of PCB-1260 detected in sample 6-RV1-SD-06 (360J ug/kg). The ER-L (0.02 ug/kg) for endrin was exceeded only in sample 6-RV1-SD-06 (5.1J ug/kg). The ER-M values for PCB-1260 and endrin were not exceeded.

Sample 6-RV2-SD-06 was the only sample in the ravine in which PAHs exceeded the ER-L values. The ER-L (225 ug/kg) and ER-M (1,380 ug/kg) for phenanthrene were exceeded in this sample (1,600 ug/kg) while the ER-L for flouranthene (600 ug/kg) also was exceeded in this sample (1,500J ug/kg). The ER-L for pyrene (350 ug/kg), benzo(a)anthracene (230 ug/kg), chrysene (400 ug/kg), dibenzo(a,h)anthracene (60 ug/kg), benzo(a)pyrene (400 ug/kg), acenapthene (150 ug/kg), fluorene (35 ug/kg), and anthracene (85 ug/kg) were all exceeded at this station due to the following sediment concentrations: pyrene (2,100 ug/kg), benzo(a)anthracene (1,100 ug/kg), chrysene (1,100 ug/kg), dibenzo(a,h)anthracene (83 ug/kg), benzo(a)pyrene (1,000 ug/kg), acenaphthene (220J ug/kg), fluorene (250J ug/kg), and anthracene (480 ug/kg).

The following chemicals detected in the ravine sediments do not have Region IV screening values for them: aluminum, barium, beryllium, iron, manganese, vanadium, benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(g,h,i)perylene and indeno(1,2,3-cd) pyrene. There are either criteria or toxicity data for aquatic organisms exposed to these chemicals in water samples, however, there is limited, if any, data assessing the effects on aquatic organism exposed to these chemicals in sediment samples. Therefore, the effects of these chemicals on aquatic organisms cannot be determined. However, it should be noted that of these chemicals, only aluminum and iron exceeded state or federal water quality criteria for the surface water samples. None of these chemicals in the surface water for which criteria do not exist, exceeded the toxicity values obtained from AQUIRE. Finally, the toxicity of benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(g,h,i)perylene are likely accounted for when the other PAHs are evaluated.

As discussed earlier in this section, the contaminants detected in the sediments will be compared to toxicological data associated with surface soils (See Section 5.4.4).

5.4 Surface Soil Quality

As discussed in the section above, there are no standards, criteria, or other screening values for assessing potential impacts to terrestrial ecological receptors from contaminants in soils. In addition, the amount of literature data evaluating adverse ecological effects on terrestrial species exposed to contaminants in surface soils is limited. The following paragraphs compare the concentrations of COCs detected in the surface soils to the published toxicity data. No information was found which evaluated the toxicological affects on plants and/or invertebrates inhabiting soils contaminated with TCL organics, therefore, the evaluation was limited to TAL inorganics.

5.4.1 Site 9

Toxicological effects on plants and/or invertebrates inhabiting soils contaminated by the following chemicals were obtained: barium, chromium, copper, lead, mercury, and zinc.

Barium concentrations in the surface soils ranged from 4.9JB to 8.9B mg/kg, which were below the 2,000 mg/kg that induced plant toxicity (Adriano, 1986). Chromium concentrations of 10 mg/kg in soil caused mortality in the earthworm species Pheretima pesthuma (Hopkin, 1989). Soil concentrations of chromium ranged from 1.7B to 5.1 mg/kg, which is below the 10 mg/kg toxicity level. Copper concentrations ranged from 0.93 JB to 2.8JB mg/kg, which are below the 50 mg/kg level that interfered with the reproduction activity of the earthworm species Allolobuphora caliginosa (Hopkin, 1989). The concentrations of lead in the soil ranged from 4.1 to 25.7 mg/kg. The phytoxicity of lead was reported to be lower than that of copper, which would be greater than 50 mg/kg (Adriano, 1986). Mercury concentrations ranged from 0.02B to 0.03B mg/kg, which is less than the 0.79 mg/kg that caused toxicity to earthworms. (USDI, 1987). Finally, zinc concentrations ranged from 6.8 to 18.1 mg/kg, which are less than the 450 to 1,400 mg/kg that caused plant toxicity (Adriano, 1986).

5.4.2 Site 6 (Lot 201)

Toxicological effects on plants and/or invertebrates inhabiting soil contaminated by the following chemicals was obtained: arsenic, barium, cadmium, chromium, copper, lead, nickel and zinc.

Arsenic concentrations ranged from 0.91B to 9.7J mg/kg which were below the 25 mg/kg that depressed crop yields (USDI, 1988). Barium concentrations ranged from 3.5 JB to 16.5 B mg/kg which were below the 2,000 mg/kg that induced plant toxicity (Adriano, 1986). Cadmium concentrations ranged from 0.51 JB to 1.5 J mg/kg which were higher than the 0.5 mg/kg level that caused low toxicity in the earthworm species Lumbricus rubellus (Hopkin, 1989).

Soil concentrations of chromium ranged from 3.5 to 21.6 mg/kg, some of which exceeded the 10 mg/kg that caused mortality in the earthworm species Pheretima pesthuma (Hopkin, 1989). Copper concentrations ranged from 0.75JB to 27.81 mg/kg which were below the 50 mg/kg level that interfered with the reproduction activity of the earthworm species Allolobuphora caliginosa (Hopkin, 1989). The phytoxicity of lead is low compared with other trace elements such as cadmium, copper, nickel, and arsenic (Adriano, 1986). The concentrations of lead ranged from 1J to 78 mg/kg which cannot be evaluated because a specific toxicity level for lead was not found. Nickel concentrations ranged from 3.7B to 6.4JB mg/kg which were less than the 17 mg/kg that caused low toxicity to the earthworm species Lumbricus rubellus (Hopkin, 1989). Finally, zinc concentrations ranged from 4.6 to 135J mg/kg which were less than the 450 mg/kg causing plant toxicity (Adriano, 1986).

5.4.3 Site 6 (Lot 203)

Toxicological effects on plants and/or invertebrates inhabiting soil contaminated by the following chemicals was obtained: arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc.

Arsenic concentrations ranged from 0.39B to 4.9 mg/kg which were below the 25 mg/kg that depressed crop yields (USDI, 1988). Barium concentrations ranged from 2.7JB to 47.8 mg/kg which were below the 2,000 mg/kg that induced plant toxicity (Adriano, 1986). Cadmium concentrations ranged from 0.48 to 9.3 mg/kg which were higher than the 0.5 mg/kg level that caused low toxicity in the earthworm species Lumbricus rubellus (Hopkin, 1989).

Soil concentrations of chromium ranged from 1.1 to 25.2 mg/kg, some of which exceeded the 10 mg/kg that caused mortality in the earthworm species Pheretima pesthuma (Hopkin, 1989). Copper concentrations ranged from 1JB to 75 mg/kg, some of which exceeded the 50 mg/kg level that interfered with the reproduction activity of the earthworm species Allolobuphora caliginosa (Hopkin, 1989). The phytoxicity of lead is low compared with other trace elements such as cadmium, copper, nickel, and arsenic (Adriano, 1986). The concentrations of lead ranged from 4.1 to 4,010J mg/kg which cannot be evaluated because a specific toxicity level for lead was not found. Mercury concentrations ranged from 0.03B to 1.1 mg/kg, some of which exceeded the 0.79 mg/kg level that was toxic to the earthworm species Octochaetus pattoni (USDI, 1987). Nickel concentrations ranged from 1.8JB to 13.2 mg/kg which were less than the 17 mg/kg that caused low toxicity to the earthworm species Lumbricus rubellus (Hopkin, 1989). Finally, zinc concentrations ranged from 1.1B to 604 mg/kg some of which exceeded the 450 mg/kg causing plant toxicity (Adriano, 1986).

5.4.4 Sites 6 (Wooded and Ravine Areas) and 82

Toxicological effects on plants and/or invertebrates inhabiting soil contaminated by the following chemicals was obtained: arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel and zinc.

Arsenic concentrations ranged from 0.49B to 26.3 mg/kg, most of which were below the 25 mg/kg that depressed crop yields (USDI, 1988). Barium concentrations ranged from 1.1JB to 1,410 mg/kg which were below the 2,000 mg/kg that induced plant toxicity (Adriano, 1986). Cadmium concentrations ranged from 0.4JB to 51.9 mg/kg, most of which exceeded the 0.5

mg/kg level that caused low toxicity in the earthworm species Lumbricus rubellus (Hopkin, 1989).

Soil concentrations of chromium ranged from 0.72B to 54.6 mg/kg, some of which exceed the 10 mg/kg that caused mortality in the earthworm species Pheretima pesthuma (Hopkin, 1989). Copper concentrations ranged from 0.39JB to 348 mg/kg, some of which were below the 50 mg/kg level that interfered with the reproduction activity of the earthworm species Allolobuphora caliginosa (Hopkin, 1989). The phytoxicity of lead is low compared with other trace elements such as cadmium, copper, nickel, and arsenic (Adriano, 1986). The concentrations of lead ranged from 2 to 1,710 mg/kg which cannot be evaluated because a specific toxicity level for lead was not found. Mercury concentrations ranged from 0.02B to 3.9 mg/kg, some of which exceeded the 0.79 mg/kg level that was toxic to the earthworm Octochaetus pattoni (USDI, 1987). Nickel concentrations ranged from 1.7B to 79.4 mg/kg, some of which exceeded the 17 mg/kg that caused low toxicity to the earthworm species Lumbricus rubellus (Hopkin, 1989). Finally, zinc concentrations ranged from 1.6 to 16,600 mg/kg, some of which exceeded the 450 mg/kg causing plant toxicity (Adriano, 1986).

5.5 Physical/Chemical Characteristics

Table 5-13 contains values for bioconcentration factors, water solubility, organic carbon partition coefficient, and vapor pressure for the contaminants identified in the sediments, surface water and surface soil samples. Information from this table was used in the risk characterization to assess the fate and transport of the constituents and the potential risks to the environmental receptors. The following paragraphs discuss the significance of each parameter included in the table.

Bioconcentration factors (BCF) measure the tendency for a chemical to partition from the water column or sediment and concentrate in aquatic organisms. This factor is important for ecological receptors because chemicals with high bioconcentration factors could accumulate in lower-order species and subsequently accumulate to toxic levels in higher-order species that consume the lower-order species. Bioconcentration factors among the metals range from 19 for beryllium to 350,000 for manganese, and 1.17 for vinyl chloride to 100,000 for PCB-1260 among the organics. The pesticides have the highest potential to concentrate in the fish or crab tissue. Published BCF data were not available for some of the COCs at OU No. 2.

Water solubility is important in the ecological environment because it measures the tendency for a chemical to remain dissolved in the water column, partition to soil or sediment, or bioconcentrate in aquatic organisms. Chemicals with high water solubilities tend to be more bioavailable to aquatic organisms. However, they will not significantly bioconcentrate in the organisms. On the other hand, chemicals with a low water solubility will remain bound to the sediment and soils but may bioconcentrate in organisms to a significant degree. Water solubility for metals is not applicable because they are practically insoluble in water. The water solubility of the organics ranged from less than 0.01 mg/l for the PAHs to 83,000 mg/l for phenol.

The organic carbon partition coefficient (Koc) measures the tendency for a chemical to partition between soil or sediment particles containing organic carbon and water. This coefficient is important in the ecological environment because it determines how strongly an organic chemical will be bound to the organics in the sediments. The Koc is highest for the pesticides (4×10^6 ml/g) and lowest for phenol (14.2 ml/g). Koc values are not applicable for metals.

The vapor pressure measures the tendency for a chemical to partition into air. This parameter is important for the ecological environment because it can be used to determine the concentrations of the constituents in air. The vapor pressure is highest for vinyl chloride (3,000 mm Hg). Other contaminants with significant vapor pressure values include benzene (95 mm Hg), carbon disulfide (360 mm Hg), and 1,2-dichloroethane (79 mm Hg). The vapor pressure for the most other contaminants of concern are low or negligible.

TABLE 5-1

OPERABLE UNIT NO. 2
SURFACE WATER DATA SUMMARY - WALLACE CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO NORTH CAROLINA AND REGION IV FRESHWATER SURFACE WATER SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Surface Water ARARs			Contaminant Frequency/Range		Comparison to ARARs		
	North Carolina (NCWQS) (1)	Region IV (2) Screening Values		No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above NCWQS	No. of Positive Detects above Screening Values	
		Acute	Chronic				Acute	Chronic
Inorganics: (ug/l)								
Aluminum (pH 6.3. - 9.0)	Not Established	Not Established	Not Established	25/28	480J-1350	NA (3)	NA	NA
Arsenic	50	69	36	1/28	3.7B-3.7B	0/1	0/1	0/1
Barium	Not Established	Not Established	Not Established	6/28	16JB-22.6B	NA	NA	NA
Cadmium (4)	5.0	43	9.3	2/28	3.2JB-17.4J	1/2	0/2	1/2
Chromium (VI)	20 (Total)	1,100	50	1/28	4.9B-4.9B	0/1	0/1	0/1
Copper(4)	3	2.9	2.9	6/28	3B-209	5/6	6/6	6/6
Iron	Not Established	Not Established	Not Established	28/28	477-1,050	NA	NA	NA
Lead(4)	25	140	5.6	9/28	1.2B-10.4	0/9	0/9	1/9
Manganese	Not Established	Not Established	Not Established	26/28	8.2JB-25J	NA	NA	NA
Mercury(4)	0.025	2.1	0.025	3/28	0.24B-0.52	3/3	0/3	3/3

Notes: (1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value for Hazardous Waste Sites
(3) NA - Not Applicable
(4) Hardness Dependent (Based on 50 mg/l $CaCO_3$)
(5) Designated Swamp Areas - Waters may have a pH as low as 4.3 and dissolved oxygen less than 5.0 mg/l if due to natural conditions.
(6) An instantaneous reading may be as low as 4.0 mg/l, but the daily average must be 5.0 mg/l.

TABLE 5-1 (cont.)

OPERABLE UNIT NO. 2
SURFACE WATER DATA SUMMARY - WALLACE CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO NORTH CAROLINA AND REGION IV FRESHWATER SURFACE WATER SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Surface Water ARARs			Contaminant Frequency/Range		Comparison to ARARs		
	North Carolina (NCWQS) (1)	Region IV (2) Screening Values		No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above NCWQS	No. of Positive Detects above Screening Values	
		Acute	Chronic				Acute	Chronic
Nickel(4)	8.3	75	8.3	4/28	102-1,380	4/4	4/4	4/4
Silver(4)	0.1	2.3	0.23	1/28	2.6B-2.6B	1/1	1/1	1/1
Vanadium	Not Established	Not Established	Not Established	9/28	1.9JB-3.3JB	NA	NA	NA
Zinc(4)	86	95	86	10/28	7.3B-111	2/10	2/10	2/10
Organics: (ug/l)								
1, 2-Dichloroethene	Not Established	Not Established	Not Established	13/28	2J-85	NA	NA	NA
Tetrachloroethene	Not Established	1,020	45	3/28	1J-4J	NA	0/3	0/3
Toluene	Not Established	370	37	4/28	1J-3J	0/4	0/4	0/4
Trichloroethene	Not Established	Not Established	Not Established	12/28	3J-98	NA	NA	NA
Vinyl Chloride	Not Established	Not Established	Not Established	1/28	6J-6J	NA	NA	NA
Other Parameters:								
Dissolved Oxygen (mg/l)	5.0(5)	Not Established	Not Established	NA	0.15-6.8	11	NA	NA
pH (S.U.)	6.8-8.5	Not Established	6.5-8.5	NA	3.9-6.8	20	NA	16

Notes: (1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value for Hazardous Waste Sites
(3) NA - Not Applicable
(4) Hardness Dependent (Based on 50 mg/l $CaCO_3$)
(5) An instantaneous reading may be as low as 4.0 mg/l, but the daily average must be 5.0 mg/l.

TABLE 5-2

OPERABLE UNIT NO. 2
SURFACE WATER DATA SUMMARY - BEAR HEAD CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO NORTH CAROLINA AND REGION IV FRESHWATER SURFACE WATER SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Surface Water ARARs			Contaminant Frequency/Range		Comparison to ARARs		
	North Carolina (NCWQS) (1)	Region IV (2) Screening Values		No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above NCWQS	No. of Positive Detects above Screening Values	
		Acute	Chronic				Acute	Chronic
Inorganics: (µg/l)								
Aluminum (pH 6.5-9.0)	Not Established	Not Established	Not Established	10/14	334-2,700	NA (3)	NA	NA
Barium	Not Established	Not Established	Not Established	14/14	13.4JB-36B	NA	NA	NA
Chromium (VI)	20 (Total)	1,100	50	3/14	4.4B-8B	0/3	0/3	0/3
Copper (4)	3	2.9	2.9	3/14	4B-55.8	1/3	1/3	1/3
Iron	Not Established	Not Established	Not Established	14/14	501-6,200	NA	NA	NA
Lead (4)	25	140	5.6	10/14	1.5JB-8.2	0/10	0/10	2/10
Manganese	Not Established	Not Established	Not Established	14/14	6.2B-65	NA	NA	NA
Mercury (4)	0.025	2.1	0.025	2/14	0.05-0.34	2/2	0/2	2/2
Nickel (4)	8.3	75	8.3	2/14	8J-244	1/2	1/2	1/2

Notes: (1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value for Hazardous Waste Sites
(3) NA - Not Applicable
(4) Hardness Dependent (Based on 50 mg/l $CaCO_3$)
(5) An instantaneous reading may be as low as 4.0 mg/l, but the daily average must be 5.0 mg/l.

TABLE 5-2 (cont.)

OPERABLE UNIT NO. 2
SURFACE WATER DATA SUMMARY - BEAR HEAD CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO NORTH CAROLINA AND REGION IV FRESHWATER SURFACE WATER SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Surface Water ARARs			Contaminant Frequency/Range		Comparison to ARARs		
	North Carolina (NCWQS) (1)	Region IV (2) Screening Values		No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above NCWQS	No. of Positive Detects above Screening Values	
		Acute	Chronic				Acute	Chronic
Silver (4)	0.1	2.3	0.23	2/14	2.1B-3.6B	2/2	1/2	2/2
Vanadium	Not Established	Not Established	Not Established	3/14	2JB-3JB	NA	NA	NA
Zinc (4)	86	95	86	3/14	6.2B-30.7	0/3	0/3	0/3
Other Parameters:								
Dissolved Oxygen (mg/l)	5.0 (5)	Not Established	Not Established	NA	0.3-6.34	2	NA	NA
pH (S.U.)	6.8-8.5	Not Established	6.5-8.5	NA	6.2-6.8	8	NA	4

Notes:
(1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value for Hazardous Waste Sites
(3) NA - Not Applicable
(4) Hardness Dependent (Based on 50 mg/l $CaCO_3$)
(5) An instantaneous reading may be as low as 4.0 mg/l, but the daily average must be 5.0 mg/l.

TABLE 5-3

OPERABLE UNIT NO. 2
SURFACE WATER DATA SUMMARY - RAVINE
FREQUENCY AND RANGE OF DETECTION
COMPARED TO NORTH CAROLINA AND REGION IV FRESHWATER SURFACE WATER SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Surface Water ARARs			Contaminant Frequency/Range		Comparison to ARARs		
	North Carolina (NCWQS) (1)	Region IV (2) Screening Values		No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above NCWQS	No. of Positive Detects above Screening Values	
		Acute	Chronic				Acute	Chronic
Inorganics: (ug/l)								
Aluminum (pH 6.5-9.0)	Not Established	750	87	6/6	119B-613	NA (3)	0/6	6/6
Arsenic	50	360	90	3/6	2.2B-10.5	0/3	0/3	0/3
Barium	Not Established	Not Established	Not Established	6/6	37.1JB-91B	NA	NA	NA
Cadmium (4)	2.0	1.79	0.66	2/6	3.7JB-4.3JB	2/2	2/2	2/2
Chromium	50	16	11	2/6	4.2B-6.5B	0/2	0/2	0/2
Copper (4)	7	9.22	6.54	6/6	4.7B-9JB	4/6	0/6	4/6
Iron	1,000	NA	1,000	6/6	127J-9600	2/6	NA	2/6
Lead (4)	25	33.78	1.32	6/6	1.9B-12.2	0/6	0/6	6/6
Manganese	Not Established	Not Established	Not Established	6/6	38.6J-597	NA	NA	NA
Silver (4)	0.06	1.23	0.012	3/6	2.9B-67.6	3/3	3/3	3/3
Vanadium	Not Established	Not Established	Not Established	1/6	6.2B-6.2B	NA	NA	NA
Zinc (4)	50	65.04	58.91	6/6	72.7-495	6/6	6/6	6/6

Notes: (1) NCWQS - North Carolina Water Quality Standard for Freshwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value for Hazardous Waste Sites
(3) NA - Not Applicable
(4) Hardness Dependent (Based on 50 mg/l $CaCO_3$)

TABLE 5-4

OPERABLE UNIT NO. 2
WALLACE CREEK: SURFACE WATER CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	North Carolina NCWQS (1)	Region IV Screening Values (2)	
				ACUTE	CHRONIC
Inorganics: (ug/l)					
Cadmium	6-WC07-SW-312M	17.4J	5	43	9.3
Copper	6-WC03-SW-312M	129	3	2.9	2.9
	6-WC05-SW-06B	5.5B	3	2.9	2.9
	6-WC05-SW-06M	3B	3	2.9	2.9
	6-WC05-SW-312M	43.8	3	2.9	2.9
	6-WC10-SW-312M	66	3	2.9	2.9
	6-WC11-SW-312M	209	3	2.9	2.9
Lead	6-WC03-SW-312M	10.4	25	140	5.6
Mercury	6-WC03-SW-312M	0.52	0.025	2.1	0.025
	6-WC05-SW-312M	0.24B	0.025	2.1	0.025
	6-WC11-SW-312M	0.52	0.025	2.1	0.025
Nickel	6-WC03-SW-312M	1,380	8.3	75	8.3
	6-WC05-SW-312M	177	8.3	75	8.3
	6-WC10-SW-312M	102	8.3	75	8.3
	6-WC11-SW-312M	213	8.3	75	8.3
Silver	6-WC05-SW-312M	2.6B	0.1	2.3	0.23
Zinc	6-WC03-SW-312M	111	86	95	86
	6-WC11-SW-312M	95.1	86	95	86
Dissolved Oxygen (mg/l)	6-WC07-SW/SD-B (3)	0.2	5.0*	NA	NA
	6-WC08-SW/SD-B	0.15	5.0*	NA	NA
	6-WC09-SW/SD-S (5)	2.26	5.0*	NA	NA
	6-WC09-SW/SD-B	0.15	5.0*	NA	NA

(1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value For Hazardous Waste Sites
(3) Sample Numbers with a"-B" indicates the sample was measured from the bottom in the middle of the creek
(4) Sample Numbers with a "-BB" indicates the sample was measured from the bottom of the bank of the creek
(5) Sample Numbers with a "-S" indicates the sample was measured from the surface in the middle of the creek

TABLE 5-4 (cont.)

OPERABLE UNIT NO. 2
WALLACE CREEK: SURFACE WATER CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	North Carolina NCWQS (1)	Region IV Screening Values (2)	
				ACUTE	CHRONIC
Dissolved Oxygen (mg/l) (Cont.)	6-WC10-SW/SD-BB(4)	3.0	5.0*	NA	NA
	6-WC10-SW/SD-S	3.2	5.0*	NA	NA
	6-WC10-SW/SD-B	0.15	5.0*	NA	NA
	6-WC11-SW/SD-B	2.2	5.0*	NA	NA
	6-WC11-SW/SD-S	3.2	5.0*	NA	NA
	6-WC11-SW/SD-BB	0.3	5.0*	NA	NA
	6-WC9A-BN-B	0.13	5.0*	NA	NA
	6-WC11A-BN-B	0.15	5.0*	NA	NA
pH (S.U.)	6-WC6A-BN-S	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC6A-BN-B	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC9A-BN-S	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC11A-BN-S	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC01-SW/SD-B	3.9	6.8 - 8.5	NA	6.5 - 8.5
	6-WC03-SW/SD-S	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC03-SW/SD-B	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC04-SW/SD-S	6.6	6.8 - 8.5	NA	6.5 - 8.5
	6-WC05-SW/SD-B	6.5	6.8 - 8.5	NA	6.5 - 8.5
	6-WC05-SW/SD-S	6.5	6.8 - 8.5	NA	6.5 - 8.5
	6-WC06-SW/SD-S	6.7	6.8 - 8.5	NA	6.5 - 8.5
	6-WC07-SW/SD-BB	6.0	6.8 - 8.5	NA	6.5 - 8.5
	6-WC08-SW/SD-BB	6.2	6.8 - 8.5	NA	6.5 - 8.5
	6-WC08-SW/SD-S	6.1	6.8 - 8.5	NA	6.5 - 8.5
	6-WC09-SW/SD-BB	6.1	6.8 - 8.5	NA	6.5 - 8.5

(1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value For Hazardous Waste Sites
3) Sample Numbers with a "-B" indicates the sample was measured from the bottom in the middle of the creek
(4) Sample Numbers with a "-BB" indicates the sample was measured from the bottom of the bank of the creek
(5) Sample Numbers with a "-S" indicates the sample was measured from the surface in the middle of the creek
* An instantaneous reading may be as low as 4.0 mg/l; however, the daily average must be at least 5.0 mg/l.

TABLE 5-4 (cont.)

OPERABLE UNIT NO. 2
WALLACE CREEK: SURFACE WATER CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	North Carolina NCWQS (1)	Region IV Screening Values (2)	
				ACUTE	CHRONIC
	6-WC09-SW/SD-S	6.1	6.8 - 8.5	NA	6.5 - 8.5
	6-WC10-SW/SD-BB	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC10-SW/SD-S	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-WC11-SW/SD-BB	6.1	6.8 - 8.5	NA	6.5 - 8.5
	6-WC11-SW/SD-S	6.3	6.8 - 8.5	NA	6.5 - 8.5

(1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U.S. EPA Region IV Freshwater Surface Water Screening Value For Hazardous Waste Sites
(3) Sample Numbers with a"-B" indicates the sample was measured from the bottom in the middle of the creek
(4) Sample Numbers with a "-BB" indicates the sample was measured from the bottom of the bank of the creek
(5) Sample Numbers with a "-S" indicates the sample was measured from the surface in the middle of the creek
* An instantaneous reading may be as low as 4.0 mg/l; however, the daily average must be at least 5.0 mg/l.

TABLE 5-5

OPERABLE UNIT NO. 2
BEAR HEAD CREEK: SURFACE WATER CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	North Carolina NCWQS (1)	Region IV Screening Values (2)	
				ACUTE	CHRONIC
Inorganics: (ug/l)					
Copper	6-BH07-SW-312M	55.8	3	2.9	2.9
Lead	6-BH03-SW-06M	5.9	25	140	5.6
	6-BH05-SW-06M	8.2	25	140	5.6
Mercury	6-BH05-SW-06M	0.05B	0.025	2.1	0.025
	6-BH07-SW-312M	0.34	0.025	2.1	0.025
Nickel	6-BH07-SW-312M	244	8.3	75	8.3
Silver	6-BH07-SW-06B	3.6B	0.1	2.3	0.23
	6-BH07-SW-06M	2.1B	0.1	2.3	0.23
Dissolved Oxygen (mg/l)	6-BHO7-SW/SD-B(3)	0.3	5.0*	NA	NA
	6-BHO7-SW/SD-S (4)	3.15	5.0*	NA	NA
pH (S.U.)	6-BH02-SW/SD-B	6.5	6.8 - 8.5	NA	6.5 - 8.5
	6-BH03-SW/SD-B	6.5	6.8 - 8.5	NA	6.5 - 8.5
	6-BH06-SW/SD-B	6.6	6.8 - 8.5	NA	6.5 - 8.5
	6-BH07-SW/SD-B	6.6	6.8 - 8.5	NA	6.5 - 8.5
	6-BHO7-SW/SD-S	6.2	6.8 - 8.5	NA	6.5 - 8.5
	6-BH2A-BN-B	5.5	6.8 - 8.5	NA	6.5 - 8.5
	6-BH6A-BN-S	6.3	6.8 - 8.5	NA	6.5 - 8.5
	6-BH4A-FS-B	6.4	6.8 - 8.5	NA	6.5 - 8.5

(1) NCWQS - North Carolina Water Quality Standard for Saltwater Aquatic Life
(2) U. S. EPA Region IV Freshwater Surface Water Screening Value For Hazardous Waste Sites
(3) Sample Numbers with "-B" indicate the sample was measured at the bottom in the middle of the creek
(4) Sample Numbers with "-S" indicate the sample was measured at the surface in the middle of the creek

TABLE 5-6

OPERABLE UNIT NO. 2
RAVINE: SURFACE WATER CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	North Carolina NCWQS (1)	Region IV Screening Values (2)	
				ACUTE	CHRONIC
Inorganics: (ug/l)					
Aluminum	6-RV2-SW-06	613	NA	750	87
	6-RV3-SW-06	119B	NA	750	87
	6-RV5-SW-06	148B	NA	750	87
	6-RV6-SW-06	612	NA	750	87
	6-RV7-SW-06	279	NA	750	87
	6-RV8-SW-06	487	NA	750	87
Cadmium	6-RV2-SW-06	3.7JB	2	1.79	0.66
	6-RV5-SW-06	4.3JB	2	1.79	0.66
Copper	6-RV2-SW-06	9JB	7	9.22	6.54
	6-RV5-SW-06	9JB	7	9.22	6.54
	6-RV7-SW-06	7.5B	7	9.22	6.54
	6-RV8-SW-06	7.2B	7	9.22	6.54
Iron	6-RV7-SW-06	1,910	1,000	NA	1,000
	6-RV8-SW-06	9,600	1,000	NA	1,000
Lead	6-RV2-SW-06	6.1	25	33.78	1.32
	6-RV3-SW-06	1.9B	25	33.78	1.32
	6-RV5-SW-06	4.8	25	33.78	1.32
	6-RV6-SW-06	8	25	33.78	1.32
	6-RV7-SW-06	2.8B	25	33.78	1.32
	6-RV8-SW-06	12.2	25	33.78	1.32
Silver	6-RV3-SW-06	3.6B	0.06	1.23	0.012
	6-RV6-SW-06	67.6	0.06	1.23	0.012
	6-RV8-SW-06	2.9B	0.06	1.23	0.012

(1) NCWQS - North Carolina Water Quality Standard for Freshwater Aquatic Life
(2) U. S. EPA Region IV Freshwater Surface Water Screening Value For Hazardous Waste Sites

TABLE 5-6 (cont.)

OPERABLE UNIT NO. 2
RAVINE: SURFACE WATER CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	North Carolina NCWQS (1)	Region IV Screening Values (2)	
				ACUTE	CHRONIC
Zinc	6-RV2-SW-06	452	50	65.04	58.91
	6-RV3-SW-06	113	50	65.04	58.91
	6-RV5-SW-06	374	50	65.04	58.91
	6-RV6-SW-06	495	50	65.04	58.91
	6-RV7-SW-06	248	50	65.04	58.91
	6-RV8-SW-06	72.7	50	65.04	58.91

(1) NCWQS - North Carolina Water Quality Standard for Freshwater Aquatic Life
(2) U. S. EPA Region IV Freshwater Surface Water Screening Value For Hazardous Waste Sites

TABLE 5-7

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - WALLACE CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
Analyte	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Inorganics: (mg/kg)						
Aluminum	Not Established	Not Established	33/33	539-25,400	NA (3)	NA
Arsenic	33	85	15/33	1B-10.2	0/15	0/15
Barium	Not Established	Not Established	30/33	2.5JB-110	NA	NA
Beryllium	Not Established	Not Established	13/33	0.07B-0.78B	NA	NA
Chromium	80	145	27/33	1.2B-28.5	0/27	0/27
Copper	70	390	25/33	0.43JB-53,200	2/25	1/25
Iron	Not Established	Not Established	33/33	390-14,600	NA	NA
Lead	35	110	33/33	1.5-314J	9/33	2/33
Manganese	Not Established	Not Established	32/33	3.1-50.2	NA	NA
Nickel	30	50	5/33	2.7JB-10.7JB	0/5	0/5
Silver	1	2.2	1/33	7.3-7.3	1/1	1/1
Vanadium	Not Established	Not Established	26/33	0.82JB-45.5J	NA	NA
Zinc	120	270	19/33	6.2-926	4/19	2/19

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABL[illegible]7 (Cont.)

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - WALLACE CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
Analyte	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Organics: (μg/kg)						
4',4'-DDE	2	15	14/33	5.9-83	14/14	11/14
4',4'-DDD	2	20	15/33	7.4J-200J	15/15	12/15
4',4'-DDT	1	7	3/33	200J-1,200J	3/3	3/3
Dieldrin	0.02	8	1/33	4.8J-4.8J	1/1	0/1
PCB-1260	50 (4)	400 (4)	14/33	31J-2,100J	12/14	6/14
1,2-Dichloroethene	Not Established	Not Established	1/33	31J-31J	NA	NA
Toluene	Not Established	Not Established	2/33	4J-5J	NA	NA
Total Xylenes	Not Established	Not Established	3/33	26-120J	NA	NA
Trichloroethene	Not Established	Not Established	2/33	7J-23	NA	NA
Phenol	Not Established	Not Established	2/33	120J-190J	NA	NA
Benzo(a)anthracene	230	1,600	4/33	67J-210J	0/4	0/4
Benzo (a) pyrene	400	2,500	6/33	63J-1,600	3/6	0/6
Benzo (b) fluoranthene	Not Established	Not Established	6/33	94J-420J	NA	NA
Benzo (k) fluoranthene	Not Established	Not Established	2/33	67J-140J	NA	NA
Carbon Disulfide	Not Established	Not Established	5/33	2J-24J	NA	NA

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABL[illegible]7 (Cont.)

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - WALLACE CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Chrysene	400	2,800	3/33	74J-230J	0/3	0/3
Fluoranthene	600	3,600	11/33	94J-760J	1/11	0/11
Phenanthrene	225	1,380	1/33	76J-76J	0/1	0/1
Pyrene	350	2,200	12/33	95J-810J	2/12	0/12

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABLE 5-8

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - BEAR HEAD CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Inorganics: (mg/kg)						
Aluminum	Not Established	Not Established	20/20	465-22,100	NA(3)	NA
Arsenic	33	85	8/20	0.54B-6.1JB	0/8	0/8
Barium	Not Established	Not Established	16/20	7.7JB-40.4B	NA	NA
Beryllium	Not Established	Not Established	9/20	0.13B-0.97B	NA	NA
Cadmium	5	9	11/20	0.54JB-4.7JB	0/11	0/11
Chromium	80	145	18/20	2.3B-16.4B	0/18	0/18
Copper	70	390	13/20	1.2JB-28.1B	0/13	0/13
Iron	Not Established	Not Established	20/20	442-17,100	NA	NA
Lead	35	110	20/20	2.5-70.4J	5/20	0/20
Manganese	Not Established	Not Established	20/20	3.8J-48.6	NA	NA
Selenium	Not Established	Not Established	1/20	2.9-2.9	NA	NA
Vanadium	Not Established	Not Established	20/20	1.5JB-54.1B	NA	NA
Zinc	120	270	15/20	6.4B-82.4	0/15	0/15

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABL[illegible]3 (Cont.)

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - BEAR HEAD CREEK
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
Analyte	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Organics: (µg/kg)						
4',4'-DDE	2	15	11/20	5.7-68	11/11	9/11
4',4'-DDD	2	20	10/20	8.4J-220J	10/10	7/10
4',4'-DDT	1	7	8/20	6.6J-38J	8/8	6/8
PCB-1260	50 (4)	400 (4)	10/20	51-370J	10/10	0/10
Benzene	Not Established	Not Established	1/20	5J-5J	NA	NA
Ethylbenzene	Not Established	Not Established	1/20	57J-57J	NA	NA
Tetrachloroethane	Not Established	Not Established	1/20	3J-3J	NA	NA
Trichloroethane	Not Established	Not Established	2/20	5J-150	NA	NA
Total Xylenes	Not Established	Not Established	2/20	3J-380	NA	NA
Benzo (b) fluoranthene	Not Established	Not Established	1/20	96J-96J	NA	NA
Benzo (a) pyrene	400	2,500	6/20	93J-640	2/6	0/6
Indeno (1,2,3-CD) pyrene	Not Established	Not Established	1/20	40J-40J	NA	NA
Pyrene	350	2,200	2/20	60J-76J	0/2	0/2

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABLE 5-9

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - RAVINE
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
Analyte	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Inorganics: (mg/kg)						
Aluminum	Not Established	Not Established	11/11	739-10,300	NA(3)	NA
Arsenic	33	85	4/11	0.61B-4.3	0/4	0/4
Barium	Not Established	Not Established	10/11	2.9JB-61.5	NA	NA
Beryllium	Not Established	Not Established	4/11	0.06B-0.25B	NA	NA
Cadmium	5	9	9/11	0.53JB-5.9J	1/9	0/9
Chromium	80	145	6/11	2B-17.7	0/6	0/6
Copper	70	390	11/11	2.6JB-67.5	0/11	0/11
Iron	Not Established	Not Established	11/11	420-7,590	NA	NA
Lead	35	110	11/11	2.1B-105J	2/11	0/11
Manganese	Not Established	Not Established	11/11	3.4J-288	NA	NA
Mercury	0.15	1.3	9/11	0.03B-0.75	3/11	0/9
Nickel	30	50	4/11	2.1B-7.7JB	0/4	0/4
Silver	1	2.2	6/11	0.56B-1.2B	1/6	0/6
Vanadium	Not Established	Not Established	11/11	1.2B - 19	NA	NA
Zinc	120	270	11/11	20.3-408	4/11	1/11

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABL[illegible]9 (Cont.)

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - RAVINE
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Analyte	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Organics: (µg/kg)						
4',4'-DDE	2	15	6/11	23J-120J	6/6	6/6
4',4'-DDD	2	20	6/11	4.1J-45J	6/6	3/6
4',4'-DDT	1	7	8/11	14J-210J	8/8	8/8
Dieldrin	0.02	8	2/11	8.1J-43J	2/2	2/2
Endrin	0.02	45	1/11	5.1J-5.1J	1/1	0/1
PCB 1260	50(4)	400(4)	6/11	29J-360J	4/6	0/6
Acenaphthene	150	650	1/11	220J-220J	1/1	0/1
Anthracene	85	960	1/11	480-480	1/1	0/1
Benzo(a)anthracene	230	1,600	3/11	43J-1,100	1/3	0/3
Benzo (a) pyrene	400	2,500	3/11	70J-1,000	1/3	0/3
Benzo (b) fluoranthene	Not Established	Not Established	4/11	54J-1,200	NA	NA
Benzo (g,h,i) perylene	Not Established	Not Established	2/11	57J-680	NA	NA
Benzo (k) fluoranthene	Not Established	Not Established	1/11	440-440	NA	NA
Chrysene	400	2,800	3/11	59J-1,100	1/3	0/3
Dibenz (a,h) anthracene	60	260	1/11	83J-83J	1/1	0/1

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABI 9 (Cont.)

OPERABLE UNIT NO. 2
SEDIMENT DATA SUMMARY - RAVINE
FREQUENCY AND RANGE OF DETECTION
COMPARED TO USEPA REGION IV SEDIMENT SCREENING VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	Region IV Sediment Screening Value		Contaminant Frequency/Range		Comparison to Screening Values	
Analyte	ER-L(1)	ER-M(2)	No. of Positive Detects/ No. of Samples	Range of Positive Detections	No. of Positive Detects above ER-L	No. of Positive Detects above ER-M
Fluoranthene	600	3,600	3/11	84J-1,500J	1/3	0/3
Fluorene	35	640	1/11	250J-250J	1/1	0/1
Indeno (1,2,3-CD) pyrene	Not Established	Not Established	2/11	57J-710	NA	NA
2-Methylnapthalene	65	670	1/11	44J-44J	0/1	0/1
Napthalene	340	2,100	1/11	54J-54J	0/1	0/1
Phenanthrene	225	1,380	3/11	50J-1,600	1/3	1/3
Pyrene	350	2,200	4/11	96J-2,100	1/4	0/4

Notes: (1) ER-L - Effects Range - Low
(2) ER-M - Effects Range - Median
(3) NA - Not Applicable
(4) Total PCBs

TABLE 5-10

OPERABLE UNIT NO. 2
WALLACE CREEK: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
Inorganics: (mg/kg)				
Copper	6-WC03-SD-06M	53,200	70	390
	6-WC03-SD-612B	79.6	70	390
Lead	6-WC03-SD-06M	314J	35	110
	6-WC06-SD-06B	70.9	35	110
	6-WC08-SD-06B	97	35	110
	6-WC08-SD-06M	44.1	35	110
	6-WC08-SD-612B	49.7	35	110
	6-WC08-SD-612M	156	35	110
	6-WC09-SD-06M	106	35	110
	6-WC09-SD-612M	37.4	35	110
	6-WC10-SD-06M	68.9	35	110
Silver	6-WC03-SD-06M	7.3	1	2.2
Zinc	6-WC03-SD-06M	926	120	270
	6-WC08-SD-612M	132	120	270
	6-WC09-SD-06B	388	120	270
	6-WC09-SD-06M	137	120	270
Organics: (ug/kg)				
4',4'-DDE	6-WC06-SD-06B	25J	2	15
	6-WC06-SD-612B	16J	2	15
	6-WC06-SD-612B	7.9J	2	15
	6-WC07-SD-06B	48J	2	15
	6-WC08-SD-06B	47J	2	15

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-10 (cont.)

OPERABLE UNIT NO. 2
WALLACE CREEK: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
	6-WC08-SD-06M	18J	2	15
	6-WC08-SD-612B	27.9	2	15
	6-WC08-SD-612M	7.6J	2	15
	6-WC09-SD-06B	5.9	2	15
	6-WC09-SD-06M	69	2	15
	6-WC09-SD-612M	83	2	15
	6-WC10-SD-06M	32	2	15
	6-WC10-SD-612M	34J	2	15
	6-WC11-SD-06M	25J	2	15
4',4'-DDD	6-WC01-SD-612D	16J	2	20
	6-WC06-SD-06B	80J	2	20
	6-WC07-SD-612M	67	2	20
	6-WCO8-SD-06M	50J	2	20
	6-WC08-SD-612M	200J	2	20
	6-WC08-SD-612B	23J	2	20
	6-WC08-SD-612M	49	2	20
	6-WC09-SD-06B	7.4J	2	20
	6-WC09-SD-06M	80J	2	20
	6-WC09-SD-612B	16J	2	20
	6-WC09-SD-612M	49J	2	20
	6-WC10-SD-06M	44	2	20
	6-WC10-SD-612M	43J	2	20
	6-WC11-SD-06B	35J	2	20
	6-WC11-SD-06M	42J	2	20
4',4'-DDT	6-WC06-SD-06B	200J	1	7

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-10 (cont.)

OPERABLE UNIT NO. 2
WALLACE CREEK: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
	6-WC07-SD-612M	220J	1	7
	6-WC08-SD-06M	1,200J	1	7
Dieldrin	6-WC01-SD-612D	4.8J	0.02	8
PCB-1260	6-WC04-SD-06M	760	50	400
	6-WC05-SD-06M	330J	50	400
	6-WC06-SD-06B	1,300J	50	400
	6-WC06-SD-06M	400J	50	400
	6-WC07-SD-06M	2,000J	50	400
	6-WC08-SD-06B	310J	50	400
	6-WC08-SD-06M	2,100J	50	400
	6-WC09-SD-06M	290J	50	400
	6-WC09-SD-612M	730J	50	400
	6-WC10-SD-06M	420	50	400
	6-WC10-SD-612M	160J	50	400
	6-WC11-SD-06M	120J	50	400
Benzo(a)pyrene	6-WC05-SD-06B	850J	400	2,500
	6-WC05-SD-612B	1600	400	2,500
	6-WC09-SD-612M	480J	400	2,500
Flouranthene	6-WC08-SD-06B	760J	600	3,600
Pyrene	6-WC08-SD-06B	810J	350	2,200
	6-WC09-SD-06B	410J	350	2,200

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-11

OPERABLE UNIT NO. 2
BEAR HEAD CREEK: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
Inorganics: (mg/kg)				
Lead	6-BH03-SD-06M	45.3	35	110
	6-BH03-SD-612M	46.1	35	110
	6-BH06-SD-06B	42	35	110
	6-BH07-SD-06B	49.2	35	110
	6-BH07-SD-06M	70.4J	35	110
Organics: (ug/kg)				
4',4'-DDE	6-BH02-SD-06M	5.7	2	15
	6-BH03-SD-06M	68	2	15
	6-BH03-SD-612M	22	2	15
	6-BH04-SD-06B	14	2	15
	6-BH04-SD-06M	41J	2	15
	6-BH04-SD-612B	35J	2	15
	6-BH04-SD-612M	53J	2	15
	6-BH05-SD-06B	30J	2	15
	6-BH05-SD-06M	32	2	15
	6-BH06-SD-06B	68J	2	15
	6-BH06-SD-06M	24J	2	15
4',4'-DDD	6-BH03-SD-06M	25	2	20
	6-BH03-SD-612M	9.2J	2	20
	6-BH04-SD-06B	8.4J	2	20
	6-BH04-SD-06M	42J	2	20
	6-BH04-SD-612M	11J	2	20

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-11 (cont.)

OPERABLE UNIT NO. 2
BEAR HEAD CREEK: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
	6-BH04-SD-612M	220J	2	20
	6-BH05-SD-06B	26J	2	20
	6-BH05-SD-06M	23	2	20
	6-BH06-SD-06B	37J	2	20
	6-BH06-SD-06M	22J	2	20
4',4'-DDT	6-BH03-SD-06M	15	1	7
	6-BH03-SD-612M	6.6J	1	7
	6-BH04-SD-06B	16J	1	7
	6-BH04-SD-06M	9.4J	1	7
	6-BH04-SD-612M	38J	1	7
	6-BH05-SD-06M	21J	1	7
	6-BH06-SD-06B	14J	1	7
	6-BH06-SD-06M	7J	1	7
PCB-1260	6-BH03-SD-06M	170	50	400
	6-BH03-SD-612M	160	50	400
	6-BH04-SD-06B	51	50	400
	6-BH04-SD-612B	240J	50	400
	6-BH04-SD-06M	110J	50	400
	6-BH04-SD-612M	370J	50	400
	6-BH05-SD-06B	64J	50	400
	6-BH05-SD-06M	110J	50	400
	6-BH06-SD-06B	180J	50	400
	6-BH06-SD-06M	69J	50	400

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-11 (cont.)

OPERABLE UNIT NO. 2
BEAR HEAD CREEK: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
Benzo(a)pyrene	6-BH03-SD-06B	450J	400	2,500
	6-BH03-SD-612B	640	400	2,500

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-12

OPERABLE UNIT NO. 2
RAVINE: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
Inorganics: (mg/kg)				
Cadmium	6-RV1-SD-06	5.9	5	9
Lead	6-RV3-SD-06	62.3	35	110
	6-RV8-SD-06	105J	35	110
Mercury	6-RV1-SD-06	0.75	0.15	1.3
	6-RV2-SD-06	0.23	0.15	1.3
	6-RV8-SD-06	0.27	0.15	1.3
Silver	6-RV8-SD-06	1.2	1	2.2
Zinc	6-RV1-SD-06	408	120	270
	6-RV6-SD-06	204	120	270
	6-RV7-SD-612	193	120	270
	6-RV8-SD-06	142	120	270
Organics: (ug/kg)				
4',4'-DDE	6-RV2-SD-06	120J	2	15
	6-RV3-SD-612	53J	2	15
	6-RV5-SD-06	44J	2	15
	6-RV6-SD-06	58J	2	15
	6-RV7-SD-06	37J	2	15
	6-RV7-SD-612	23J	2	15
4',4'-DDD	6-RV2-SD-06	45J	2	20
	6-RV4-SD-06	9.4J	2	20
	6-RV4-SD-612	4.1J	2	20

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-12 (cont.)

OPERABLE UNIT NO. 2
RAVINE: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
	6-RV5-SD-06	9J	2	20
	6-RV7-SD-06	36J	2	20
	6-RV7-SD-612	34J	2	20
4',4'-DDD	6-RV2-SD-06	45J	2	20
	6-RV4-SD-06	9.4J	2	20
	6-RV4-SD-612	4.1J	2	20
	6-RV5-SD-06	9J	2	20
	6-RV7-SD-06	36J	2	20
	6-RV7-SD-612	34J	2	20
4',4'-DDT	6-RV2-SD-06	130J	1	7
	6-RV3-SD-06	210J	1	7
	6-RV3-SD-612	51	1	7
	6-RV4-SD-06	14J	1	7
	6-RV5-SD-06	19J	1	7
	6-RV6-SD-06	170J	1	7
	6-RV7-SD-06	60J	1	7
	6-RV7-SD-612	19J	1	7
Dieldrin	6-RV1-SD-07	43J	0.02	8
	6-RV3-SD-612	8.1J	0.02	8
Endrin	6-RV1-SD-06	5.1J	0.02	45
PCB-1260	6-RV1-SD-06	360J	50	400
	6-RV2-SD-06	92J	50	400
	6-RV3-SD-06	190J	50	400
	6-RV5-SD-06	79J	50	400

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-12 (cont.)

OPERABLE UNIT NO. 2
RAVINE: SEDIMENT CRITERIA EXCEEDENCES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Parameter	Sample Number	Concentration in the Sample	Region IV (1)	
			NOAA ER-L Value	NOAA ER-M Value
Acenapthene	6-RV2-SD-06	220J	150	650
Anthracene	6-RV2-SD-06	480	85	960
Benzo(a)anthracene	6-RV2-SD-06	1,100	230	1,600
Benzo(a)pyrene	6-RV2-SD-06	1,000	400	2,500
Chrysene	6-RV2-SD-06	1,100	400	2,800
Dibenz(a,h)anthracene	6-RV2-SD-06	83	60	260
Flouranthene	6-RV2-SD-06	1,500J	600	3,600
Flourene	6-RV2-SD-06	250J	35	640
Phenanthrene	6-RV2-SD-06	1,600	225	1,380
Pyrene	6-RV2-SD-06	2,100	350	2,200

(1) - Region IV Sediment Screening Values
ER-L - Lower 10 percentile value
ER-M - Median percentile value

TABLE 5-13

OPERABLE UNIT NO. 2
PHYSICAL/CHEMICAL CHARATERISTICS
OF THE CONTAMINANTS OF CONCERN
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CT0-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	BCF (l/kg)	Water Solubility (mg/l)	Organic Carbon Partition Coefficient (ml/g)[a]	Vapor Pressure (mm Hg)
Aluminum	ND[c]	ND[a, b]	ND	ND[a]
Arsenic	350[c]	ND[a, b]	ND	[a, b]
Barium	ND[c]	ND[a, b]	ND	[a, b]
Beryllium	19[c]	ND[a, b]	ND	[a, b]
Cadmium	2700[c]	[a, b]	ND	[a, b]
Chromium	190[c]	ND[a, b]	ND	[a, b]
Copper	23,000[c]	ND[a, b]	ND	[a, b]
Iron	ND[c]	ND[a, b]	ND	ND[a]
Lead	1700[c]	ND[a, b]	ND	[a, b]
Manganese	350,000[c]	ND[a, b]	ND	ND[a]
Mercury	86,000[c]	ND[a, b]	ND	0.002[c]
Nickel	110[c]	ND[a, b]	ND	[a, b]
Selenium	5,700[c]	ND[a, b]	ND [d]	[a, b]
Silver	28[c]	ND[a, b]	ND	[a, b]
Vanadium	ND[a]	ND[a, b]	ND	ND[a]
Zinc	970[c]	ND[a, b]	ND	[a, b]
Benzene	230[c]	1,800[c]	83	95[c]
Carbon Disulfide	ND[c]	1,200[c]	54	360[c]
Ethyl benzene	37.5[c]	170[c]	1,100	9.6[c]
1,2-Dichloroethane	2.0[c]	8,500[c]	59	79[c]
Tetrachloroethene	49[c]	200[c]	364	19[c]
Toluene	10.7[a]	535[c]	300	28.1[c]
Total Xylenes	ND[a]	198[a]	240	10[a]
Trichloroethene	17[c]	1,100[c]	126	69[c]
Vinyl chloride	1.17[a]	8,800[c]	57	3,000[c]

(a) U.S. EPA, 1986
(b) Negligible (less than 0.1)
(c) SPHEM, 1986
ND - No Data
BCF - Bioconcentration Factors

TABLE 5-13 (cont.)

OPERABLE UNIT NO. 2
PHYSICAL/CHEMICAL CHARATERISTICS
OF THE CONTAMINANTS OF CONCERN
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CT0-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	BCF (l/kg)	Water Solubility (mg/l)	Organic/Carbon Partition Coefficient (ml/g)(a)	Vapor Pressure (mm Hg)
Endrin	15,000(c)	0.23(c)	ND	(a, b)
Dieldrin	6,800(c)	0.2(c)	1,700	(a, b)
PCB-1260	100,000	(a, b)	530,000	(a, b)
4,4'-DDE	51,000	(a, b)	4,000,000	(a, b)
4,4'-DDD	ND	0.1 (a)	800,000	(a, b)
4,4'-DDT	54,000	(a, b)	200,000	(a, b)
Anthracene	9,200(c)	(a, b)	14,000	(a, b)
Benzo(a) anthracene	ND	(a, b)	1,000,000	(a, b)
Benzo(a)pyrene	83,000(c)	(a, b)	200,000	(a, b)
Benzo (b) fluoranthene	ND	(a, b)	550,000	(b, c)
Benzo (k) fluoranthene	ND	(a, b)	550,000	(a, b)
Chrysene	370(c)	(a, b)	6,000,000	(a, b)
Dibenzo (a,h) anthracene	478(c)	(a, b)	3,300,000	(a, b)
Fluoranthene	1,150	0.206(a)	40,000	(a, b)
Fluorene	1,800(c)	1.9(c)	7,300	(a, b)
Indeno(1,2,3-CD)pyrene	ND	(a, b)	2,000,000	(a, b)
2-Methylnapthalene	ND	(a, b)	ND	ND(c)
Phenol	2.3(c)	83,000(c)	14.2	0.35(c)
Phenanthrene	2,630	1(a)	10,000	(a, b)
Pyrene	69(c)	(a, b)	40,000	(a, b)

(a) U.S. EPA, 1986
(b) Negligible (less than 0.1)
(c) SPHEM, 1986
ND - No Data
BCF - Bioconcentration Factors

6.0 ECOLOGICAL EXPOSURE CHARACTERIZATION

This section of the ERA addresses each exposure pathway via surface water, sediment, air, soil, and groundwater. To determine if ecological exposure via these pathways may occur in the absence of remedial actions, an analysis was conducted including the identification and characterization of the exposure pathways. The following four elements were examined to determine if a complete exposure pathway was present:

- a source and mechanism of chemical release
- an environmental transport medium
- a feasible receptor exposure route
- a receptor exposure point

6.1 Potential Exposure Scenarios

This section discusses the potential exposure scenarios at OU No. 2 including surface water, sediments, air, soil, and groundwater.

6.1.1 Surface Water Exposure Pathway

Potential release sources to be considered in evaluating the surface water pathway are contaminated surface soils and groundwater. The release mechanisms to be considered are groundwater seepage and surface runoff. The potential routes to be considered for ecological exposure to the contaminated surface waters are ingestion and dermal contact. Potential exposure points for ecological receptors include species living in, or coming in contact with, the surface water onsite or offsite and downgradient relative to tidal influence.

Potential receptors that may be exposed to contaminants in surface waters include fish, crabs, benthic macroinvertebrates, birds, and other aquatic and terrestrial life.

Fish and crabs are exposed to contaminants in the surface water by ingesting water while feeding and by direct contact. Overall, fish and crabs have a high exposure to contaminants in the surface water. Potential adverse effects on fish and crabs from contaminants in the surface water were quantitatively evaluated by direct comparisons of contaminant concentrations in the surface water to published water quality standards, by the use of species diversity and similarity indices, and by fish and crab tissue analysis.

Benthic macroinvertebrates may swim through the water column and/or may attach themselves to substrates in the surface water. These species have a high potential exposure to contaminants in the surface water because they are in constant contact with the water and often they ingest water while feeding. Potential adverse effects on benthic macroinvertebrates from contaminants in the surface water were quantitatively evaluated by direct comparisons of contaminant concentrations in the surface water to published water quality standards and by use of species diversity index, similarity indices, and biotic indices.

Terrestrial faunal receptors potentially are exposed to contaminants in the surface water through ingestion and dermal contact. The magnitude of the exposure depends on their feeding habits and the amount of time they reside in the contaminated waters. In addition, terrestrial species may ingest organisms (e.g., fish, insects, plants) that have bioconcentrated contaminates from the surface water. Risk to terrestrial vertebrate ecological receptors was quantitatively evaluated by comparing chronic daily intake estimates to terrestrial reference values.

Finally, other aquatic organisms (e.g., zooplankton, microinvertebrates) and aquatic plants are potentially exposed to contaminants in the surface water. These aquatic organisms are a primary food source for the benthic macroinvertebrates, crabs, and fish examined in this ERA. In addition aquatic flora add oxygen to the water through photosynthesis, add nutrients to the sediments when degraded, provide cover for small aquatic organisms and are ingested by aquatic and terrestrial fauna. These potential receptors were qualitatively evaluated in the ERA.

6.1.2 Sediment Exposure Pathway

The potential release source to be considered in evaluating the sediment pathway are contaminated surface soils and groundwater. The release mechanisms to be considered are groundwater seepage and surface runoff. The potential routes to be considered for ecological exposure to the contaminated sediments are ingestion and dermal contact. Potential exposure points for ecological receptors include species living in, or coming in contact with, the sediments onsite or offsite and downgradient relative to tidal influence.

Potential receptors that may be exposed to contaminated sediments include benthic macroinvertebrates, bottom feeding fish, aquatic vegetation and other aquatic life.

Fish (especially bottom feeders) and crabs are exposed to contaminants in the sediments by ingesting sediments while feeding on benthic macroinvertebrates and/or organic detritus or by direct contact with the sediments. In addition, fish and crabs may ingest benthic macroinvertebrates that have bioconcentrated chemicals from the sediments. Overall, fish and crabs have a high potential exposure to contaminants in the sediments. Potential adverse effects on fish and crabs from contaminants in the sediments were quantitatively evaluated by direct comparisons of contaminant concentrations in the sediments to Region IV sediment screening values, by the species diversity index, and by fish and crab tissue analysis.

Benthic macroinvertebrates reside on the bottom of the water bodies either on or in the sediments. They are exposed to contaminants in sediments by ingesting sediments while feeding or burrowing and by direct contact. Therefore, they have a very high potential exposure to the contaminants. Potential adverse effects of benthic macroinvertebrates from contaminants in the sediments were quantitatively evaluated by direct comparisons of contaminant concentrations in the sediments to Region IV sediment screening values and by the use of the species diversity index and similarity indices.

Terrestrial faunal receptors potentially are exposed to contaminants in the sediments through ingestion and dermal contact. The magnitude of the exposure depends on their feeding habits and the amount of time they reside in the contaminated sediments. In addition, terrestrial species may ingest organisms (e.g., fish, insects, plants) that have bioconcentrated contaminants from the sediments. Risk to terrestrial ecological receptors was limited to a qualitative evaluation.

Finally, other aquatic organisms (e.g., zooplankton, microinvertebrates) and aquatic plants are potentially exposed to contaminants in the sediments. These aquatic organisms are a primary food source for the benthic macroinvertebrates, crabs, and fish examined in this ERA. In addition aquatic flora add oxygen to the water through photosynthesis, add nutrients to the sediments when degraded, provide cover for small aquatic organisms and are ingested aquatic and terrestrial fauna. These potential receptors were qualitatively evaluated in the ERA.

6.1.3 Air Exposure Pathway

There are two potential release mechanisms to be considered in evaluating the atmospheric pathway: release of contaminated particulates and volatilization from surface soil, groundwater and surface water. The potential exposure points for receptors are areas on or adjacent to the site.

No data has been collected to document exposure to receptors via the air pathway. However, based on the low concentrations of VOCs detected in the soils, sediments, and surface water, the air concentration of these contaminants is not expected to cause a risk to the terrestrial ecology. Therefore, this pathway was not evaluated as part of the ERA.

6.1.4 Soil Exposure Pathway

Potential release sources to be considered in evaluating the soil pathway are surface or buried wastes and contaminated soil. The release mechanisms to be considered are fugitive dust, leaching, tracking, and surface runoff. The transport medium is the soil. The potential routes to be considered for ecological exposure to the contaminated soils are ingestion and dermal contact. Potential exposure points for ecological receptors include species living in, or coming in contact with, the soils. Terrestrial fauna receptors potentially are exposed to contaminants in the surface soils through incidental ingestion of surface soils and bioaccumulation/bioconcentration in prey. The magnitude of the exposure depends on their breeding habits and the amount of time they reside on the contaminated soils. In addition, terrestrial species may ingest other terrestrial species that have bioconcentrated or bioaccumulated contaminants from the surface soils. Risks to terrestrial vertebrate ecological receptors was quantitatively evaluated by comparing chronic daily intake estimates to terrestrial reference values.

6.1.5 Groundwater Exposure Pathway

The potential release source to be considered in evaluating the groundwater pathway are contaminated soils. The release mechanism to be considered is leaching. The routes to be considered for ecological exposure to the contaminated groundwater are ingestion and dermal contact. Groundwater discharge to area surface waters may represent a pathway for contaminant migration. Groundwater to surface water exposure will be evaluated in the surface water section of the ERA.

7.0 RISK CHARACTERIZATION / INTEGRATION

This section discusses the results of the sampling conducted during the remedial investigations at OU No. 2 and evaluates the potential impact on the ecological integrity of Wallace Creek, Bear Head Creek, and the ravine from contaminants identified at OU No. 2.

7.1 Water Quality

The concentrations of contaminants in the surface water were compared to applicable State and Federal water quality standards (see Tables 5-1, 5-2 and 5-3). Water quality criteria values are set to be protective of the aquatic environment and any exceedences of these criteria indicate a potentially hazardous environment for the aquatic organisms inhabiting the water body. However, because the surface water sampling program was a "snapshot" in time, it represents only one set of data points on a potential continuum of possible values. Variations in regional and local meteorological conditions can result in variations in stream flow and tidal influence as well as groundwater discharge that may significantly change the observed results either higher or lower. Therefore, based on the information collected and evaluated in the following sections, the exceedences noted would result in potential chronic toxicity if the data points were representative of long-term conditions.

7.1.1 Wallace Creek

Surface water concentrations of cadmium, copper, lead, mercury, nickel, silver, and zinc exceeded the North Carolina Water Quality Standards (WQS) and/or U.S. EPA Region IV acute or chronic Water Quality Screening Values (WQSV) in some of the samples.

Cadmium exceeded the WQS and the acute and chronic WQSVs in one sample, and copper exceeded the WQS in five samples and the acute and chronic WQSVs in six samples. Lead exceeded the chronic WQSV in one sample, and mercury exceeded the WQS and chronic WQSV in three samples. Nickel exceeded all three values in four samples. Finally silver and zinc exceeded the WQS and the acute and chronic WQSV in one and two samples, respectively.

Mercury, nickel and zinc exceeded water quality values in both upstream and downstream samples, therefore it is unlikely that those materials are site related. Lead exceeded the criteria only in one upstream sample and was not detected in samples downstream of the site. Also, cadmium and silver were only detected in four or less samples at the site, therefore no trend could be determined. Overall, there does not appear to be any association of TAL inorganics with contaminants from OU No.2.

The ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV was calculated for each COC. A ratio greater than unity indicated a potential for adverse effects to aquatic life. The following lists the ratios that were greater than unity:

Chemical	Chronic WQSV	Ratio
Copper	2.9	4.9
Mercury	0.025	5.6
Nickel	8.3	5.4
Silver	0.23	14.2*

* Maximum value used

None of the chemicals for which WQS or WQSV were not established exceeded toxicological data available from the literature. Therefore, no adverse effects to the ecological receptors from these metals is expected.

Dissolved oxygen concentrations exceeded (were less than) the WQS in eleven samples. The pH values were not within the allowable WQS values in twenty samples and the chronic WQSV in sixteen samples (there is no acute WQSV for pH). The low dissolved oxygen values may be the cause of the absence and/or low number of benthic macroinvertebrates collected from two of the stations on Wallace Creek. The low dissolved oxygen concentrations and pH values are probably associated with natural conditions, rather than being site related.

Several of the COCs exceeded either the State and/or Federal water quality values and had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in Wallace Creek to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

7.1.2 Bear Head Creek

Surface water concentrations of copper, lead, mercury, nickel and silver exceeded the WQS and/or acute or chronic WQSV in some of the samples.

Copper exceeded all three values in one sample. Lead exceeded the chronic WQSV in two samples. Mercury exceeded the WQS and the chronic WQSV in two samples, and nickel exceeded all three values in one sample. Finally, silver exceeded the WQS and the chronic WQSV in two samples, and the acute WQSV in one sample.

The ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV was calculated for each COC. A ratio greater than unity indicated a potential for adverse effects to aquatic life. The following list the ratios that were greater than unity:

Chemical	Ratio
Copper	2.4
Mercury	2.0
Nickel	2.2
Silver	18.3*

* Maximum value used

None of the chemicals for which WQS or WQSV were not established exceeded toxicological data available from the literature. Therefore, no adverse effects to the ecological receptors from these chemicals is expected.

Lead exceeded the water quality values in both the upstream and downstream samples, therefore it is unlikely that these metals are site related. Copper, nickel and silver exceeded the criteria in the furthest downstream samples only. It is unlikely that these metals are site related because copper and nickel were not detected in any other samples, and the only other sample that silver was detected in was upstream of the site. Mercury exceeded the water quality values immediately downstream from the sites and in the furthest downstream sample. However, mercury was not detected in the samples collected adjacent to the sites, or in the bank samples at the stations where mercury was detected onsite.

Dissolved oxygen concentrations exceeded (were less than) the WQS in two samples. The pH values were not within the allowable WSQ values in eight samples, and not within the allowable chronic WQSV in four samples. The low dissolved oxygen concentrations and pH values are probably associated with natural conditions, rather than being site related.

Several of the COCs exceeded either the State and/or Federal water quality values and had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in Bear Head Creek to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

7.1.3 Ravine

Surface water concentrations of aluminum, cadmium, copper, iron, lead, silver and zinc exceeded the WQS and/or acute or chronic WQSV in some of the samples.

Aluminum exceeded the chronic WQSV in six samples and cadmium exceeded the WQS and the acute and chronic WQSV in two samples. Copper and iron exceeded the WQS and chronic WQSV in four and two samples, respectively. Lead exceeded the chronic WQSV in six samples. Finally, silver and zinc exceeded the WQS and the acute and chronic WQSV in three and six samples, respectively.

The ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV was calculated for each COC. A ratio greater than unity indicated a potential for adverse effects to aquatic life. The following list portrays the ratios that were greater than unity:

Chemical	Ratio
Aluminum	7.0*
Cadmium	6.1
Copper	1.4*
Iron	12.3
Lead	8.3
Silver	5,063.3
Zinc	8.4*

* Maximum value used

None of the chemicals for which WQS or WQSV were not established exceeded toxicological data available from the literature. Therefore, no adverse effects to the ecological receptors from these chemicals is expected.

Field water quality measurements were not conducted in the ravine because of the intermittent nature of the water.

Several of the COCs exceeded either the State and/or Federal water quality values and had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in the ravine to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represent long-term conditions. The ravine originates in Site 6 and extends into Site 82. Therefore, any contamination detected in the ravine may be related to Sites 6 and 82.

7.1.4 Pettiford Creek

Surface water samples were not collected from Pettiford Creek for chemical analysis. However, field water quality measurements were conducted during the fish and benthic macroinverterbate sampling events.

Dissolved oxygen concentrations were less than the WQS in one sample. The pH was not measured in Pettiford Creek because the pH meter was not working. The low dissolved oxygen concentrations were probably associated with natural conditions.

7.2 Sediment Quality

The concentrations of contaminants in the sediments were compared to the Region IV lower 10 percentile (ER-L) and median percentile (ER-M) sediment screening values (SQSV) (see Tables 5-4, 5-5, and 5-6). Because the screening values are set to be protective of the aquatic environment, any exceedences of these values indicate a potentially toxic environment for the aquatic organisms inhabiting the water body.

7.2.1 Wallace Creek

Sediment concentrations of copper, lead, silver, zinc, 4,4'-DDE, 4',4-DDD, 4',4-DDT, dieldrin, PCB-1260, benzo(a)pyrene, fluoranthene, and pyrene exceeded the ER-L and/or ER-M in some of the samples.

Copper exceeded the ER-L in two samples and the ER-M in one sample, while lead exceeded the ER-L in nine samples and the ER-M in two samples. Silver exceeded the ER-L and ER-M in one sample. Finally, zinc exceeded the ER-L in four samples and the ER-M in two samples. 4,4'-DDE exceeded the ER-L and ER-M in 14 and 11 samples, respectively. 4,4'-DDD exceeded the ER-L and ER-M in 15 and 12 samples, respectively. 4,4'-DDT and dieldrin exceeded the ER-L and ER-M in three samples, and dieldrin exceeded the ER-L in one sample. PCB-1260 exceeded the ER-L in 12 samples and the ER-M in six samples. Finally, benzo(a)pyrene, fluoranthene, and pyrene exceeded the ER-L in three, one, and two samples, respectively.

The ratio of the upper confidence limit and the ER-L was calculated for each COC. A ratio greater than unity indicated a possibility for adverse effects to aquatic life, and EPA recommends conducting toxicity tests as a follow-up. The following list the ratios that were greater than unity:

Chemical	Ratio
Lead	1.0
Silver	1.6
4,4'-DDE	9.8
4,4'-DDD	15.5
4,4'-DDT	22.9
Dieldrin	240.0*
PCB-1260	6.1
Benzo (a) anthracene	1.0*
Benzo (a) pyrene	1.5
Pyrene	1.3

* Maximum value used

Literature data were not identified for determining the effects on aquatic life from contaminants for which there was not a screening value. It should be noted that of these contaminants, only aluminum and iron exceeded state or federal water quality criteria for the surface water samples. None of these contaminants for which criteria do not exist exceeded the toxicity values obtained from AQUIRE.

The exceedences of the inorganic chemicals occurred in both the upstream and downstream samples, therefore, these exceedences do not appear to be site related. Dieldrin was only detected in the furthest-most upstream station, therefore it is not site related. Except for one sample, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT only exceeded the SQSV in the samples collected adjacent to, and downstream of OU No. 2, therefore, these contaminants might be attributable to runoff from the site. The PAHs primarily were detected adjacent to Piney Green Road and Holcomb Boulevard. Therefore, they are probably due to the automobile traffic on those roads. Finally, PCB-1260 exceeded the SQSV in the 0 to 6-inch sediment samples collected adjacent to and downstream of OU No. 2. PCB-1260 was detected in just two samples upstream of OU No. 2, therefore, PCB-1260 potentially may be associated with contamination at OU No.2.

Several of the COCs exceeded the ER-L and/or ER-M and had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in Wallace Creek to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

7.2.2 Bear Head Creek

Sediment concentrations of lead, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, PCB-1260 and benzo(a)pyrene exceeded the ER-L and/or ER-M in some of the samples.

Lead exceeded the ER-L in five samples. 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT exceeded the ER-L in 11, 10, and eight samples, respectively, and the ER-M in nine, seven, and six samples respectively. PCB-1260 exceeded the ER-L in 10 samples and benzo(a)pyrene exceeded the ER-L in one sample.

The ratio of the upper confidence limit and the ER-L was calculated for each COC. A ratio greater than unity indicated a possibility for adverse effects to aquatic life, and EPA recommends conducting toxicity tests as a follow-up. The following list portrays the ratios that were greater than unity:

Chemical	Ratio
4,4'-DDE	17.3

4,4'-DDD	14.7
4,4'-DDT	13.5
PCB-1260	3.0
Benzo(a)pyrene	1.3
Pyrene	1.5

The exceedences of lead occurred in both the upstream and downstream samples, therefore, these exceedences do not appear to be site related. Most of the SQSV exceedences for 4,4'-DDE, 4,4'-DDD, 4,4'-DDT were in samples collected from the three stations adjacent to, and immediately downstream of OU No.2. Therefore, these contaminants might be attributable to runoff from the site. Benzo(a)pyrene only exceeded the SQSV at one station, which was located upstream of OU No.2 and adjacent to Piney Green Road. Therefore, benzo(a)pyrene is probably due to the automobile traffic on this road. Finally, PCB-1260 exceeded the SQSV in samples collected from the stations upstream, adjacent to, and downstream of OU No.2. Therefore, PCBs are likely related to OU No.2.

Several of the COCs exceeded the ER-L and/or ER-M and had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in Bear Head Creek to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

7.2.3 Ravine

Sediment concentrations of cadmium, lead, mercury, silver, zinc, 4,4'-DDE, 4',4-DDD, 4',4-DDT, dieldrin, endrin, PCB-1260, and several of the PAHs exceeded the ER-L and/or ER-M. The ravine is located adjacent to Site 6 and receives runoff from this site. Therefore, any contamination detected in the ravine would be site related or due to natural concentrations (especially for many of the metals).

Cadmium and lead exceeded the ER-L in one and two samples, respectively, and mercury and silver exceeded the ER-L in three and one sample, respectively. Zinc exceeded the ER-L in four samples and the ER-M in one sample. 4,4'-DDE, 4,4'-DDD, 4,4'-DDT and dieldrin exceeded the ER-L in six, six, eight and two samples, respectively, and the ER-M in six, three, eight, and two samples, respectively. Endrin exceeded the ER-L one sample. PCB-1260 exceeded the ER-L in four samples. Finally, ten PAHs exceeded the ER-L in one sample, while one PAH (phenanthrene) exceeded the ER-M in one sample.

The ratio of the upper confidence limit and the ER-L was calculated for each COC. A ratio greater than unity indicated a possibility for adverse effects to aquatic life, and EPA recommends conducting toxicity tests as a follow-up. The following list portrays the ratios that were greater than unity:

Chemical	Ratio
Lead	1.1
Mercury	2.1
Silver	1.1
Zinc	1.6
4,4'-DDE	41.0
4,4'-DDD	13.6
4,4'-DDT	187.4
Dieldrin	655.0
Endrin	255.0*
PCB-1260	3.0
Acenaphthene	1.5*
Anthracene	3.3
Benzo(a)anthracene	2.2
Benzo(a)pyrene	1.0
Chrysene	1.1
Dibenz(a,h)anthracene	1.4*
Phenanthrene	1.9
Pyrene	1.5

* Maximum value used

Several of the COCs exceeded the ER-L and/or ER-M and had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in the ravine to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

7.3 Surface Soil Quality

There are no standards, criteria, or other screening values for assessing potential impacts to terrestrial ecological receptors from contaminants in soils. In addition, the amount of literature data evaluating adverse ecological effects on terrestrial species exposed to contaminants in surface soil is limited and has not undergone extensive peer review.

Toxicological effects on plants and/or invertebrates inhabiting soils contaminated by several of the metals was obtained and compared to the concentrations of these metals. The available data was limited to plants and invertebrates, therefore, effects on mammals, reptiles, birds, and other terrestrial species could not be evaluated. The following paragraphs discuss the comparison of the metals concentrations in the surface soil to published toxicological data.

7.3.1 Site 9

The potential adverse effects on the plants and/or invertebrates from the metals detected at Site 9, were either insignificant or could not be evaluated with the available information.

7.3.2 Site 6 (Lot 201)

The concentration of chromium in some of the surface soil samples exceeded the level that caused mortality in an earthworm species. Therefore, there is a potential risk to at least one earthworm species from the chromium in the surface soils. The potential adverse effects on the plants and/or invertebrates from the other metals detected at Site 6 (Lot 201), were either insignificant or could not be evaluated with the available information.

7.3.3 Site 6 (Lot 203)

The concentrations of chromium, copper, and zinc in some of the surface soil samples exceeded levels that caused adverse effects either to plants or invertebrates. Therefore, there is a potential risk to some plants and/or invertebrates from these metals. The potential adverse effects on the plants and/or invertebrates from the other metals detected at Site 6 (Lot 203), were either insignificant or could not be evaluated with the available information.

7.3.4 Sites 6 (Wooded and Ravine Areas) and 82

The concentrations of arsenic, copper and zinc in some of the surface soil samples exceeded levels that caused adverse effects either to plants or invertebrates. Therefore, there is a potential risk to some plants and/or invertebrates from these metals. The potential adverse effects on the plants and/or invertebrates from the other metals detected at Sites 6 (Wooded and Ravine Areas) and 82, were either insignificant or could not be evaluated with the available information.

7.4 Fish and Crabs

The following sections discuss the current and potential risk to fish and crabs from contaminants identified at OU No.2.

7.4.1 Population Statistics

Estuarine fish faunas are typified by the numerical dominance of a few species. The number of estuarine families with basic marine affinities also is small. The dominant species tend to be widespread, reflecting the broad tolerances and range of adaptations of these organisms. By far, the most abundant forms are juveniles that use the estuarine environment as a nursery area. Although a few permanent residents can be found in estuaries at any time, most of the fish populations are seasonal migrants, moving into and out of these shallow ecosystems from the nearshore ocean (Kennish, 1990). Wallace Creek and Bear Head Creek are primarily freshwater in the upper stream areas and brackish in the lower stream areas. The most abundant fish forms found in the creeks were freshwater species.

7.4.1.1 Wallace Creek

The majority of the fish captured in Wallace Creek were freshwater and brackish water species (eastern mosquito, shiner sp., bluespoted sunfish and pumpkinseed). There also were species that typify an estuarine environment (spot, American eel and summer flounder); however, they were not found as abundantly as the freshwater species. The majority of the individuals of those species were represented by the juvenile form and qualify as both seasonal migrants and species that utilize estuaries as a nursery area. The size-class distribution of fish (Figures 4-2 through 4-6) support the presence of a juvenile population.

It should be noted that the population of fish evaluated in Wallace Creek, Bear Head Creek and Pettiford Creek was not large enough to interpret a hypothesis regarding similarity.

The diversity index values ranged from 0.22 at Station 6-WC4 to 0.77 at Station 6-WC6A. Decreased diversity is used as an indicator of gross environmental deterioration, where diversity of taxa and biomass of fish were inversely correlated with the percent of toxic contaminants in a river system. In estuarine environments, the abundance and biomass of fishes are large and the species diversity is generally low. This factor could explain the low diversity at Station 6-WC4.

Overall, the health of the fish community at Wallace Creek appeared normal when compared to the background station at Pettiford Creek. As discussed earlier in this report, none of the fish that were collected had anomalies. A total of four different fish species (Table 4-4) were collected at fish station WC04A (upstream of OU No. 2). The tolerance levels of the species collected are as follows: one intermediate to intolerant species (shiner sp.), one intermediate tolerant species (pirate perch), one moderately tolerant species (pumpkinseed), and one of the species (bluespoted sunfish) has a variable tolerance.

The fish species collected from an adjacent site to OU No. 2 (WC06A) had the following tolerance levels: one intermediate to intolerant species (shiner); three intermediate species (eastern mosquitofish, American eel, and warmouth); one moderately tolerant species (pumpkinseed), one tolerant species (largemouth bass); and two of the species (bluespoted sunfish and sunfish sp.) have variable tolerance levels.

Only one fish species (summer flounder) was collected downstream of OU No. 2 (WC11A) and the tolerance level of this species is not known. The fish species collected from the station adjacent to OU No. 2 were similar in tolerance levels to those species collected upstream of OU No. 2. The only difference in species tolerance between these to stations was that a tolerant species was collected at the adjacent station and no tolerant species were collected at the upstream station.

The majority of the fish that were captured had tolerance levels of intermediate to tolerant, which would indicate that Wallace Creek supports a quality of fish that are tolerant to environmental stressors.

7.4.1.2 Bear Head Creek

The majority of the fish captured in Bear Head Creek were freshwater and brackish water species (eastern mosquito, shiner sp. and pumpkinseed). There also were species that typify an estuarine environment (spot, bay anchovy and killifish); however, they were not found as abundantly as the freshwater species. The majority of the individuals of the estuarine species were represented by the juvenile form and qualify as both seasonal migrants and species that utilize estuaries as a nursery area. The size-class distribution of fish (Figures 4-2 through 4-6) support the presence of a juvenile population.

It should be noted that the population of fish evaluated in Wallace Creek, Bear Head Creek and Pettiford Creek was not large enough to interpret a hypothesis regarding similarity.

The diversity index value for Station 6-BH6A was 0.29. Decreased diversity is used as an indicator of gross environmental deterioration, where diversity of taxa and biomass of fish were inversely correlated with the percent of toxic contaminants in a river system. In estuarine environments, the abundance and biomass of fishes are large and the species diversity is generally low. This factor could explain the low diversity at Station 6-BH6A.

Overall, the health of the fish community at Bear Head Creek appeared normal when compared to the background station at Pettiford Creek. As discussed earlier in this report, none of the fish that were collected had anomalies. Fish were collected at only one station (Table 4-4) in Bear Head Creek BH06A (downstream of OU No. 2). The tolerance of these fish species consisted of the following: one intolerant species (killifish); two intermediate species (eastern mosquitofish and bay anchovy); one moderately tolerant species (pumpkinseed), and one species with variable tolerance (bluespoted sunfish). The majority of the fish species that were captured had intermediate to intolerant levels of tolerance, which would indicate that Bear Head Creek supports a quality of fish that are not tolerant to environmental stressors.

7.4.1.3 Pettiford Creek

Because of the lack of abundance of fish captured at Pettiford Creek, only limited interpretation of the population statistics can be made. The three species of fish that were captured (pumpkinseed, shiner sp. and striped mullet) had tolerances ranging from intolerant to moderately tolerant. The only fish that typified an estuarine environment was the striped mullet. The majority of the individuals of those species were not represented by the juvenile form as in Wallace and Bear Head Creeks. The pumpkinseeds and striped mullet were either above the national average for length or within the top 75 percent of the average.

It should be noted that the population of fish evaluated in Wallace Creek, Bear Head Creek and Pettiford Creek was not large enough to interpret a hypothesis regarding similarity.

The diversity index value for Station PC was 0.45. Because of the limited sampling, any hypothesis drawn from this value should not be relied upon.

Overall, the health of the fish community at Pettiford Creek appeared normal. As discussed earlier in this report, none of the fish that were collected had anomalies.

Fish have been collected at one station (Table 4-4) in Pettiford Creek. The tolerance levels of the species collected are as follows: one intermediate to intolerant species (shiner sp.), and one moderately tolerant species (pumpkinseed).

7.4.2 Tissue Analysis

This section summarizes the results of the tissue analysis for the fish and crabs collected in Wallace and Bear Head Creeks, and compares the results to concentrations detected in fish from other studies identified in the literature. Concentrations for some of the contaminants in crab tissues in other studies were not located.

7.4.2.1 Wallace Creek

Fish were collected for tissue analysis at Station 6-WC6A (located adjacent to Site 6) and Station 6-WC11 (located downstream from Site 6) in Wallace Creek. There were no fish collected for tissue analysis from Station 6-WC3A (located upstream from OU No.2) because of inadequate sample size. The following provides the comparison of tissue concentrations of COCs at Wallace Creek to worldwide studies.

Pesticides (4,4'-DDD, 4,4'-DDE and 4,4'-DDT) were detected in all of the fish and crab samples collected in Wallace Creek. These chemicals biodegrade very slowly and they have a high potential for bioaccumulation in aquatic organisms. The maximum concentration of 4,4,'-DDE in the fish tissue was 180 ug/kg and the maximum concentration in the crab samples was 15 ug/kg. The average concentration level established in the National Study of Chemical Residues in Fish (NSCRF) for industrial/urban sites for any p,p'-DDE compound in fish tissue was between 7.23 and 14,028 ug/kg with the mean concentration being 602.34 ug/kg (NSCRF, 1992). Other ecological studies conducted in 1989 in Indonesia on saltwater fish tissues detected levels of p,p'-DDE between 40 and 6,800 ug/kg and 0 to 41 ug/kg in the North Sea (Ginn, 1990). The maximum concentration of 4,4'-DDD in the fish tissue was 8.8 ug/kg and the maximum concentration in the crab samples was 8.1 ug/kg. Studies conducted in Rhode

Island in 1989 detected p,p'-DDD fish tissue levels between 18.0 and 46.0 ug/kg and North Sea studies detected levels between 0 and 28.0 ug/kg (Ginn, 1990). 4,4'-DDT was detected in one fish tissue sample at Station 6-WC6A in the concentration of 4.9 ug/kg. Studies conducted in Pacific ocean revealed levels of 4,4'-DDT ranging from 0 to 76.3 ug/kg (Geesey, 1982). Levels in the Central Mediterranean Sea ranged from 3.9 to 85.5 ug/kg.

Overall, the pesticide levels in the fish tissues at Wallace Creek were within the range of the levels detected in fish from other studies, and the pesticides were at or below levels typical to aquatic life in areas categorized as urban/industrial by the NSCRF. The pesticide concentrations in the fish were higher at Station 6-WC6A as opposed to the downstream Station (6-WC11). There was only one crab submitted for tissue analyses in Wallace Creek. The cause of the slightly elevated pesticide concentrations in the crabs at Station 6-WC11 cannot be attributed directly to OU No. 2 since the crabs are fairly mobile, and the concentrations were not substantially different between the stations. Pesticides were expected to be detected in the fish and crab tissues because pesticide use has been documented as widespread throughout MCB Camp Lejuene, North Carolina.

The concentration of PCBs detected in fish collected from Wallace Creek ranged from 51 to 1,000 ug/kg. The minimum concentration was found at Station 6-WC11 (located downstream from Site 6) and the maximum concentration was found at Station 6-WC6A (located adjacent to Site 6). PCBs were not found in the tissue of the crab. The national average of PCBs found in fish tissue is 1,897 ug/kg (NSCRF, 1992). The NSCRF reported that 91 percent of all the stations included in their survey had PCB contamination. The PCB tissue concentrations found at Wallace Creek were below the reported national average. However, based on the potential sources of contamination at Sites 6 and 82 the PCBs detected in the fish tissue may be attributed to contamination found at Sites 6 and 82.

Toluene was detected in the tissue of fish collected at Stations 6-WC11 and 6-WC6A in the concentrations of 2 ug/kg and 3 ug/kg, respectively. Studies have revealed that the average concentration of toluene in fish collected from a petroleum contaminated harbor in Japan was 5 mg/kg (Howard, 1991). This level of contamination is considerably higher than the levels of toluene found in the fish in Wallace Creek. Toluene does not readily bioaccumulate in fish, and when released into water, it will be lost by both volatilization and biodegradation.

At Stations 6-WC6A and 6-WC11, trichloroethylene was detected in fish tissue at concentrations ranging from 3 to 6 ug/kg. Average concentrations of trichoroethylene in marine fish in the United States ranged from 0.04 to 1.1 ug/kg in fish tissue, and 0.66 to 20.0 ug/kg in fish livers (Howard, 1991). Therefore, the concentrations of trichloroethylene in the fish tissue collected at Wallace Creek appeared to be at background levels when compared to the national average. It should be noted that trichloroethylene was detected in the surface water and sediments in Wallace Creek. Marine monitoring data suggest only moderate bioconcentration (2 to 25 times the concentration in water). Because of the nature of the potential sources of contamination at Sites 6 and 82 (various solvents), the levels of contamination found in the surface water and sediments, and the bioconcentration factor of trichloroethylene, the trichloroethylene detected in the fish tissue may be attributable to Sites 6 and 82.

Benzene was detected in the fish tissue at Station 6-WC6A and in crab tissue at Station 6-WC11 in concentrations of 3 and 2 ug/kg, respectively. Studies regarding the national average range of benzene in fish and crab could not be located. It is known that benzene is not expected to bioconcentrate in aquatic organisms. This is due in part to benzene's ability to rapidly volatilize when released to water. Because benzene was not detected in either the surface water or sediment in Wallace Creek, it is not likely that the benzene concentrations in the fish could be attributed to Sites 6 and 82.

Phenols were detected in the crab tissue at Station 6-WC11 in the concentration of 2,500 ug/kg. Published studies have indicated that phenols were detected in fish from Commencement Bay, Tacoma, WA in an average concentration of 0.14 ug/kg. The maximum concentration was 0.22 ug/kg (Howard, 1990). The level of phenol in the crab tissue at Wallace Creek was higher than the maximum concentration and the average concentration found in fish at Commencement Bay. However, the sample result was based on a single composite of crab tissue and may not be representative of the entire crab population. Natural sources of phenol include animal wastes and decomposition of organic wastes. Artificial sources of phenols include wastewater from manufacturers of materials such as resins, plastics, iron, steel and rubber. Phenols are frequently found in wastewater from these commercial processes (Sax, 1987). If phenols are released to the environment, its primary removal mechanism is biodegradation which is generally rapid. Data suggest that degradation will take on the order of hours to days in freshwater systems and up to a few weeks in estuarine waters, Also, phenol is not expected to significantly bioconcentrate in aquatic organisms. Phenol was not detected in the surface water of Wallace Creek and was only detected in low concentrations in the sediments. None of the fish tissue samples analyzed from Wallace Creek contained phenols. It is suggested that because of the factors listed above, compounded by the fact that crabs are fairly mobile, phenol cannot be directly attributed to Sites 6 and 82.

Fish tissue concentrations of selenium ranged from 0.14 to 0.38 mg/kg. Worldwide ecological studies detected selenium concentrations in fish tissues from 0.03 to 0.7 mg/kg in Sydney Australia and 0.62 to 14.2 mg/kg in China (Ginn, 1988) and 0.8 to 1.3 mg/kg in Massachusetts (Geesey, 1982). There did not appear to be any difference in selenium concentrations between the fish collected at each station. Therefore, the concentrations of selenium in the fish tissue collected at Wallace Creek appeared to be at background levels when compared to worldwide survey data. Because selenium was not detected in the surface water or sediment samples collected in Wallace Creek, it is unlikely that the selenium concentrations in the fish could be attributed to Sites 6 and 82.

Silver was detected in fish tissues at Station 6-WC6A in the concentration of 0.01 mg/kg. The concentration of silver in the crab tissue at Station 6-WC6A was 0.18 mg/kg. A National Marine Fishery survey conduced in March, 1978 reported the average silver concentration at 0.1 mg/kg in the muscle of the fish and 0.2 mg/kg in the whole body sample of the fish (NOAA, 1978). The tissue samples collected from 6-WC6A appear to be within the reported national average for silver. The maximum bioconcentration factor for silver in fish is 28 (SCDM, 1991). Silver concentrations in exceedence of Region IV Screening Values were found in three Ravine surface water samples. Although silver concentrations were found in Wallace Creek in one surface water sample (6-WC05-SW) and one sediment sample (6-WC03-SD), both of these locations are upstream of ravine sample locations. Wallace Creek sampling stations adjacent to or downstream of the Ravine did not exhibit silver concentrations in surface water or sediments. Therefore, the high silver concentrations found in the Ravine do not appear to be affecting Wallace Creek. The silver exceedence found at sampling station 6-WC05-SW may be a result of tidal influences.

Zinc concentrations in the fish samples ranged from 10.6 to 27.3 mg/kg, while the crab tissue concentration was 20.3 mg/kg. Other saltwater ecological studies detected the following zinc values in fish tissue analyses: 5.9 to 16.6 mg/kg in the Arabian Gulf (Ginn, 1989), 4.1 to 58.8 mg/kg in the Mediterranean Sea in Israel, 0.02 to 5.6 mg/kg in the United Kingdom (Ginn, 1988), and 88 to 145 mg/kg in the Gulf of Mexico (Ginn, 1987). The National Marine Fishery trace element survey revealed that the average concentration of zinc in the muscle of fish ranged from 2.0 to 20.0 mg/kg (NOAA, 1978). It can be determined from the above worldwide data that the concentrations of zinc found in the fish and crabs at Station 6-WC6A were within the reported normal ranges. Because zinc was detected in higher concentrations in the sediments at the downstream stations as compared to the upstream stations, the zinc detected in the fish tissues may be attributed to contamination from Sites 6 and 82.

The overall physical appearance of the fish, and the relatively low concentration of contaminants present in the fish tissues indicate the aquatic environment at Wallace Creek is not suffering from any stress presented by the detected contaminants; however, some of the contaminants found in the fish tissue (i.e., pesticides, PCBs, trichloroethylene, and zinc) may be attributed to the potential areas of contamination from Sites 6 and 82.

7.4.2.2 Bear Head Creek

Fish were collected for tissue analyses at Station 6-BH6A (located downstream from OU No. 2). There were no fish collected from Station 6-BH4A (located adjacent to OU No. 2) or Station 6-BH2A (located upstream from OU No. 2). The following provides the comparison of tissue analyses at Bear Head Creek to worldwide studies.

Pesticides (4,4'-DDD, 4,4'-DDE and 4,4'-DDT) were detected in the fish sample at Bear Head Creek. These chemicals biodegrade very slow, and as discussed previously in this report, they have a high potential for bioaccumulation in aquatic organisms. The maximum concentration of 4,4,'-DDE in the fish tissue was 290 ug/kg. The average concentration level established in the National Study of Chemical Residues in Fish (NSCRF) for industrial/urban sites for any p,p'-DDE compound in fish tissue was found to be between 7.23 and 14,028 ug/kg with the mean concentration being 602.34 ug/kg (NSCRF, 1992). Other ecological studies conduced in 1989 in Indonesia on saltwater fish tissues detected levels of p,p'-DDE between 40 and 6,800 ug/kg and 0 to 41 ug/kg in the North Sea (Ginn 1990). The maximum concentration of 4,4'-DDD in the fish tissue was 72.0 ug/kg. Studies conducted in Rhode Island in 1989 detected p,p'-DDD fish tissue levels between 18.0 and 46.0 ug/kg; North Sea studies detected levels between 0 and 28.0 ug/kg (Ginn, 1990). 4,4'-DDT was detected in one fish tissue sample at Station 6-BH6A in the concentration of 9.7 ug/kg. Studies conducted in the Pacific ocean revealed levels of 4,4'-DDT ranging from 0 to 76.3 mg/kg (Ginn, 1982). Levels in the Central Mediterranean Sea ranged from 3.9 to 85.5 ug/kg.

Overall, the pesticide levels in the fish tissues at Bear Head Creek were within the range of the levels detected in fish from other studies, and the pesticides are either at, below or slightly above levels typical to aquatic life in areas categorized as urban/industrial by the NSCRF.

Pesticides were expected to be detected in the fish tissues because pesticide use has been documented as widespread throughout MCB Camp Lejuene, North Carolina.

The PCB tissue concentration found in Bear Head Creek was reported to be 490 ug/kg. The national average of PCBs found in fish tissue is 1,897 ug/kg (NSCRF, 1992). The NSCRF reported that 91 percent of all the stations included in their survey had PCB contamination. The PCB tissue concentrations found at Bear Head Creek were below the reported national average. However, based on the potential sources of contamination at OU No. 2 (lubricating oil), the PCBs detected in the fish may be attributable to OU No. 2.

Toluene was detected in a fish collected at Station 6-BH6A at a concentration of 8 ug/kg. Studies have revealed that the average concentration of toluene in fish collected from a petroleum contaminated harbor in Japan was 5 mg/kg (Howard, 1991). This level of contamination is considerably higher than the levels of toluene found in the fish in Bear Head Creek. Toluene does not readily bioaccumulate in fish, and when released into water, it will be lost by both volatilization and biodegradation.

Benzene was detected in the fish tissue at Station 6-BH6A in a concentration of 6.0 ug/kg. Studies regarding the national average range of benzene in fish could not be located. It is known that benzene is not expected to bioconcentrate in aquatic organisms (Howard, 1991). This is due in part to benzene's ability to rapidly volatilize when released to water. Benzene was not detected in the surface water in Bear Head Creek; however, it was detected in the sediment at 6-BH1 (located at the most upstream station). Due to the proximity of the positive detection of benzene in the sediment and the lack of detection in surface water, it is not likely that the benzene concentrations in the fish could be attributed to OU No.2.

Fish tissue concentrations of selenium were reported at 0.27 mg/kg. Worldwide ecological studies detected selenium concentrations in fish tissues from 0.03 to 0.7 mg/kg in Sydney Australia and 0.62 to 14.2 mg/kg in China (Ginn, 1988) and 0.8 to 1.3 mg/kg in Massachusetts (Geesey, 1982). The concentrations of selenium in the fish tissue collected at Bear Head Creek appeared to be below the worldwide data. Because selenium was not detected in the surface water in Bear Head Creek and only appeared in one sediment sample, it is unlikely that the selenium concentration in the fish tissue could be attributed to OU No.2.

Cadmium was found in fish tissues at Station 6-BH6A in the concentration of 0.06 mg/kg. The National Marine Fishery trace element survey determined that the national average of cadmium in fish muscle was less than 0.1 mg/kg (NOAA, 1978); therefore, the concentration of cadmium in the fish tissue collected at Bear Head Creek appears to be below the national average. Cadmium was not detected in the surface water in Bear Head Creek; however it was detected in the sediment in both the upstream and downstream stations. Therefore, the cadmium detected in the fish collected from Bear Head Creek cannot be attributed to contamination from OU No.2.

Zinc concentrations in the fish samples were reported at 23.4 mg/kg. Other saltwater ecological studies detected the following zinc values in fish tissue analyses: 5.9 to 16.6 mg/kg in the Arabian Gulf (Ginn, 1989), 4.1 to 58.8 mg/kg in the Mediterranean Sea in Israel, 0.02 to 5.6 mg/kg in the United Kingdom (Ginn, 1988), and 88 to 145 mg/kg in the Gulf of Mexico (Ginn, 1987). The National Marine Fishery trace element survey revealed that the average concentration of zinc in the muscle of fish ranged from 2.0 to 20.0 mg/kg (NOAA, 1978). It can be determined from the above worldwide data that the concentrations of zinc found in the fish at Station 6-BH6A were within the reported normal ranges. Because zinc was detected in higher concentrations in the sediments at the downstream stations as compared to the upstream stations, the zinc detected in the fish tissues may be attributed to contamination from Sites 6 and 82.

The overall physical appearance of the fish, and the relatively low concentration of contaminants present in the fish tissues indicate the aquatic environment at Bear Head Creek is not suffering from any stress presented by the detected contaminants; however, some of the contaminants found in the fish tissue (pesticides, PCBs, and zinc) could be attributed to the potential areas of contamination.

7.4.2.3 Pettiford Creek

Baker did not collect fish or crab tissue samples at Pettiford Creek.

7.5 Benthic Macroinvertebrate

This section evaluates the current and potential adverse risk to the benthic macroinvertebrates from contaminants detected in the sediments and surface water in Wallace Creek, Bear Head Creek, and the ravine.

7.5.1 Wallace Creek

The species density at Stations 6-WC3A and 6-WC6A was 1,275 and 1,128 individuals/m^2, respectively and the species diversity for these stations was 0.448 and 0.510, respectively. These values compare to a species density of 210 individuals/m^2 and species diversity of 0.372 at the Pettiford Creek station (PC). The MBI values at Stations 6-WC3A and 6-WC6A were 6.46 and 7.30, respectively, compared to 8.84 at Station PC.

Station 6-WC3A was more similar to Station 6-WC6A than Station PC concerning water chemistry, habitat, and sediment type. Therefore, the species density, diversity, and MBI values are expected to be similar, if all other factors (i.e., pollution impacts) are equal.

Approximately 74 percent (148 individuals) of the individuals collected at Station 6-WC3A were the chiromid species Tribelos jucundum; none of the other 52 individuals at this station comprised more than six percent of the sample number. Tribelos jucundum does not have a BI, however Tribelos spp. has a BI of 6.6 (Lenat, 1993). Tribelos jucundum is relatively sensitive to heavy metals, and intolerant to organic waters with a tolerance value of 1.0 (U.S. EPA, 1990). This organism is primarily found in freshwaters with salinity concentrations of less than 0.5 ppt and waters having moderate dissolved oxygen concentrations (U.S. EPA, 1977). In addition, they are characteristic of clean water habitats, but are tolerant of organic enrichment if the dissolved oxygen concentration remains above 5.0 mg/l and the pH and water temperature are not adversely altered (U.S. EPA, 1977).

Overall, contaminants at Station 6-WC3A do not appear to be adversely affecting the benthic community based on the similar species densities and diversities between Station 6-WC3A and Station 6-WC6A and the 6.46 MBI value indicating good to fair water quality. In addition, Tribelos jucundum, a relatively intolerant species found primarily in clean environments, accounted for most of the individuals at Station 6-WC3A.

At Station 6-WC6A, approximately 64 percent (113 individuals) of the individuals collected at Station 6-WC6A were the amphipod species, Gammarus fasciatus, 19 percent (34 individuals) were Tribelos jucundum, and 13.5 percent (24 individuals) were the oligochaete species, Limnodrilus hoffmeisteri.

In general, amphipods occur in unpolluted waters (Pennak, 1989). In addition, Gammarus fasciatus (among a few other amphipods) often comprise the majority of specimens taken by casual collectors and widely distributed and common in unpolluted waters (Pennak, 1989). Gammarus fasciatus has a BI of 6.9 (Lenat, 1993) and is facultative in its tolerance to organic wastes with a tolerance value of 2.0 (U.S. EPA, 1990). As discussed above, Tribelos jucundum individuals are usually associated with clean and unpolluted environments. Oligichaetes, however, are generally regarded as "indicators" of organic pollution (Pennak, 1989). Limnodrilus hoffmeisteri has a BI of 9.8 (Lenat, 1993) and is tolerant to organic wastes with a tolerance value of 5.0 (U.S. EPA, 1990).

Overall, contaminants at Station 6-WC6A do not appear to be adversely affecting the benthic community based on the similar species densities and diversities between Station 6-WC6A and Station 6-WC3A and the 7.30 MBI value which indicates fair water quality (Lenat, 1993). In addition, Gammarus fasciatus and Tribelos jucundum, which are generally found in unpolluted environments, comprise approximately 84 percent of the individuals collected at Station 6-WC6A.

No benthic macroinvertebrates were collected at Station 6-WC9A and only eight individuals representing three species were collected at Station 6-WC11A. The dissolved oxygen at these stations were less than 0.2 mg/l at the bottom and there also was a salt wedge at these stations. This most likely accounted for the low density of individuals at these stations because an increase in chemical concentrations were not detected at these two stations. Previous studies have reported that macrobenthos in the deeper mud environments underwent drastic seasonal fluctuations due to anoxic conditions (Tenore, 1972). In addition, the study correlated the absence of benthic life in much of the deeper portions of an estuary with anoxic conditions in those areas (Tenore, 1972).

Several of the metals detected in the surface water of Wallace Creek exceeded their applicable WQSs and/or WQSVs while several of the metals and pesticides and PCB-1260 detected in the sediment of Wallace Creek exceeded their applicable SQSVs. Therefore, although there does not appear to be a current adverse risk to the benthic macroinvertebrate community, the potential for adverse effects to this community is present.

7.5.2 Bear Head Creek

The species density at Stations 6-BH2A and 6-BH4A was 3,709 and 2,747 individuals/m^2, respectively, and the species diversity for these stations was 0.932 and 0.514, respectively. These values compare to a species density of 210 individuals/m^2 and species diversity of 0.372

at the Pettiford Creek station (PC). Station 6-BH2A was very similar to Station 6-BH2A based on the water chemistry, habitat, and sediment type, and not very similar to Station PC. The MBI values at Stations 6-BH2A and 6-BH4A were 7.51 and 7.06, respectively, compared to 8.84 at Station PC.

Approximately 45 percent (261 individuals) of the individuals collected at Station 6-BH2A were the oligochaete Isochaetides curvisetosus, 10 percent of the species were the oligochaete Sparganophilus sp., 8 percent of the species were the oligochaete Limnodrilus hoffmeisteri, and 7.5 percent of the species were the bivalve Pisidium casertanum.

As discussed earlier in this report, oligichaetes are generally regarded as "indicators" of organic pollution (Pennak, 1989). However, Isochaetides curvisetosus has a BI of 7.1 (Lenat, 1993), and it is facultative in its tolerance to organic wastes with a tolerance value of 2.0 (U.S. EPA, 1990). A tolerance value for Sparganophilus sp. has not been established. Limnodrilus hoffmeisteri has a BI of 9.8 (Lenat, 1993) and it is tolerant to organic wastes with a tolerance value of five (U.S. EPA, 1990). Finally, Pisidium spp. has a BI of 6.8 (Lenat, 1993) and the species Pisidium casertanum is tolerant to organic wastes with a tolerance value of 4.0 (U.S. EPA, 1990).

Overall, contaminants at Station 6-BH2A do not appear to be adversely affecting the benthic community based on the relatively high species density and diversity values and the MBI value of 7.51 indicating fair water quality (Lenat, 1993). In addition, Isochaetides curvisetosus, a relatively pollution intolerant species found primarily in clean environments, accounted for nearly half of the individuals at Station 6-BH2A.

Approximately 70 percent (301 individuals) of the individuals collected at Station 6-BH4A were the bivalve Pisidium casertanum, 11 percent of the species were the amphipod Gammarus fasciatus, and 8 percent of the species were the oligochaete Limnodrilus hoffmeisteri.

Pisidium casertanum, with a BI of 6.8, and Gammarus fasciatus, with a BI of 6.9 are facultatively tolerant to pollution, while Limnodrilus hoffmeisteri, with a BI of 9.8, is relatively tolerant to pollution.

Overall, contaminants at Station 6-BH4A do not appear to be adversely affecting the benthic macroinvertebrate community based on the similar species densities and diversities between

Station 6-WC3A and Station 6-WC6A and the MBI value of 7.06 indicating fair water quality (Lenat, 1993). The majority of the individuals collected at Station 6-BH4A are facultatively tolerant to pollution, which means they may live in clean or semi-polluted habitats.

One benthic macroinvertebrate was collected at Station 6-BH6A. A slight anaerobic odor was detected in the sediments at Station 6-BH6A indicating that the sediments may have been slightly anoxic. This potentially could have caused the low numbers of individuals at this station.

7.6 Terrestrial Species

As discussed in Section 7.3 (Surface Soil Quality), the contaminant concentrations in the surface soils of a few of the TAL inorganics potentially may be high enough to cause adverse effects to plants or invertebrates (specifically earthworms). The available data was limited to plants and invertebrates, therefore, effects on mammals, reptiles, birds, and other terrestrial species could not be evaluated.

The potential soil exposure to terrestrial fauna at OU No. 2 was evaluated by both direct and indirect exposure to COCs via water and soil and via foodchain transfer. Contaminants of concern at OU No. 2 are identified in section 5.1.3 for each individual site. Indicator species used in this analysis are the whitetailed deer, cottontail rabbit and the quail. The exposure points for these receptors are the surface soils and surface water (surface soils from site 6, Lot 201; Site 6, Lot 203; Sites 6, Wooded areas and Ravine, and 82; and, Site 9; Surface water from Wallace Creek). The routes for terrestrial exposure to the COCs in the soil and water are incidental soil ingestion, drinking water ingestion, and vegetation ingestion.

Total exposure to the COCs in the soil and surface waters by the terrestrial receptors was evaluated by estimating the chronic daily dose and comparing this dose to terrestrial reference values (TRVs) representing acceptable daily dose in mg/kg/day. For this analysis, TRVs were developed from No-Observed-AdverseEffect-Levels (NOAELs) obtained from the Integrated Risk Information System (IRIS, 1993) or toxicological profiles (Table 7-1). No uncertainty factors or modifying factors were applied to the NOAELs.

The estimated chronic daily doses representing the total exposure of the receptors to soils, surface water, and vegetation were determined using the following equation:

$$E = \frac{(Cw)(Iw) + [(Cs)(Bv)(Iv) + (Cs)(Is)][H]}{BW}$$

Where:

E = Total Exposure, mg/kg/d

Cw = Constituent concentration in water, mg/L

Iw = Rate of drinking water ingestion, L/d

Cs = Constituent concentration in soil, mg/kg

Bv = Soil to plant transfer coefficient, unitless

Iv = Rate of vegetation ingestion, kg/d

Is = Incidental soil ingestion, kg/d

H = Contaminated area/Home range area ratio, unitless

BW = Body weight, kg

Bioconcentration of the COCs were calculated using the soil to plant transfer coefficient (Bv) for organics (Travis, 1988) and metals (Baes, 1984). The concentrations of the COCs in the soil, Cs, were the log-normal 95th percentile upper confidence limit of the arithmetic mean concentration and the concentrations of the COCs in the water, Cs, were the log-normal 95th percentile upper confidence limit of the arithmetic mean concentration for Wallace Creek.

The exposure parameters used in the exposure calculation are presented in Table 7-1 and are summarized for each receptor below.

Whitetailed Deer

For the whitetailed deer, the feeding rate is 1.6 kg/d (Dee, 1991). The incidental soil ingestion rate is 0.019 kg/d (Scarano, 1993). The rate of drinking water ingestion is 1.1 L/d (Dee, 1991). The rate of vegetation ingestion is 1.6 kg/d (Dee, 1991). The body weight is 45.4 kg (Dee, 1991), and the home range is 454 acres (Dee, 1991).

Cottontail Rabbit

For the cottontail rabbit, the feeding rate is 0.1 kg/d (Newell, 1987). The incidental soil ingestion rate is 0.002 kg/d (Newell, 1987). The rate of drinking water ingestion is 0.185 L/d

(Federal Register, 1993). The rate of vegetation ingestion is 0.1 kg/d. The body weight is 2 kg (Newell, 1987), and the home range is 10 acres (USDI, 1984).

Bobwhite Quail

For the bobwhite quail, the feeding rate is 0.01 kg/d (Newell, 1987). The incidental soil ingestion rate is 0.001 kg/d (Newell, 1987). The rate of drinking water ingestion is 0.013 L/d (Federal Register, 1993). The rate of vegetation ingestion is 0.01 kg/d. The body weight is 0.1 kg (Newell, 1987), and the home range is 12.1 acres (USDI, 1985).

Estimates of the potential risk to the terrestrial receptors were made by comparing the total exposure of the COCs to the TRVs. Exceedences of the TRVs indicates a potential for adverse effects.

The Quotient Index (QI) method was used in this analysis.

$$QI = \frac{E}{TRV}$$

where:

QI = Quotient Index
E = Total Exposure, mg/kg/day
TRV = Terrestrial Reference Value, mg/kg/day

Ratios of less than unity indicate a low likelihood of adverse effects while a ratio above unity indicate the likelihood of an adverse affect to the receptor. For the COCs that had available TRVs, the QI did not exceed unity for any of the indicator terrestrial receptors.

7.7 Threatened and/or Endangered Species

The only identified threatened or endangered species at OU No. 2 is the American alligator. This species potentially may be adversely affected by the contaminants detected in the surface water, sediments and fish tissue. No attempt was made during this evaluation to estimate the exposure to contaminants in these media because of the large uncertainty in available models. In addition, even if exposure could be quantified, there is limited (if any) toxicological data on alligators. Therefore, actual risk to the alligators exposed to contaminants at OU No. 2 can not be determined.

7.8 Flora/Wetlands

Wetlands have been identified along the banks of Wallace Creek and Bear Head Creek. Wetlands are valuable components of the environment as they play an important role in maintaining and improving environmental quality. A few of their significant functions include controlling flood waters, improving water quality, and providing wildlife habitat.

A wetland delineation or evaluation was not conducted at OU No. 2. Some stressed and/or dead vegetation was observed along the stream bank at a few of the stations. The observed stressed/dead vegetation was neither widespread or extensive in areal extent. This is typical of any wetland system that has natural successional processes occurring including maturing trees and seasonal die off of mature plant species. In addition, natural stresses may be added to the wetlands systems from variation in tidal influence of the saltwater. The National Wetlands Inventory Map (NWI) was examined to determine the classification of wetlands in OU No. 2. The NWI has designated the banks surrounding Wallace Creek as a palustrine system that is forested with evergreens. A palustrine system included all non-tidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. The area surrounding Bear Head Creek is also a palustrine system; however, it is forested with primarily deciduous trees. The northern bank is designated as a non-tidal, saturated area, where the southern bank is designated as a non-tidal, temporarily flooded, partially drained area. Contaminants in the surface water and sediments potentially may adversely impact the wetland systems due to the observed exceedences of water and sediment quality values.

7.9 Other Sensitive Environments

Bear Head Creek and the inland portion of Wallace Creek and any coastal wetlands associated with these waters is regulated under the CAMA. The tidal portion of Wallace Creek, and the New River and a 75 foot inland buffer zone are regulated under CAMA. The only activities occurring in the inland portions of the waters that would require authorization under CAMA are activities that would occur in the water (e.g., constructing a pier or boat ramp, dredging, etc.). In addition, for the tidal waters, any land disturbing activities (e.g., construction, digging, etc.) within the water and within the 75 feet buffer zone will require a permit or authorization. OU No. 2 is located in the inland portion of Bear Head Creek and Wallace Creek. There do not appear to be any activities that will occur in the waters at these locations, and therefore no authorization under CAMA would be required.

No specific areas within Wallace Creek, Bear Head Creek, and the New River directly downstream of Wallace Creek have been designated as spawning areas critical for the maintenance of fish/shellfish, however, some spawning areas may exist in these waters. The potential impacts to the fish in these waters have already been discussed in this report. These same impacts would apply to fish in the spawning areas. The fish/shellfish in these spawning areas, however, may be more susceptible to chemical stresses due to the higher sensitivity of the reproductive life stages of organisms to these types of stresses.

The Wallace Creek Swamp Natural Area is located in and adjacent to Wallace Creek upstream of Piney Green Road. Although this area is upstream of the suspected sources of contamination at OU No. 2, potential impacts to this area may occur if contaminants are transported upstream due to the tidal influence in Wallace Creek.

No specific areas with Wallace Creek, Bear Head Creek, and the New River directly downstream of Wallace Creek have been designed as nursery areas, however, some nursery areas may exist in these waters. The potential impacts to the fish in these waters have already been discussed in this report. These same impacts would apply to fish in the nursery areas. The fish/shellfish in these spawning areas, however, may be more susceptible to chemical stresses due to the higher sensitivity of juvenile organisms to these types of stresses.

7.10 Uncertainty Analysis

The procedures used in this evaluation to assess risks to ecological receptors, as in all such assessments, are subject to uncertainties. In general, the following are the main sources of uncertainty:

- Environmental chemistry sampling and analysis;
- Environmental parameter measurement;
- Exposure parameter estimation;
- Toxicological information.

Each of these sources of uncertainty as they pertain to this risk assessment are discussed below.

The chemical sampling program at OU No. 2 consisted of surface water, sediments, soil, tissue, and groundwater. The concentrations of chemicals in the surface water will vary with the tides; the concentrations are expected to be lower at higher tides (more dilution) and higher at low tides (less dilution).

The proximity of estuaries to landmasses renders them highly susceptible to pollution from human activities; this pollution threatens fish communities in many regions. Anthropogenic stresses on fish populations can be intense. Whereas much attention has been focused on the acute exposure of these populations to pollutants, sublethal and chronic exposures also debilitate resident and seasonal species. The mobility and migratory habits of fishes, however, make observations on anthropogenic effects more difficult to assess, and most of the evidence on pollution-induced changes in fish populations has been derived from laboratory experiments. Effects of man-made stresses on fishes in estuaries are often obscured by naturally occurring and poorly understood, long-term variations.

The ecological investigation consisted of one sampling effort. The results of this sampling will only provide a "snapshot in time" of the ecological environment. Because the biotic community can have a high amount of natural variability, the "snapshot in time" may not be an accurate representation of actual site conditions. There also is error and uncertainty in the sampling methods used to collect the fish and benthic macroinvertebrates. Because few, if any, fish were collected at the stations, the population statistics were not reliable. In addition, in several of the tissue samples, only one fish was analyzed because only one was collected of that species. Therefore, the concentrations of contaminants may not be a good representation of the average tissue concentration.

The collection of benthic macroinvertebrates has less uncertainty than the collection of fish. However, the effectiveness of the ponar depends upon the sediment type. The ponar is less effective in hard, rocky sediments, or sediments with a lot of organic debris that may prevent the ponar from completely closing, than in soft, mucky sediments. Because the sediment types varied among the stations, the effectiveness of the ponar also would have varied.

There is uncertainty in trying to attribute differences in species density, diversity, and similarities between stations to specific hazards, because these differences may be the result of natural causes. As discussed previously, fish and crabs are mobile. Therefore, the tissue contaminant concentrations cannot be correlated with the contaminants detected at OU No. 2 because the fish or crabs may have been exposed to the contaminants at a different location. Also, as observed in this investigation, natural conditions (salt wedge, low dissolved oxygen) can result in low numbers of individuals.

There also is uncertainty in the use of toxicological data in ecological risk assessments. The surface water and sediment values established by North Carolina and Region IV are set to be protective of a majority of the potential receptors. There will be some species, however, that will not be protected by the values because of their increased sensitivity to the chemicals. Also, the toxicity of chemicals mixtures is not well understood. All the toxicity information used in the ERA for evaluating risk to the ecological receptors is for individual chemicals. Chemical mixtures can affect the organisms very differently than the individual chemicals.

Finally, estuaries are physically unstable areas characterized by large spatial and temporal variations in temperature, salinity, oxygen concentration, turbidity, and other factors. Temporally, such variations take place in the short term and long term. Yet, despite these variations, the basic structure of estuarine fish communities is reasonably stable, and the fishes often have more or less predictable patterns of abundance and distribution. However, estuarine fish populations change dramatically in response to environmental perturbations; these population changes can be permanent even though the predominantly estuarine species have broad temperature tolerances and strong osmoregulatory abilities. The species composition of estuarine communities change constantly, attesting to the variable environmental conditions and the limitations of the tolerances of the fish populations to alterations in the habitat.

7.11 Ecological Significance

The objective of the ERA was to determine if past reported disposal practices at OU No. 2 were adversely impacting the ecological integrity of the terrestrial environment or of Wallace Creek, Bear Head Creek, or the ravine. The ecological significance of the results is necessary to provide the risk managers with the requisite information, to be used in conjunction with the human health risk assessment, in order to determine the appropriate remedial action at the site for the protection of public health and the environment.

For the aquatic portion of the ERA, the results indicate that COCs present in surface water and sediments of Wallace Creek, Bear Head Creek, and the Ravine could pose a moderate to high potential risk to aquatic receptors. The presence of VOCs in Wallace Creek results from groundwater discharge from the site to the creek. However, none of the TCL organic chemicals detected in the surface water samples exceeded the WQS or WQSV values. Some TAL inorganics exceeded the WQS and/or WQSV in both creeks and the ravine. However, although the ravine is a source of the inorganic contamination, the results of the inorganic sampling in Wallace Creek could not establish a direct impact to the creek due to exceedence of these inorganics in both upstream and downstream samples. The fish population of both creeks appeared healthy and population statistics did not indicate that they were impacted by COCs from OU No. 2. Fish tissue results indicated that some COCs were elevated in concentration and could be attributed to sources of COCs at OU No. 2. The primary influence on the benthic macroinverebrate community appeared to be related to the presence of salinity gradients in the two creeks. The salt wedge that developed at the interface of the freshwater and saltwater systems resulted in low dissolved oxygen that created an adverse habitat for intolerant species. It is noted that the seasonal rainfall for the area was atypically high and resulted in lower salinities throughout the New River estuary.

For the terrestrial portion of the ERA, the results indicate that COCs present in the surface soils could pose a moderate risk to plant and terrestrial invertebrates when compared to available toxicological values. However, comparisons of the total exposure to the COCs in the soil and surface waters by the terrestrial vertebrate receptors with available TRVs indicated that the QI did not exceed unity for any of the indicator terrestrial receptors.

Based on the above findings, past reported disposal practices at OU No. 2 potentially are adversely impacting the ecological integrity of Wallace Creek, Bear Head Creek, or the ravine. The findings do not indicate a potentially adverse impact to vertebrate terrestrial receptors.

TABLE 7-1

OPERABLE UNIT NO. 2
TERRESTRIAL REFERENCE VALUES
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Contaminant of Concern	Soil to Plant Transfer Coefficient (Bv)	Toxicity Reference Value (TRV) mg/kg/d
4,4'-DDE	0.006 (1, 2)	0.05 (4)
4,4'-DDD	0.015 (1, 2)	0.05 (4)
4,4'-DDT	0.033 (1, 2)	0.05 (4)
Dieldrin	0.526 (1, 2)	0.005 (4)
Endrin	0.015 (2)	0.025 (4)
PCB-1260	0.019 (1, 2)	2.4 (9)
1,1,1-Trichloroethane	1.390 (1, 2)	350 (4)
Tetrachloroethene	1.281 (1, 2)	20 (4)
Anthracene	0.155 (1, 2)	1000 (4)
1,4-Dichlorobenzene	0.322 (1, 2)	60 (4)
Flouranthene	0.085 (1, 2)	125 (4)
Phenol	8.360 (1, 2)	60 (4)
Pyrene	0.085 (1, 2)	75 (4)
Arsenic	0.040 (3)	16 (5)
Barium	0.150 (3)	30 (4)
Cadmium	0.550 (3)	4.7 (6)
Chromium	0.008 (3)	2.7 (7)
Copper	0.020 (3)	300 (4)
Lead	0.045 (3)	27.4 (4)
Mercury	0.900 (3)	7.4 (8)
Nickel	0.060 (3)	5 (4)
Zinc	1.500 (3)	38 (10)

(1) Table 5-13.
(2) Travis, 1988.
(3) Baes, 1984.
(4) IRIS, 1993.
(5) USDH, 1992a.
(6) USDH, 1992b.
(7) USDH, 1991a.
(8) ATSDR, 1988.
(9) USDH, 1991b.
(10) ATSDR, 1989.

TABLE 7-2

OPERABLE UNIT NO. 2
EXPOSURE PARAMETERS (1)
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

	UNITS	WHITE-TAILED DEER	COTTON-TAIL RABBIT	BOBWHITE QUAIL
Food Source Ingestion		Vegetation 100 %	Vegetation 100 %	Vegetation 100 %
Feeding Rate	kg/d	1.6(2)	0.1(3)	0.01(3)
Incident Soil Ingestion	kg/d	0.019(1)	0.002(3)	0.001(3)
Rate of Drinking Water Ingestion	l/d	1.1(2)	0.185(4)	0.013(4)
Rate of Vegetation Ingestion	kg/d	1.6(2)	0.1	0.01
Body Weight	kg	45.4(2)	2(3)	0.1(3)
Home Range Size	acres	454(2)	10(6)	12.10(5)

NA - Not Applicable
(1) Scarano, 1993.
(2) Dee, 1991.
(3) Newell, 1987.
(4) Federal Register, 1993.
(5) USDI, 1985.
(6) USDI, 1984.

8.0 SUMMARY/CONCLUSIONS

The following sections contain the summary/conclusions for the ERA including Water Quality, Sediment Quality, Surface Soil Quality, fish and benthic macroinvertebrates.

8.1 Water Quality

The water quality summary/conclusions are discussed in the following sections.

8.1.1 Wallace Creek

None of the TCL organic COCs detected in Wallace Creek exceeded applicable water quality criteria values. Dissolved oxygen concentrations and pH values were below WQS and WQSV at some of the stations, but probably were associated with natural conditions.

Surface water concentrations of cadmium, copper, lead, mercury, nickel, silver, and zinc exceeded the North Carolina Water Quality Standards (WQS) and/or U.S. EPA Region IV acute or chronic Water Quality Screening Values (WQSV) in some of the samples. The exceedences of these TAL inorganics occurred in upstream and/or downstream samples or were infrequent in occurrence.

In addition, several TAL inorganics had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in Wallace Creek to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

8.1.2 Bear Head Creek

None of the TCL organic COCs detected in Bear Head Creek exceeded applicable water quality criteria values. Dissolved oxygen concentrations and pH values were below WQS and WQSV at some of the stations, but probably were associated with natural conditions.

Surface water concentrations of copper, lead, mercury, nickel, and silver exceeded the WQS and/or WQSV in some of the samples. The exceedences of these TAL inorganics occurred in upstream and/or downstream samples or were infrequent in occurrence.

In addition, several TAL inorganics had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in Bear Head Creek to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

8.1.3 Ravine

None of the TCL organic COCs detected in the ravine exceeded applicable water quality criteria values.

Surface water concentrations of aluminum, cadmium, copper, iron, lead, silver, and zinc exceeded the WQS and/or WQSV in some of the samples. The exceedences of these TAL inorganics occurred in upstream and/or downstream samples or were infrequent in occurrence.

In addition, several TAL inorganics had the ratio of the upper 95% confidence limit (or maximum value) and the chronic WQSV greater than unity. Based on these results, the potential risk for aquatic life in the ravine to be adversely affected by chronic toxicity from the COCs in the surface water is expected to be moderate to high, provided that the exposure concentration evaluated represents long-term conditions.

8.1.4 Pettiford Creek

Dissolved oxygen concentrations were below the WQS at one station, but probably was associated with natural conditions.

8.2 Sediment Quality

The sediment quality summary/conclusions are discussed in the following sections.

8.2.1 Wallace Creek

Sediment concentrations of copper, lead, silver, zinc, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, dieldrin, PCB-1260, benzo(a)pyrene, fluoranthene, and pyrene exceeded the Region IV lower 10 percentile (ER-L) and/or median percentile (ER-M) sediment screening values (SQSV) in some of the samples. The exceedences of the TAL inorganics occurred in both upstream and downstream samples and, therefore, do not appear site related. Dieldrin was detected in the uppermost station only. The remaining pesticides and PCBs exceeded the SQSV primarily in adjacent and downstream samples and their presence might be attributable to site runoff. The PAHs only were detected near roadways.

In addition, several TAL inorganics and TCL organics had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in Wallace Creek to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

8.2.2 Bear Head Creek

Sediment concentrations of lead, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, PCB-1260, and benzo(a)pyrene exceeded the ER-L and/or ER-M SQSVs in some of the samples. The exceedences of lead occurred in both upstream and downstream samples and, therefore, do not appear site related. The pesticides and PCBs exceeded the SQSV primarily in adjacent and downstream samples and their presence might be attributable to site runoff. The PAHs exceeded the SQSV near the roadway only.

In addition, several TAL inorganics and TCL organics had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in Bear Head Creek to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

8.2.3 Ravine

Sediment concentrations of cadmium, lead, mercury, silver, zinc, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT, dieldrin, endrin, PCB-1260, and several PAHs exceeded the ER-L and/or ER-M SQSVs in some of the samples. These constituents probably are attributable to site runoff.

In addition, several TAL inorganics and TCL organics had the ratio of the upper 95% confidence limit and the ER-L greater than unity. Based on these results, the potential risk for aquatic life in the ravine to be adversely affected by chronic toxicity from the COCs in the sediments is expected to be moderate to high.

8.3 Surface Soil Quality

The surface soil quality summary/conclusions are discussed in the following sections. The effects on terrestrial life from pesticides, PCBs, PAHs and several of the metals could not be addressed in the ERA because of lack of available information. The following paragraphs discuss effects on terrestrial life from the metals for which toxicological information was found.

8.3.1 Site 9

None of the metals detected in the Site 9 surface soil for which toxicological information was available, exceeded the applicable values.

8.3.2 Site 6 (Lot 201)

Surface soil concentrations of chromium detected at Site 6 (Lot 201) exceeded published toxicological values and potentially may cause adverse effects to terrestrial life.

8.3.3 Site 6 (Lot 203)

Surface soil concentrations of chromium, copper and zinc detected at Site 6 (Lot 203) exceeded published toxicological values and potentially may cause adverse effect to terrestrial life.

8.3.4 Sites 6 (Wooded and Ravine Areas) and 82

Surface soil concentrations of arsenic, copper, and zinc detected at Sites 6 (Wooded and Ravine Areas) and 82 exceeded published toxicological values and potentially may cause adverse effects to terrestrial life.

8.4 Fish

The fish summary/conclusions are discussed in the following sections.

8.4.1 Population Statistics

The summary/conclusions for the fish population statistics are discussed in the following sections.

8.4.1.1 Wallace Creek

The majority of the individuals collected at Wallace Creek were represented by juveniles representing the following species: eastern mosquito, shiner sp., pumpkinseed and the american eel.

Community similarity indices showed the greatest similarity between Stations 6-BH6A and 6-WC6A (0.53) and the least similarity between Stations 6-BH6A and 6-WC11 (0) and Stations 6-WC4 and 6-WC11 (0). Because a limited number of fish were collected at all the stations, the similarity values are not reliable.

The diversity of fishes collected at Wallace Creek varied within the stations. Typically, estuarine environments produce a high biomass and abundance, but are limited in the quantity of species. As with the similarity values, the diversity values are not representative of the creek due to the limited data set.

At Wallace Creek, there were no anomalies observed on the fish such as lesions, bacterial or viral infections.

The fish community at Wallace Creek appeared healthy and the population statistics did not indicate that the environment was impacted by contaminants of concern from OU No. 2.

8.4.1.2 Bear Head Creek

The majority of the individuals collected at Bear Head Creek were represented by juveniles which included, eastern mosquito, spot, and pumpkinseed.

Community similarity indices showed the greatest similarity between Stations 6-BH6A and 6-WC6A (0.53) and the least similarity between Stations 6-BH6A and 6-WC11 (0) and Stations 6-WC4 and 6-WC11 (0). Because a limited number of fishes were collected at all the stations, the similarity values are not reliable.

The diversity value derived from the fish collected at Bear Head Creek was 0.29. Typically, estuarine environments produce a high biomass and abundance, but are limited in the quantity of species. As with the similarity values, the diversity values are not representative of the creek due to the limited data set.

At Bear Head Creek, there were no anomalies observed on the fish such as lesions, bacterial or viral infections.

The fish community at Bear Head Creek appeared healthy and the population statistics did not indicate that the environment was impacted by contaminants of concern from OU No. 2.

8.4.1.3 Pettiford Creek

The individuals collected at Pettiford Creek included, shiner sp., pumpkinseed, and striped mullet. Because of the limited numbers of fishes that were collected, conclusions regarding population were limited.

The only diversity value derived from the fish collected at Pettiford Creek was 0.45. Typically, estuarine environments produce a high biomass and abundance, but are limited in the quantity of species.

At Pettiford Creek, there were no anomalies observed on the fish such as lesions, bacterial or viral infections.

The fish community at Pettiford Creek appeared healthy and the population statistics did not indicate that the environment was impacted by contaminants.

8.4.2 Tissue Analysis

The summary/conclusions for the fish tissue analysis are discussed in the following sections.

8.4.2.1 Wallace Creek

Toluene, silver, benzene, and selenium were detected in fish and crab tissue samples. The fish tissue concentrations were within the range of tissue concentrations for these contaminants reported in ecological studies. Because of the frequency of detection of these contaminants both upstream and downstream from OU No. 2, the contaminants can not be attributed to the sites.

The fish community at OU No. 2 had elevated tissue concentrations of the following contaminants of concern: pesticides, PCBs, trichloroethene, and zinc. Due to the nature of the contaminants of concern, these constituents may be attributed to OU No. 2. The crab tissues had elevated levels of phenols, although the contaminant can not be attributed to the site.

8.4.2.2 Bear Head Creek

Toluene, cadmium, benzene and selenium were detected in fish and crab tissue samples. The fish tissue concentrations were within the range of tissue concentrations for these contaminants reported in ecological studies. Because of the frequency of detection of these contaminants both upstream and downstream from OU No. 2, the contaminants can not be attributed to the sites.

The fish community in Bear Head Creek had elevated tissue concentrations of the following contaminants of concern: pesticides, PCBs, and zinc. Due to the nature of the contaminants of concern, these constituents may be attributed to OU No. 2.

8.4.2.3 Pettiford Creek

Baker was not tasked with collecting fish for tissue analysis at Pettiford Creek.

8.5 Benthic Macroinvertebrate

The benthic macroinvertebrate summary/conclusions are discussed in the following sections.

8.5.1 Wallace Creek

Species richness in Wallace Creek was highest in the upstream stations (7-12 species) and lowest in the downstream stations (0-3 species). Species density followed a similar pattern with approximately 1,200 individuals/m^2 in the upper reaches and approximately 50 individuals/m^2 in the lower reaches of the creek. Species diversity was less than 0.5 at all the sampled stations on Wallace Creek.

The dominant species in the creek varied from the chiromid species Tribelos jucundum (74 percent of the individuals) in the upper reaches, the amphipod Gammarus fasciatus (64 percent of the individuals) in the mid-reaches, and the polychaetes Nereis succinea and Capitella capitata (five of the eight individual) and the oligochaete Limnodrilus hoffmeisteri (three of the eight individuals) in the lower reaches of Wallace Creek. This variation followed the variation in salinity measurements at the stations and indicated the effects of the tidal influence seen in the transition from a freshwater system in the upper reaches of the creek and the estuarine influence in the lower reaches of the creek.

The Macroinvertebrates Biotic Index (MBI) ranged from good-fair (6.46) in the upper reaches of the creek to poor (9.8) in the lower reaches of the creek. However, the salinity gradient influenced the species composition in the lower reaches with the tolerant freshwater oligochaete species being present. In addition, the presence of the salt wedge and low dissolved oxygen can create an adverse habitat for intolerant species.

8.5.2 Bear Head Creek

Species richness in Bear Head Creek was highest in the upstream stations (16-33 species) and lowest in the downstream station (one species). Species density followed a similar pattern with approximately 2,700 to 3,700 individuals/m^2 in the upper reaches and approximately 25 individuals/m^2 in the lower reaches of the creek. Species diversity was less than 1.0 at the upper reach station and less than 0.5 in the mid-reach station. Only one species was found in the lower reach station.

The dominant species in the creek varied from the oligochaete species Isochaetides curvisetosus (45 percent of the individuals) in the upper reaches, the bivalve Pisidium casertanu (70 percent of the individuals) in the mid-reaches, and the polychaete Nereis succinea (100 percent of the individuals) in the lower reaches of Bear Head Creek. This variation followed the variation in the salinity measurements at the stations and indicated the effects of the tidal influence seen in the transition from a freshwater system in the upper reaches of the creek and the estuarine influence in the lower reaches of the creek.

The MBI was poor and ranged from 7.51 in the upper reaches of the creek to 7.06 in the mid-reach of the creek. However, the salinity gradient influenced the species composition in the lower reach with no freshwater species being present. In addition, the presence of the salt wedge and low dissolved oxygen can create an adverse habitat for intolerant species.

Although there was no observed salt wedge or salinity graident in Bear Head Creek between the biological sampling stations (i.e., above station 6-BH07), Table 3-4 does indicate that a salinity gradient and salt wedge exists at station 6-BH07SW/SD, approximately 2,500 feet below station 6-BH07. Table 3-18 indicates that surface water samples were taken at station 6-BH07-SW/SD on a falling tide approximately 80 percent to low tide. Finally, there are reported large fluctuations in salinity in estuaries similar to the New River watershed (e.g., White Oak River) with measured salinities varying by 10 to 15 ppt at a given station. Due to the high seasonal rainfall, the salt wedge may be positioned much lower in the downstream reach of Bear Head Creek than would be typical. Therefore, a salinity gradient is the likely influence in the species composition in the lower reach of the creek.

8.5.3 Pettiford Creek

Four species were collected in Pettiford Creek and species density was 210 individuals/m^2. Species diversity was less than 0.5 at the sampled station on Pettiford Creek. The dominant species in the creek was the oligochaete Limnodrilus hoffmeisteri (70 percent of the individuals). The MBI was poor at 8.84.

8.6 Terrestrial Receptors

Total exposure to the COCs in the soil and surface waters by the terrestrial receptors was evaluated by estimating the chronic daily dose and comparing this dose to terrestrial reference values (TRVs). Indicator species used in this analysis were the whitetailed deer, cottontail rabbit and the quail. The exposure points for these receptors are the surface soils and surface water (surface soils from site 6, Lot 201; Site 6, Lot 203; Sites 6, Wooded areas and Ravine, and 82; and, Site 9; Surface water from Wallace Creek). The routes for terrestrial exposure to the COCs in the soil and water are incidental soil ingestion, drinking water ingestion, and vegetation ingestion. Estimates of the potential risk to the terrestrial receptors were made by comparing the total exposure of the COCs to the TRVs using the Quotient Index (QI) method. Ratios of less than unity indicate a low likelihood of adverse effects while a ratio above unity indicate the likelihood of an adverse affect to the receptor. For the COCs that had available TRVs, the QI did not exceed unity for any of the indicator terrestrial receptors.

8.7 Ecological Significance

The objective of the ERA was to determine if past reported disposal practices at OU No. 2 were adversely impacting the ecological integrity of the terrestrial environment or of Wallace Creek, Bear Head Creek, or the ravine. The ecological significance of the results is necessary to provide the risk managers with the requisite information, to be used in conjunction with the human health risk assessment, in order to determine the appropriate remedial action at the site for the protection of public health and the environment.

Based on the above findings, past reported disposal practices at OU No. 2 potentially are adversely impacting the ecological integrity of Wallace Creek, Bear Head Creek, or the ravine. The findings do not indicate a potentially adverse impact to vertebrate terrestrial receptors.

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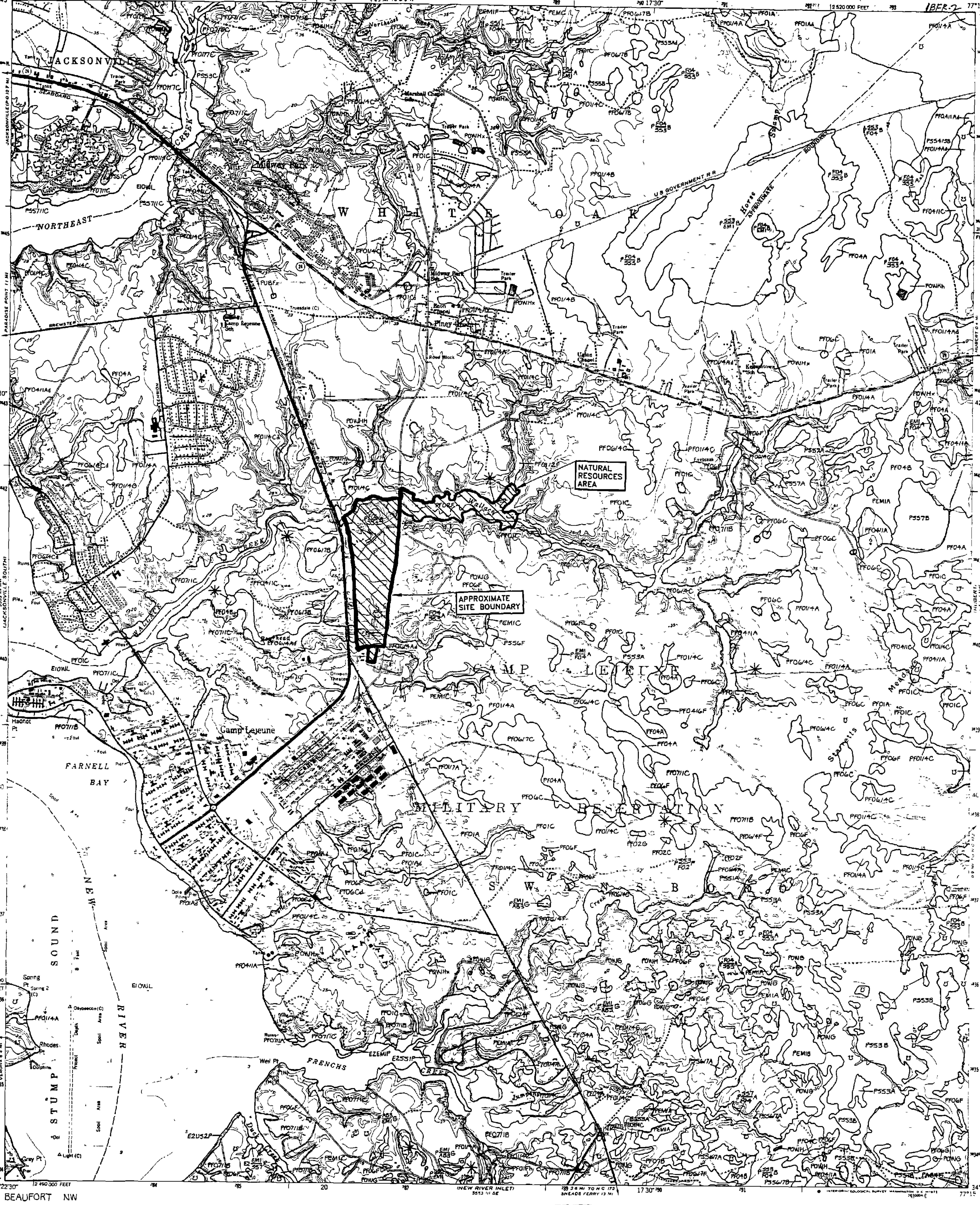
APPENDIX A
NATIONAL WETLAND INVENTORY MAP

NATIONAL WETLANDS INVENTORY

UNITED STATES DEPARTMENT OF THE INTERIOR

CAMP LEJEUNE, N C



BEAUFORT NW

NEW RIVER

DRAFT

CAMP LEJEUNE, N C

SCALE 1 24 000

1 MILE — 1000 0 1000 2000 3000 4000 5000 6000 7000 FEET — 1 KILOMETER

1 acre — 10 acres — 20 acres

ACREAGE GUIDE

Other information including a narrative report concerning the wetland resources depicted on this document may be available For information, contact ________

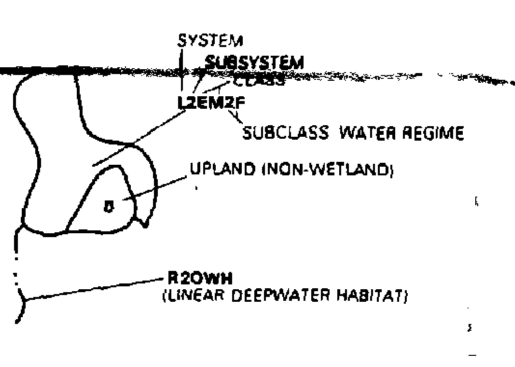
1 100,000 NAME BEAUFORT NEW RIVER — TOPO NAME CAMP LEJEUNE	TECHNICAL RESPONSIBILITY		
	TASK	NAME	DATE
	ZTS Transfer / Lettering	D BARCLAY	1-7-86
	ZTS QC	[illegible]	2-4-86
	MAP PI QC	F J Sargent	2 6-86
	ZTS CORRECTION	D Barclay	2-6-86
	CORRECTION CHECK	K [illegible]	2 7-86
	F W S ACCEPT	C MARTIN	3-5-86

SPECIAL NOTE

This document was prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation visible hydrology and geography in accordance with **Classification of Wetlands and Deepwater Habitats of the United States (FWS/OBS - 79/31 December 1979)** The aerial photographs typically reflect conditions during the specific year and season when they were taken In addition, there is a margin of error inherent in the use of the aerial photographs. Thus, a detailed on the ground and historical analysis of a single site may result in a revision of the wetland boundaries established through photographic interpretation In addition, some small wetlands and those obscured by dense forest cover may not be included on this document

Federal State and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State or local government or to establish the geographical scope of the regulatory programs of government agencies Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities

SYMBOLOGY EXAMPLE



U — Primarily represents upland areas, but may include unclassified wetlands such as man-modified areas non photo-identifiable areas and/or unintentional omissions

NOTES TO THE USER

- Wetlands which have been field examined are indicated on the map by an asterisk (*)
- Additions or corrections to the wetlands information displayed on this map are solicited. Please forward such information to the address indicated
- Subsystems, Classes, Subclasses and Water Regimes in *italics* were developed specifically for NATIONAL WETLANDS INVENTORY mapping.
- Some areas designated as R4SB, R4SBW, OR R4SBJ (INTERMITTENT STREAMS) may not meet the definition of wetland.
- This map uses the class Unconsolidated Shore (US) *On earlier NWI maps that class was designated Beach/Bar (BB), or Flat (FL)* Subclasses remain the same in both versions

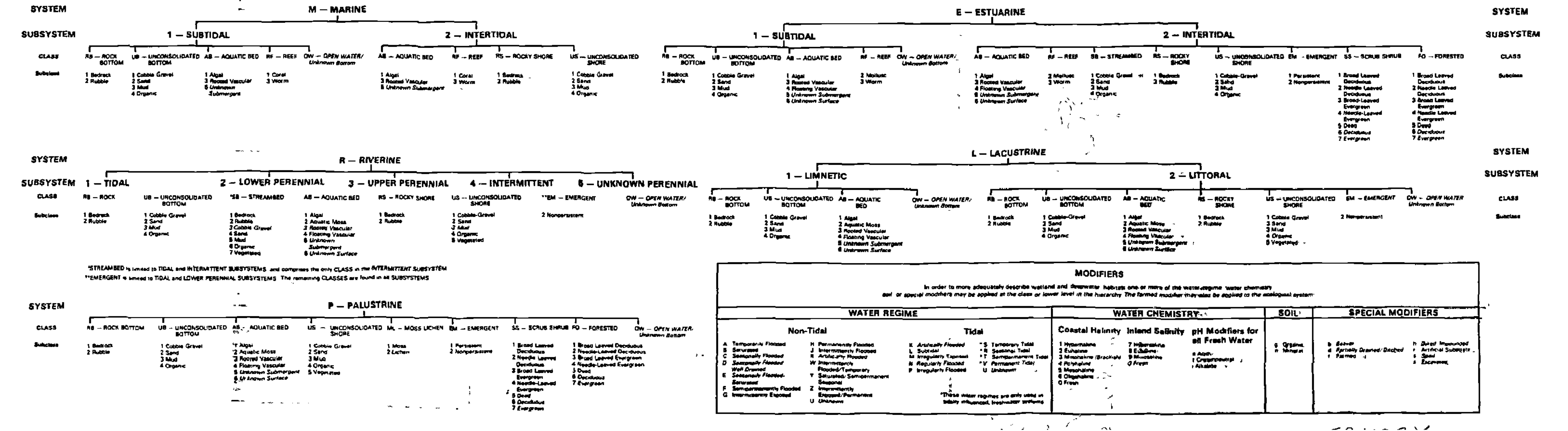
AERIAL PHOTOGRAPHY

DATE	3 / 82	DATE	/ /
SCALE	1 58 000	SCALE	
TYPE	CIR	TYPE	

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

Prepared by National Wetlands Inventory



APPENDIX B
MCB CAMP LEJEUNE ENDANGERED SPECIES AND SPECIAL INTEREST COMMUNITIES SURVEY

Critical species list - Camp Lejeune endangered species and special-interest communities survey

Principal investigator: Richard LeBlond, 326-1440.

List current as of 9-30-91.
Replaces list of 6-30-91.

"?" = Species names followed by a "?" are less than confidently identified. They are nonetheless caught in this biological safety net, the mesh size of which errs on the side of diversity. Until identification is confirmed (most of these are represented by a specimen), these site records should be regarded as tentative.

Species sites are listed chronologically under the species name, with the 1990 month and day of discovery listed first, followed by the site's sector site number, community type and UTM grid number. Sites documented prior to the start of the current survey are indicated by the parenthetical date of discovery following the site name (see Rhexia aristosa at FD-1). Prior sites not yet relocated during the current survey are indicated by "---" in the date column (see Rhynchospora tracyi at FD-1).

Status codes. Federal status is listed first, and separated from the state status by a comma; e.g., Rhexia aristosa FC2,T (Federal Candidate level 2, state Threatened). Species with state status only are indicated by a single code without comma; e.g., Rhynchospora tracyi SR (Significantly Rare).

- FE = Federal Endangered
- FT = Federal Threatened
- FC1 = Federal Candidate level 1. At risk. Listing warrented but precluded by higher priorities.
- FC2 = Federal Candidate level 2. Vulmerable. Listing warrented but precluded by higher priorities.
- F3C = Federal Candidate level 3C. More abundant and/or less threatened than previously known.
- E = State Endangered
- T = State Threatened
- SC = State Special Concern
- C = State Candidate
- SR = State Significantly Rare
- W = State Watch List (W1)
- W3 = " " " , undocumented state occurrence prior to Lejeune site.

proposed = proposed for listing as State Candidate, Significantly Rare or Watch List based on current evidence

List of species and communities by sector - Camp Lejeune
endangered species and special-interest communities survey

List current as of 9-30-91.
Replaces list of 6-30-91.

		Status	UTM Grid
SECTOR E			
E-1	**Upper Beach**		907266-
	Amaranthus pumilus (1988)	FC2,T	949297
E-5	**Brackish Marsh**		860237
	Parietaria praetermissa	W	
	Solanum pseudogracile	W	
SECTOR F			
FA-1	**Depression Meadow**		878409
	Aristida palustris	SR	
	Burmannia biflora	W	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora wrightiana	W	
FA-2	**Road Meadow**		895385
	Rhynchospora nitens	W	
	Rhynchospora pusilla	W	
FA-4	**Depression Meadow**		883407
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
FB-1	**Wet Pine Flatwoods**		927413
	Amphicarpum purshii	SR	
	Lysimachia loomisii	W	
	Panicum tenerum	SR	
	Xyris difformis var. curtissii	W	
FB-2	**Road Meadow**		926409
	Rhynchospora pusilla	W	
	Rhynchospora nitens	W	
FB-3	**Wet Pine Flatwoods**		937416
	Lysimachia loomisii	W	
	Pleea tenuifolia	W	
	Scleria minor	SR	
	Tofieldia glabra	FC2,C	

(FB-3 cont.)			
	Xyris difformis var. curtissii	W	
	Xyris elliottii	SR	
FB-4	Wet Pine Flatwoods		939426
	Lysimachia loomisii	W	
	Rhynchospora harveyi	W	
	Rhynchospora pusilla	W	
	Scleria minor	SR	
FC-2	**Flatwood/Swamp Ecotone**		922413
	Anthaenantia rufa	W	
	Helianthus heterophyllus	W	
	Lysimachia loomisii	W	
	Oxypolis ternata	FC2,T	
FC-3	**Depression Meadow**		918318
	Aristida palustris	SR	
	Bartonia verna	W	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Litsea aestivalis	FC2,C	
	Muhlenbergia torreyana	F3C,E	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora cephalantha f. antrorsa	unusual/rare	
	Rhynchospora tracyi	SR	
FC-4	**Pocosin Ecotone**		919376
	Andropogon capillipes	W	
	Gentiana autumnalis	W	
FD-1	Cypress Savanna		904377
	Agalinis linifolia	SR	
	Anthaenantia rufa	W	
	Aristida palustris	SR	
	Bartonia verna	W	
	Burmannia biflora	W	
	Carex verrucosa	SR	
	Coelorachis rugosa	W	
	Dichanthelium sp. 1 =Panicum hirstii	FC2,C	
	Dichanthelium erectifolium	SR	
	Lobelia boykinii	FC2,C	
	Lysimachia loomisii	W	
	Muhlenbergia torreyana	F3C,E	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora cephalantha f. antrorsa	unusual/rare	
	Rhynchospora harperi	C	
	Rhynchospora tracyi (1984)	SR	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
	Spiranthes laciniata	C	

(FD-1 cont.)

	Xyris baldwiniana	W	
FD-3	**Small Depression Pond**		899378
	Carex verrucosa	SR	
	Eleocharis equisetoides	SR	

<u>SECTOR G</u>

G-10	**Pocosin Ecotone**		929348
	Lysimachia asperulifolia	FE,E	
GA-1	**Depression Meadow, Wet Pine Flatwoods**		894359
	Agalinis linifolia	SR	
	Andropogon capillipes	W	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Eleocharis melanocarpa	C	
	Gentiana autumnalis	W	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	
GA-2	**Depression Meadow**		896360
	Andropogon capillipes	W	
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Panicum tenerum	SR	
	Pleea tenuifolia	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
GA-3	**Cypress Savanna**		898360
	Agalinis linifolia	SR	
	Andropogon capillipes	W	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Carex verrucosa	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora pusilla	W	
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	

GA-4	**Savanna**		899349
	Asclepias pedicellata	C	
	Dichanthelium erectifolium	SR	
	Dionaea muscipula	FC2,C-SC	
	Lysimachia loomisii	W	
	Oxypolis ternata	FC2,C	
	Pleea tenuifolia	W	
	Polygala brevifolia	W	
	Polygala hookeri	C	
	Rhynchospora pallida	SR	
	Sarracenia rubra ssp. rubra	W	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	
	Xyris baldwiniana	W	
GA-5	Depression Meadow		901361
	Agalinis linifolia	SR	
	Anthaenantia rufa	W	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Carex verrucosa	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
	Xyris smalliana	W	
GB-1	**Wet Pine Flatwoods/Small Stream Pocosin**		908376
	Rhynchospora elliottii	W	
GB-2	**Road Meadow**		907376
	Agalinis virgata	C	
GB-3	Road Meadow		929368
	Calopogon barbatus	W	
	Dionaea muscipula	FC2,C-SC	
	Solidago pulchra	FC2,C	
GB-4	**Road Meadow**		931365
	Dionaea muscipula	FC2,C-SC	
	Rhynchospora pallida	SR	
	Solidago pulcra	FC2,C	
GB-5	Wet Pine Flatwoods		932364
	Dionaea muscipula	FC2,C-SC	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	

GB-6	Pocosin Ecotone		935364
	Amphicarpum purshii	SR	
	Dionaea muscipula	FC2,C-SC	
	Solidago pulchra	FC2,C	
GB-7	Road Meadow		940364
	Rhexia aristosa	FC2,T	
	Solidago pulchra	FC2,C	
GB-8	Road Meadow		932368
	Bartonia verna	W	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	
GB-9	Road Meadow		934362
	Juncus validus	W	
GB-10	Road Depression Meadow		918374
	Calopogon barbatus	W	
GC-1	Small Depression Pond		946360
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis tricostata	W	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora tracyi	SR	
GC-2	Small Depression Pond		949357
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Cladium mariscoides	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Ludwigia linifolia	SR	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Rhynchospora pusilla	W	
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	
GC-3	Pocosin Ecotone		945342
	Amphicarpum purshii	SR	
GC-5	Depression Meadow		940345
	Eleocharis tricostata	W	
	Panicum tenerum	SR	

GC-6	**Depression Meadow**		**942358**
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Litsea aestivalis	FC2,C	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
GC-7	Depression Meadow		942359
	Aristida palustris	SR	
	Litsea aestivalis	FC2,C	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	
	Sarracenia rubra ssp. rubra	W	
GC-8	**Small Depression Pond**		**947356**
	Rhexia aristosa	FC2,T	
	Rhexia aristosa X cubensis	undescribed taxon	
	Rhexia cubensis	SR	
GC-9	Depression Meadow		949356
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Rhexia aristosa	FC2,T	
GC-10	Depression Meadow		948356
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Eleocharis tricostata	W	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	
GC-11	**Flatwoods Road Meadow**		**949364**
	Andropogon capillipes	W	
GC-12	**Streamhead Pocosin**		**944348**
	Amphicarpum purshii	SR	
	Dionaea muscipula	FC2,C-SC	
	Peltandra sagittifolia	SR	
	Rhynchospora pallida	SR	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	

GD-1	**Road Meadow**		938326
	Amphicarpum purshii	SR	
	Rhexia cubensis	SR	
GD-2	**Small Depression Pond**		938335
	Eleocharis tricostata	W	
GD-3	Small Depression Pond		937335
	Eleocharis vivipara	W	
	Litsea aestivalis	FC2,C	
	Rhexia aristosa	FC2,T	
	Xyris smalliana	W	
GD-4	Small Depression Pond		936336
	Dichanthelium erectifolium	SR	
	Eleocharis melanocarpa	C	
	Eleocharis tricostata	W	
	Rhexia aristosa	FC2,T	
GD-5	**Road Meadow**		921333
	Agalinis linifolia	SR	
	Dionaea muscipula	FC2,C-SC	
	Pleea tenuifolia	W	
	Rhynchospora pusilla	W	
	Solidago pulchra	FC2,C	
GD-6	Road Meadow		922332
	Rhexia aristosa	FC2,T	
	Rhexia aristosa X cubensis	undescribed taxon	
	Rhexia cubensis	SR	
	Rhynchospora pusilla	W	
	Xyris baldwiniana	W	
GE-1	**Flatwoods/Pocosin Ecotone**		910328
	Calamovilfa brevipilis	F3C,E	
	Carex elliottii	W	
	Dionaea muscipula (1988)	FC2,C-SC	
	Ludwigia microcarpa (1988)	W	
	Lysimachia asperulifolia (1988)	FE,E	
	Polygala brevifolia	W	
	Rhynchospora pallida	SR	
	Solidago pulchra (1988)	FC2,C	
	Tofieldia glabra	FC2,C	
GE-2	**Pocosin Ecotone**		918333
	Amphicarpum purshii	SR	
	Dionaea muscipula	FC2,C-SC	
	Oxypolis ternata	FC2,C	
	Pleea tenuifolia	W	
	Polygala brevifolia	W	
	Rhynchospora pallida	SR	
	Rhynchospora wrightiana	W	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	

GE-3	**Road Depression Meadow**		907330
	Amphicarpum purshii	SR	
	Calamovilfa brevipilis	F3C,E	
	Dionaea muscipula	FC2,C-SC	
	Pleea tenuifolia	W	
GE-4	Small Depression Pond		907328
	Rhexia aristosa	FC2,T	
	Rhynchospora inundata	W	
GF-1	**Wet Pine Flatwoods**		**949331**
	Agalinis fasciculata	W	
	Agalinis virgata	C	
	Calopogon barbatus	W	
	Gentiana autumnalis	W	
	Tofieldia glabra	FC2,C	
GF-1	Road Meadow		**949331**
	Andropogon capillipes	W	
GF-3	Depression Meadow		906327
	Rhexia aristosa	FC2,T	
GF-5	Road Meadow		944326
	Agalinis linifolia	SR	
	Ludwigia microcarpa	W	
	Rhexia aristosa	FC2,T	
	Xyris baldwiniana	W	
GG-1	**Depression Meadow**		934317
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	
GG-2	**Road Meadow**		943325
	Eleocharis tricostata	W	
	Ludwigia microcarpa	W	
GH-1	Coastal Fringe Sandhill		?
	Cladina evansii	W	
GI-1	Coastal Fringe Sandhill		?
	Cladina evansii	W	

SECTOR H

HA-3	**Depression Meadow**		876335
	Aristida palustris	SR	
	Burmannis biflora	W	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Rhynchospora nitens	W	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
HA-5	**Depression Meadow**		874336
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2,T	
	Scleria georgiana	C	
HA-6	Small Depression Pond		873334
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis tricostata	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	
HA-7	**Small Depression Pond**		872334
	Dichanthelium erectifolium	SR	
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	
HA-8	Small Depression Pond		872333
	Coelorachis rugosa	W	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	
HA-9	**Road Meadow** (best treated as extension of HA-10)		871336
	Scleria georgiana	C	
HA-10	**Small Depression Pond**		870337
	Scleria georgiana	C	
HA-11	Small Depression Pond		869338
	Ludwigia linifolia	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora nitens	W	
	Scleria reticularis var. reticularis	C	

HB-1	**Flatwoods/Pocosin Ecotone**		876311
	Carex elliottii	W	
	Dionaea muscipula	FC2,C-SC	
	Polygala brevifolia	W	
HB-2	**Flatwoods/Pocosin Ecotone**		875317
	Amphicarpum purshii	SR	
	Lysimachia asperulifolia (P. Robinson)	FE,E	
	Polygala brevifolia	W	
	Solidago pulchra	FC2,C	
HB-3	Small Depression Pond		878328
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Dionaea muscipula	FC2,C-SC	
	Ludwigia linifolia	SR	
	Oxypolis ternata	FC2,C	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Solidago pulchra	FC2,C	
HB-5	**Wet Pine Flatwoods, Pocosin**		870320
	Asclepias pedicellata	C	
	Calopogon barbatus	W	
	Solidago pulchra	FC2,C	
	Sporopolus species 1	FC2,T	
HD-1	**Small Depression Pond/Black Gum Swamp**		878337
	Dichanthelium erectifolium	SR	
	Rhexia aristosa	FC2,T	
HD-2	**Depression Meadow/Small Depression Pond**		876339
	Aristida palustris	SR	
	Burmannia biflora	W	
	Rhexia aristosa	FC2,T	
HD-3	**Depression Meadow/Small Depression Pond**		871341
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Eleocharis robbinsii	C	
	Myriophyllum laxum	FC2,T	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Rhynchospora inundata	W	
	Rhynchospora nitens	W	
	Rhynchospora pleiantha	SR	
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	

HE-1	Depression Meadow		893334
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Rhexia aristosa	FC2,T	
HE-2	**Depression Meadow**		892334
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Bartonia verna	W	
	Burmannia biflora	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora wrightiana	W	
HE-3	**Depression Meadow**		889332
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Ludwigia linifolia	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
	Scleria reticularis var. reticularis	C	
	Xyris smalliana	W	
HE-4	**Small Stream Pocosin**		895331
	Rhynchospora inundata	W	
HE-5	Depression Meadow		896332
	Aristida palustris	SR	
	Burmannia biflora	W	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora harperi	C	
	Rhynchospora inundata	W	
HE-6	Small Depression Pond		882329
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia aristosa X cubensis	undescribed taxon	
	Rhexia cubensis	SR	
	Rhynchospora scirpoides	C	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	

HE-7	**Road Meadow**		880330
	Agalinis fasciculata	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora pusilla	W	
	Rhynchospora nitens	W	
HE-8	**Pocosin Ecotone**		883329
	Dionaea muscipula	FC2,C-SC	
HE-8	Road Depression Meadow		882328
	Paspalum praecox	W	
HF-1	**Small Depression Pond/Depression Meadow**		900316
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis tricostata	W	
	Ludwigia linifolia	SR	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	
	Scleria georgiana	C	
	Spiranthes laciniata	C	
	Xyris smalliana	W	
HF-2	Road Meadow		899316
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora inundata	W	
	Rhynchospora nitens	W	
	Rhynchospora pallida	SR	
	Rhynchospora wrightiana	W	
	Sagittaria graminea var. chapmanii	C	
HF-3	Small Depression Pond		898318
	Aristida palustris	SR	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Sagittaria graminea var. chapmanii	C	
HF-3	**Road Meadow**		898318
	Amphicarpum purshii	SR	
HF-4	Road Meadow		898319
	Agalinis linifolia	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	

(HF-4 cont.)			
	Rhynchospora nitens	W	
	Sagittaria graminea var. chapmanii	C	
HF-5	**Flatwoods/Pocosin Ecotone**		896319
	Carex elliottii	W	
	Rhexia cubensis	SR	
	Rhynchospora pallida	SR	
HF-6	**Road Meadow**		894319
	Rhexia aristosa	FC2,T	
	Rhynchospora pallida	SR	
HF-7	**Small Depression Pond**		892318
	Eleocharis equisetoides	SR	
	Rhynchospora inundata	W	
	Xyris smalliana	W	
HF-8	Road Meadow		896311
	Amphicarpum purshii	SR	
HF-8	Small Depression Pond		896312
	Agalinis linifolia	SR	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis elongata	C	
	Eleocharis equisetoides	SR	
	Eleocharis tricostata	W	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	
	Rhynchospora inundata	W	
	Rhynchospora pleiantha	C	
HF-9	**Road Meadow**		889313
	Amphicarpum purshii	SR	
HF-11	Small Depression Pond		897309
	Agalinis linifolia	SR	
	Carex verrucosa	SR	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora inundata	W	
	Spiranthes laciniata	C	
	Sporobolus species 1 (into HF-20)	FC2,T	
HF-12	Small Depression Pond		897308
	Eleocharis elongata	C	
	Eleocharis equisetoides	SR	

HF-13	**Small Depression Pond**		895309
	Carex verrucosa	SR	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora inundata	W	
	Rhynchospora tracyi	SR	
HF-14	Pocosin Ecotone		894312
	Amphicarpum purshii	SR	
	Rhexia aristosa	FC2,T	
HF-15	**Small Depression Pond**		894310
	Eleocharis equisetoides	SR	
	Litsea aestivalis	FC2,C	
	Scirpus etuberculatus	SR	
HF-15	Pond/Flatwoods Ecotone		894310
	Asclepias pedicellata	C	
HF-16	Small Depression Pond		892308
	Eleocharis robbinsii? (too deep to wade)	C	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhexia cubensis	SR	
	Rhynchospora inundata	W	
	Rhynchospora scirpoides	C	
HF-17	**Small Depression Pond**		891306
	Aristida palustris	SR	
	Burmannia biflora	W	
	Dichanthelium erectifolium	SR	
	Eleocharis equisetoides	SR	
	Eleocharis robbinsii	C	
	Panicum tenerum	SR	
	Rhexia aristosa	FC2,T	
	Rhynchospora scirpoides	C	
	Rhynchospora tracyi	SR	
	Rhynchospora wrightiana	W	
	Utricularia olivacea	T	
	Xyris smalliana	W	
HF-18	**Depression Meadow**		898308
	Agalinis linifolia	SR	
	Coelorachis rugosa	W	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
HF-19	**Small Depression Pocosin**		897307
	Amphicarpum purshii (into HF-20)	SR	
HF-20	**Flatwoods/Pocosin Ecotone**		897308
	Amphicarpum purshii	SR	
	Solidago pulchra	FC2,C	
	Sporobolus species 1	FC2,T	

HF-21	**Small Depression Pond**		899310
	Coelorachis rugosa	W	
HF-22	**Road Depression Meadow**		902306
	Juncus validus	W	
HF-23	**Small Stream Swamp**		905302
	Carex albicans var. emmonsii	W	
HF-24	Road/Pocosin Ecotone		900309
	Dionaea muscipula	FC2,C-SC	
	Rhynchospora pallida	SR	
HF-25	**Road Depression Meadow**		904310
	Andropogon capillipes	W	
	Burmannia biflora	W	
	Dichanthelium wrightianum	W	
	Dionaea muscipula	FC2,C-SC	
	Ludwigia microcarpa	W	
	Paspalum praecox	W	
	Polygala brevifolia	W	
	Rhynchospora nitens	W	
	Rhynchospora pallida	SR	
	Solidago pulchra	FC2,C	
	Xyris baldwiniana	W	

SECTOR I

IA-1	**Small Depression Pond**		886297
	Rhynchospora inundata	W	
	Rhynchospora scirpoides	C	
IA-2	Small Depression Pond		890296
	Burmannia biflora	W	
	Eleocharis equisetoides	SR	
	Eleocharis vivipara (?)	W	
	Panicum tenerum	SR	
	Rhyncospora inundata	W	
	Rhynchospora scirpoides	C	
IA-3	**Wet Pine Flatwoods**		887298
	Asclepias pedicellata	C	
IC-2	**Small Depression Pond**		875279
	Eleocharis equisetoides	SR	
	Rhynchospora inundata	W	
IC-3	Small Depression Pond		869280
	Eleocharis equisetoides	SR	

IC-4	**Small Depression Pond**		870280
	Eleocharis equisetoides	SR	
	Rhynchospora inundata	W	
	Sagittaria engelmanniana	W	
IC-6	**Coastal Fringe Sandhill**		859270
	Cladina evansii	W	
IC-7	**Small Depression Pond**		862270
	Eleocharis equisetoides	SR	
IC-8	**Coastal Fringe Sandhill**		?
	Cladina evansii	W	
IC-9	**Maritime Forest**		853258
	Cynanchum angustifolium	W	
	Iresine rhizomatosa	W	
	Sageretia minutiflora	C	
IC-10	**Coastal Fringe Evergreen Forest**		856262
	Asplenium platyneuron var. bacculum-rubrum	W	
	Cornus asperifolia	C	
	Rhynchospora miliacea	W	
IC-11	**Seepage Meadow**		867259
	Eleocharis montevidensis	proposed	
IE-2	Pocosin Ecotone		873291
	Dionaea muscipula	FC2,C-SC	

SECTOR J

JB-1	Small Stream Swamp		819305
	Carex chapmanii	FC2,T	
	Carex floridana	W	
JC-1	**Small Depression Pond**		844290
	Eleocharis melanocarpa	C	

SECTOR K

KA-1	Small Stream Swamp		797390
	Carex floridana	W	
KC-1	Wet Pine Flatwoods		772377
	Buchnera floridana	W	
	Calamovilfa brevipilis	F3C,E	
	Dionaea muscipula	FC2,C-SC	
	Pleea tenuifolia	W	
	Rhynchospora pallida	SR	
	Solidago pulchra	FC2,C	

SECTOR L

LA-1	**Road Depression Meadow**		727352-
	Wet Pine Flatwoods		724337
	Dionaea muscipula	FC2,C-SC	
	Pleea tenuifolia	W	
	Rhynchospora pusilla	W	
	Xyris elliottii	SR	
LB-1	**Road Meadow** (US 17)		725306-724337
	Savanna		
	Agalinis aphylla	C	
	Agalinis fasciculata	W	
	Agalinis virgata	C	
	Amphicarpum purshii	SR	
	Andropogon capillipes	W	
	Asclepias pedicellata	C	
	Bartonia verna	W	
	Calamovilfa brevipilis	F3C,E	
	Calopogon barbatus	W	
	Dionaea muscipula	FC2,C-SC	
	Gentiana autumnalis	W	
	Linum floridanum var. chrysocarpum	SR	
	Oxypolis ternata	FC2,C	
	Pleea tenuifolia	W	
	Polygala brevifolia	W	
	Rhynchospora nitens	W	
	Rhynchospora pallida	SR	
	Rhynchospora pusilla	W	
	Solidago pulchra	FC2,C	
	Sporobolus species 1	FC2,T	
	Tofieldia glabra	FC2,C	
	Xyris baldwiniana	W	
	Xyris elliottii	SR	
	Xyris flabelliformis	C	
LB-3	**Mesic Pine Flatwoods**		734330
	Carex chapmanii	FC2,T	
	Carex floridana	W	
LB-4	**Powerline Depression Meadow**		743296-747287
	Carex elliottii	W	
	Polygala brevifolia	W	
LC-1	**Road Meadow** (NC 210)		752270-745287
	Agalinis fasciculata	W	
	Agalinis tenella	W	
	Andropogon capillipes	W	
	Dionaea muscipula	FC2,C-SC	
	Xyris difformis var. curtissii	W	
	Xyris elliottii	SR	

LC-2	**Powerline Depression Meadow**		747287-764282
	Andropogon capillipes	W	
	Carex elliottii	W	
	Dionaea muscipula	FC2,C-SC	
	Rhexia aristosa	FC2,T	
	Rhynchospora oligantha	C	

<u>SECTOR M</u>

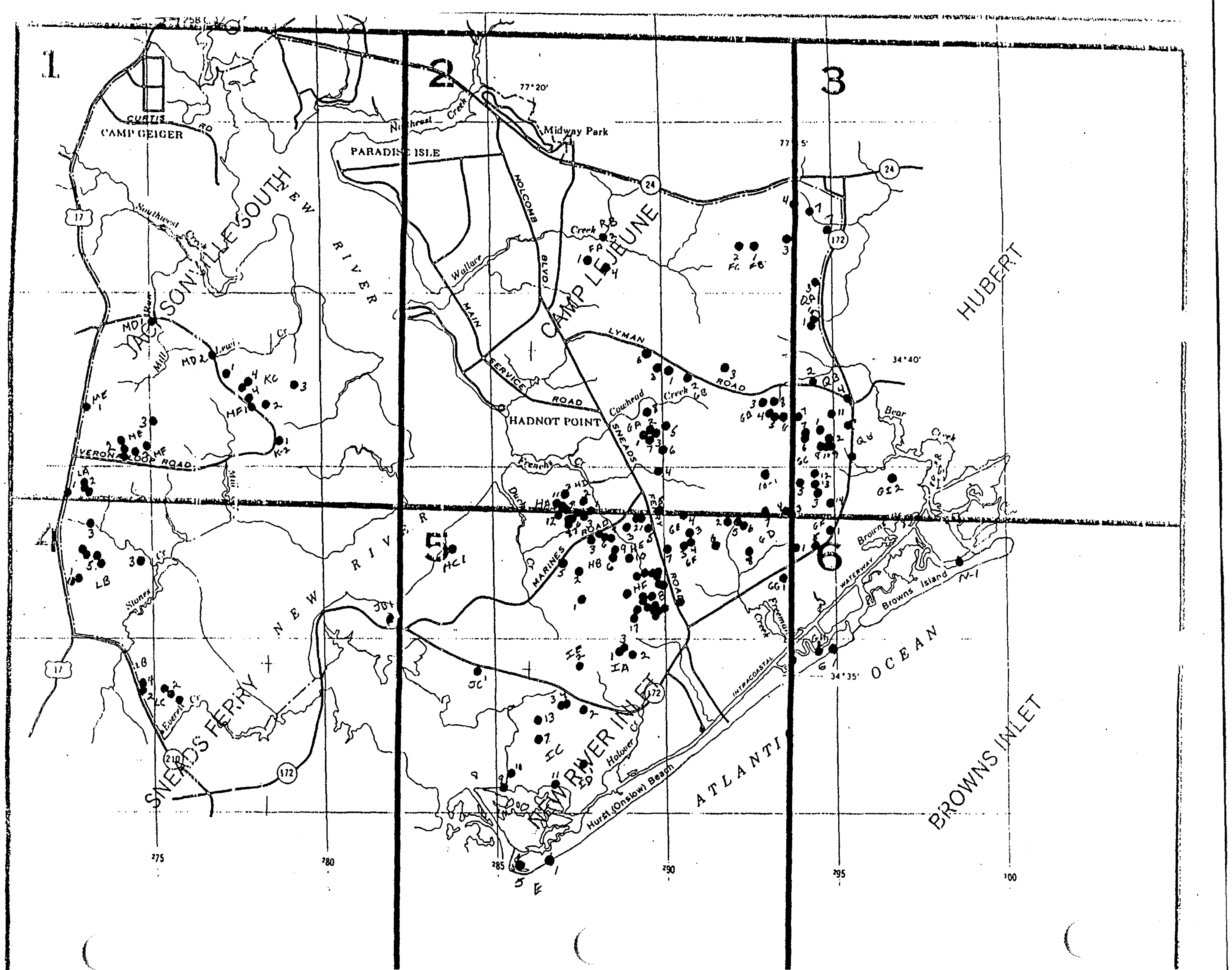
MB-1	**Mesic Pine Flatwoods**		770398
	Carex floridana	W	
MD-1	Small Stream Swamp		752393-
	Carex chapmanii	FC2,T	752372
	Carex floridana	W	
	Scirpus lineatus	C	
	Senecio glabellus	W	
ME-1	**Road Meadow (US 17)**		728353-735387
	Oxypolis ternata	FC2,C	
MF-1	**Wet Pine Flatwoods**, Pocosin Ecotone		776370
	Andropogon capillipes	C	
	Calamovilfa brevipilis	F3C,E	
	Calopogon barbatus	W	
	Carex elliottii	W	
	Dionaea muscipula	FC2,C-SC	
	Polygala brevifolia	W	
	Solidago pulchra	FC2,C	

<u>SECTOR Q</u>

QA-1	**Small Depression Pocosin**		943390
	Litsea aestivalis (1984)	FC2,C	
QA-2	**Small Depression Pond**		941391
QA-3	Depression Meadow		946402
	Anthaenantia rufa	W	
	Aristida palustris	SR	
	Burmannia biflora	W	
	Coelorachis rugosa	W	
	Dichanthelium erectifolium	SR	
	Dichanthelium sp. 1 =Panicum hirstii	FC2,C	
	Eleocharis equisetoides	SR	
	Lobelia boykinii	FC2,C	
	Muhlenbergia torreyana	F3C,E	
	Panicum tenerum	SR	
	Paspalum praecox	W	
	Rhexia aristosa	FC2,T	
	Rhynchospora elliottii	W	
	Rhynchospora harperi	C	

(QA-3	Depression Meadow cont.)		
	Rhynchospora tracyi	SR	
	Scleria georgiana	C	
	Spiranthes laciniata	C	
	Xyris smalliana	W	
QA-3	Pocosin Ecotone		946401
	Amphicarpum purshii	SR	
	Gentiana autumnalis	W	
	Rhynchospora nitens	W	
QA-4	Wet Pine Flatwoods		940403
	Andropogon capillipes	W	
QA-5	**Wet Pine Flatwoods**		950414
	Andropogon capillipes	W	
	Gentiana autumnalis	W	
QA-6	Depression Meadow		944392
	Aristida palustris	SR	
	Carex verrucosa	SR	
	Panicum tenerum	SR	
	Rhynchospora inundata	W	
QA-7	**Small Stream Swamp**		944424
	Carex chapmanii	FC2,T	
	Carex elliottii	W	
	Rhynchospora miliacea	W	
	Scirpus lineatus	C	
QB-1	Nonriverine Swamp Forest (Nyssa biflora variant) "Peterson's Quagmire"		953375
QB-2	**Road Meadow** (Lyman Road)		943375
	Anthaenantia rufa	W	
	Coelorachis rugosa	W	
	Dionaea muscipula	**FC2,C-SC**	
	Gentiana autumnalis	W	
	Paspalum praecox	**W**	
	Paspalum stramineum var. stramineum	**proposed**	
	Polygala brevifolia	**W**	
	Rhynchospora nitens	**W**	
	Rhynchospora oligantha	**SR**	
	Rhynchospora pallida	SR	
	Scleria georgiana	**C**	
	Scleria minor	**SR**	
	Solidago gracillima	**W**	
	Solidago pulchra	FC2,C	
	Tofieldia glabra	FC2,C	
	Xyris baldwiniana	W	

QB-3.	**Small Depression Pond**		954361
	Eleocharis tricostata	W	
	Rhexia cubensis	SR	
	Rhynchospora wrightiana	W	
RB-1	Road Meadow		888434
	Ludwigia microcarpa	W	



1
2
3
4
5
6
CAMP GEIGER
CURTIS RD
Northeast Creek
Midway Park
PARADISE ISLE
77°20'
77°15'
JACKSONVILLE SOUTH
CAMP LEJEUNE
NEW RIVER
HOLCOMB BLVD
MAIN SERVICE ROAD
LYMAN ROAD
HADNOT POINT
SNEADS FERRY ROAD
VERONA LOOP ROAD
MARINES ROAD
HUBERT
34°40'
34°35'
SNEADS FERRY
NEW RIVER INLET
ATLANTIC OCEAN
BROWNS INLET
Browns Island
INTRACOASTAL WATERWAY
Hurst (Onslow) Beach
275
280
285
290
295
300

NATURAL AREA DESCRIPTION - WALLACE CREEK SWAMP
CAMP LEJEUNE MARINE CORPS BASE, ONSLOW CO.

(from Moore 1985)

NAME OF SITE: Wallace Creek Swamp. RB-2 (portions of the area also occur in Sectors FA and RA).

QUAD: Camp Lejeune.
UTM COORDINATES: 882417.

LOCATION AND DIRECTIONS: Wallace Creek floodplain east from Old Piney Green Road for 0.9 mile, and extending 0.3 mile north in floodplain of North Prong Wallace Creek flowing southward from Powerline Road 0.9 mile east of Piney Green Road. Site includes portions of Compartment 7 timber stand 7, Compartment 8 timber stand 11, and Compartment 20 timber stand 2.

SIZE: 115 acres.
PROVINCE: Coastal Plain.
WATERSHED: Wallace Creek / New River.

GENERAL LANDSCAPE DESCRIPTION: Broad floodplain and former mill pond on Wallace Creek dominated by a Cypress-Gum Swamp community (CT-1) grading upstream into a Coastal Plain Small Stream Swamp community (CT-2). The adjacent uplands contain mixed pine/hardwood communities, including Loblolly Pine associations with Red Oak and Sweet Gum.

PHYSICAL DESCRIPTION

ASPECT: Flat.
SLOPE: Flat.
TOPOGRAPHIC POSITION: Alluvial flats.
HYDROLOGY: Palustrine.
MOISTURE: Wet to intermittently flooded.
SOILS: Muckalee loam (CT-1, CT-2) grading to Marvyn loamy fine sand on the low slopes.
GEOLOGY: Talbot surface unconsolidated sandy sediments.
ELEVATION: <5-5 feet (CT-1), 5-10 feet (CT-2).

NATURAL COMMUNITY DESCRIPTION - CT-1

A) NAME OF COMMUNITY: Cypress-Gum Swamp.

B) VEGETATION STRUCTURE: Taxodium canopy and open understory over an herbaceous ground layer.

C) DOMINANTS AND IMPORTANT SPECIES:
Canopy: Taxodium distichum dominates, with a subcanopy of Nyssa biflora, Acer rubrum, Ulmus alata and Fraxinus pennsylvanica.

C) DOMINANTS AND IMPORTANT SPECIES:
Shrub layer: scattered Sabal minor and Persea palustris.
Ground layer: grass dominated with Glyceria striata, Poa spp., Panicum spp.

D) POSITION IN THE LANDSCAPE AND RELATION TO OTHER COMMUNITIES: Community occupies a former mill pond basin grading upstream into the small stream swamp community (CT-2).

E) QUALITY AND CONDITION: Community dominated by old Cypress trees 5 or more feet in diameter at their bases, and 2-2.5 feet in diameter 6-7 feet above ground. Community occurs within a former mill pond basin and thus is artificially influenced.

F) SIZE: Estimated at 90 acres.

NATURAL COMMUNITY DESCRIPTION - CT-2

A) NAME OF COMMUNITY: Coastal Plain Small Stream Swamp (Blackwater Subtype).

B) VEGETATION STRUCTURE: Mixed Cypress-hardwood canopy with moderate understory over a patchy herbaceous ground layer.

C) DOMINANTS AND IMPORTANT SPECIES:
Canopy: Taxodium distichum, Nyssa biflora, Fraxinus pennsylvanica, Ulmus americana, Acer rubrum, Liquidambar styraciflua. Taxodium is not as dominant here as in the Cypress--Gum community.
Understory: Persea palustris, Sabal minor, Ilex opaca.

D) POSITION IN THE LANDSCAPE AND RELATION TO OTHER COMMUNITIES: Community occurs in the floodplain upstream from the former mill pond Cypress-Gum Swamp community (CT-1) and grades at the low slope into upland pine/hardwood communities.

E) QUALITY AND CONDITION: Apparently a typical example with mature forest.

F) SIZE: Estimated at 25 acres.

SPECIAL STATUS SPECIES PRESENT
PLANTS
NC: Ponthieva racemosa (CT-1).

POTENTIAL FOR OTHER SPECIAL STATUS SPECIES: Moderate; site not visited during current survey, but contains suitable habitat for Carex chapmanii and Scirpus lineatus.

OTHER NOTEWORTHY SPECIES OR FEATURES PRESENT: State Watch List species: Dryopteris ludoviciana (CT-1) and Senecio glabellus (CT-1), which also may occur in CT-2.

SITE INTEGRITY: Site impacted by creation and discontinuance of mill pond.

AVERAGE DBH OF CANOPY TREES
CT-1: No information available.
CT-2: No information available.
MAXIMUM DBH OF CANOPY TREES
CT-1: Taxodium distichum - 2-2.5 feet.
CT-2:

FIRE REGIME: Site not on a controlled burn rotation; communities not fire dependent.

OTHER DISTURBANCES OR IMPACTS: None known (but see next item).

ADJACENT LAND USE: Upland area south of the floodplain from Old Piney Green Road to ca. 0.3 mile east has been heavily impacted as part of the Engineer Training Area, and is the site of a proposed landfill.

SIGNIFICANCE OF SITE: The old-growth Cypress stand in the old mill pond is a rare remnant of a once-common community.

PROTECTION CONSIDERATIONS AND MANAGEMENT NEEDS: Landfill site needs to be monitored to insure that erosion, debris and pollution do not enter the Wallace Creek drainage system.

SURVEY BOUNDARIES: Stream channels surveyed eastward to Smith Road and northward to highway NC 24 (by J.H. Moore and/or S. Leonard in 1984).

PRIORITY FOR FURTHER STUDY: The small stream swamp community (CT-2) needs additional survey work to determine extent, quality and special status species present.

OTHERS KNOWLEDGEABLE ABOUT SITE: S. Leonard, J.H. Moore.

PLANT SPECIES LIST

Codes: D = stratal dominant or codominant; d = subdominant; * = special status species; x = present.

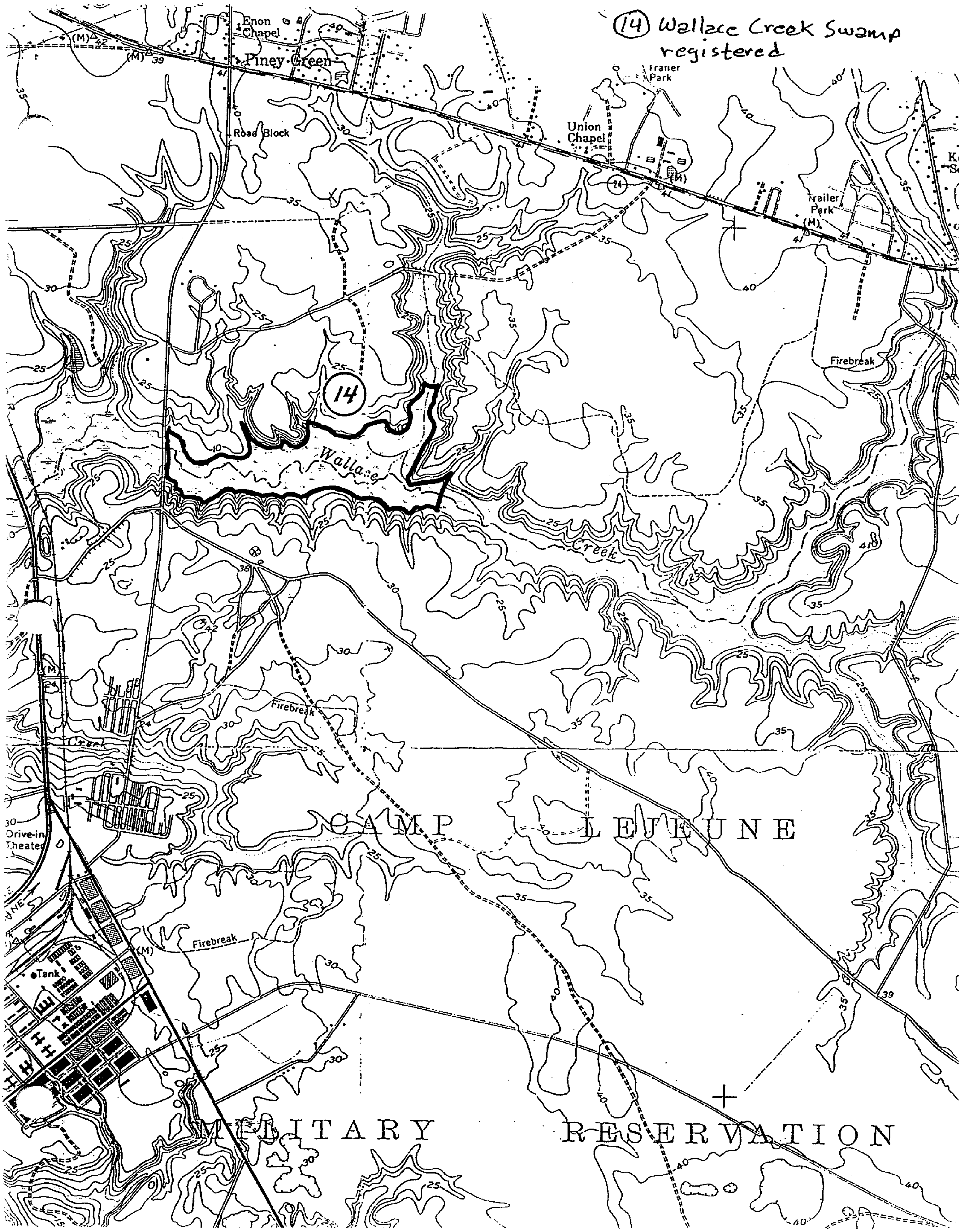
CT-1: Cypress-Gum Swamp.
CT-2: Coastal Plain Small Stream Swamp (Blackwater Subtype).

	CT-1	CT-2
CANOPY		
Acer rubrum	x	x
Fraxinus pennsylvanica	x	x
Liquidambar styraciflua		x
Nyssa biflora	x	d
Taxodium distichum	D	d
Ulmus alata	x	x

	CT-1	CT-2
UNDERSTORY		
Ilex opaca		x
SHRUBS		
Persea palustris	x	x
Sabal minor	x	x
VINES		
Anisostichus capreolata	x	
Berchemia scandens	x	
Decumaria barbara	x	
Parthenocissus quinquefolia	x	
Smilax glauca	x	
Toxicodendron radicans	x	
HERBS		
Asplenium asplenioides	x	
Boehmeria cylindrica	x	
Dryopteris ludoviciana	x	
Galium sp.	x	
Glyceria striata	x	
Hydrocotyle sp.	x	
Hypoxis hirsuta var. leptocarpa	x	
Onoclea sensibilis	x	
Panicum spp.	x	
Poa spp.	x	
Polygonum spp.	x	
Polystichum acrostichoides	x	
Ponthieva racemosa	*	
Potamogeton pulcher		x
Ranunculus spp.	x	
Saururus cernuus		x
Senecio glabellus	x	
Viola spp.	x	

NOTE: It is likely that most of the herbs in CT-1 will also be found in CT-2.

(14) Wallace Creek Swamp
registered



APPENDIX C
FIELD DATA SHEETS
SURFACE WATER AND SEDIMENT SAMPLES

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH01-SW/SD Date: 10/2/92 Time: 16:20

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NE

Weather Conditions: NE Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH02-SW/SD Date: 8/28/92 Time: 14:54

Sample Type: Fish Benthic Macroinvertebrate **Sediment** **Surface Water**

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer **Sediment Corer** Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ______

Vegetation Type: NE

Estimated Stream Width: 1.5 m Est. Stream Depth: 0.6 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water **Warm Water** Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded **Shaded** 90%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic **None** Other: ______

Sediment Oils: **Absent** Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Hard packed Sand, minimum organics

Water:

Temp.: 24 C Dissolved Oxygen: 4.6 mg/L pH: 6.5 S.U.

Conductivity: 115 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ______

Water Surface Oils: Slick Sheen **None**

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: ______

Weather Conditions: ______ Tide: **In** Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH04-SW/SD Date: 8/29/92 Time: 09:35

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Deciduous trees

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded 85% Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ___ Replicate #2: ___ Replicate #3: ___

Sediment Description: Very fine silt/Sand mixed with organics

Water:

Temp.: 23.0 C Dissolved Oxygen: 5.8 mg/L pH: 6.8 S.U.

Conductivity: 140 Micromhos/cm Salinity: 0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: Moderate leaf litter

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Brown

Weather Conditions: Slight rain Tide: In Out

Comments: NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-AH03-SW/SD Date: 8/28/92 Time: ______

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Hardwood trees

Estimated Stream Width: 4.6 m Est. Stream Depth: 0.9 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: A lot of organic debris

Water:

Temp.: 27.5° C Dissolved Oxygen: 7.89 mg/L pH: 6.5 S.U.

Conductivity: 420 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: ______

Weather Conditions: Thundershower in the A.M. Tide: In Out

Comments: NA= Not Applicable; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH05-SW 6-BH05-SD Date: 8/28/92 8/26/92 Time: 08:25 09:25

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: 1st horizon-grasses and Cat tail type plants; 2nd horizon-deciduous Trees

Estimated Stream Width: 6 m Est. Stream Depth: .6 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Sandy Substrate

Water:

8/28/92 Temp.: 23° C Dissolved Oxygen: 5.75 mg/L pH: 6.8 S.U.

Conductivity: 135 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Slightly Amber

Weather Conditions: 8/26/92: Sunny, appx 32°C; 8/28/92: Raining Tide: In 8/26/92 Out 8/28/92

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH06-SW 6-BH06-SD Date: 8/28/92 8/26/92 Time: 07:40 09:05

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: 1st horizon-grasses; 2nd horizon-deciduous and Pine trees

Estimated Stream Width: 9 m Est. Stream Depth: NE m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ___ Replicate #2: ___ Replicate #3: ___

Sediment Description: Loose Sandy Substrate with organic Materials

Water:

8/28/92 Temp.: 23° C Dissolved Oxygen: 5.85 mg/L pH: 6.6 S.U.

Conductivity: 120 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Slightly Amber

Weather Conditions: 8/26/92: Sunny, appx 32°C Tide: In 8/26/92 Out 8/28/92

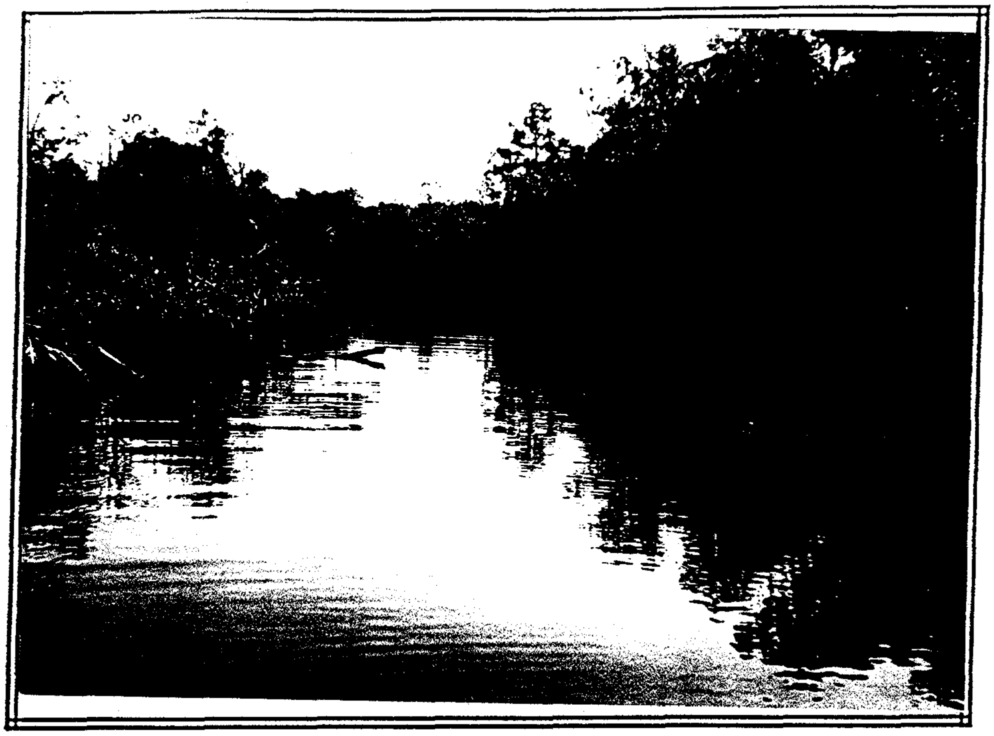
Comments: NA = Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH07-SW/SD Date: 8/25/92 Time: 09:45

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ________



Downstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ________

Vegetation Type: Cedar, evergreens

Estimated Stream Width: 33.5 m Est. Stream Depth: 1.4 m Riffle: NA m Run: N/A m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open 5-8% Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ________

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Silt/muck

Water:

Temp.: S=25°; B=26.5° C Dissolved Oxygen: S=3.15; B=0.3 mg/L pH: S=6.2; B=6.6 S.U.

Conductivity: S=2,223; B=12,500 Micromhos/cm Salinity: S=1.0; B=7.5 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ________

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Tannic

Weather Conditions: Sunny, >32°C Tide: In Out

Comments: S= Surface; B= Bottom; NA= Not Applicable; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV1-SD Date: 8/25/92 Time: 17:10

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Evergreen brush; 90% pines; 10% deciduous trees

Estimated Stream Width: 0.61 m Est. Stream Depth: NA m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NA Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Dark Brown; Not Sand, nor Clay

Water:

Temp.: NA C Dissolved Oxygen: NA mg/L pH: NA S.U.

Conductivity: NA Micromhos/cm Salinity: NA ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NA

Weather Conditions: Sunny, >32°C Tide: In Out

Comments: No water in stream bed; NA= Not Applicable.

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV2-SW/SD Date: 8/25/92 Time: 16:30

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: 60% pine, 40% deciduous

Estimated Stream Width: 0.6 m Est. Stream Depth: 0.15 m Riffle: NA m Run: NA m Pool: 6.1 m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded 100%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Pine needles

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NE

Weather Conditions: Sunny, > 32°C Tide: In Out

Comments: NA = Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV3-SW/SD Date: 8/24/92 Time: 16:30

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Pine and deciduous trees

Estimated Stream Width: 1.5 m Est. Stream Depth: NE m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Sandy, upper layer of organics, no mottling

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NE

Weather Conditions: Sunny, >32°C Tide: In Out

Comments: NA = Not Applicable; NE = Not Analyzed

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV4-SD Date: 8/24/92 Time: 15:30

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer/Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Pine, deciduous trees

Estimated Stream Width: 1.8 m Est. Stream Depth: NA m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NA Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Sandy, upper layer of organics, no mottling

Water:

Temp.: NA C Dissolved Oxygen: NA mg/L pH: NA S.U.

Conductivity: NA Micromhos/cm Salinity: NA ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NA

Weather Conditions: Sunny, > 32°C Tide: In Out

Comments: No Water in stream bed; NA= Not Applicable

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV5-SW/SD Date: 8/25/92 Time: 16:05

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Deciduous trees and Pines

Estimated Stream Width: .9 m Est. Stream Depth: NE m Riffle: NA m Run: NA m Pool: .9 m

Stream Type: Cold Water Warm Water Velocity: NONE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Sandy mud, medium brown color

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Slight Amber

Weather Conditions: Sunny, appx. 27° C Tide: In Out

Comments: Water sample taken from a pool - bed dried up on both ends; NA = Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV6-SW/SD Date: 8/25/92 Time: 11:40

Sample Type: Fish Benthic Macroinvertebrate **Sediment** **Surface Water**

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer **Spoon** Other: ________

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ________

Vegetation Type: 90% deciduous, 10% Pine

Estimated Stream Width: 0.9 m Est. Stream Depth: 0.3 m Riffle: NA m Run: NA m Pool: 0.9 m

Stream Type: Cold Water **Warm Water** Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded **Shaded** 100%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic **None** Other: ________

Sediment Oils: **Absent** Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ___ Replicate #2: ___ Replicate #3: ___

Sediment Description: Sandy

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ________

Water Surface Oils: Slick Sheen **None**

Turbidity: Clear **Slightly Turbid** Turbid Opaque Water Color: Slightly Amber

Weather Conditions: Sunny Some Clouds present, appx 30°C Tide: In Out

Comments: NA = Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV7-SW/SD Date: 8/25/92 Time: 10:20

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: 30% pines, 70% deciduous trees

Estimated Stream Width: 0.9 m Est. Stream Depth: .9 m Riffle: NA m Run: NA m Pool: 1.2 m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded 100%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Sand layer, organics layer

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber

Weather Conditions: Sunny, some clouds, appx. 30° C Tide: In Out

Comments: NA - Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-RV 8-SW/SD   Date: 8/25/92   Time: 09:20

Sample Type: Fish   Benthic Macroinvertebrate   Sediment   Surface Water

SAMPLING EQUIPMENT: Seine   Gill Net   Ponar   Kemmerer   Sediment Corer   Spoon   Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest   Industrial   Other: ______

Vegetation Type: Deciduous trees

Estimated Stream Width: 0.8 m   Est. Stream Depth: 0.4-0.5 m   Riffle: NA m   Run: NA m   Pool: NA m

Stream Type: Cold Water   Warm Water   Velocity: NE   Channelized: Yes X   No __

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded 100%

Sediment/Substrate:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other: ______

Sediment Oils: Absent   Slight   Moderate   Profuse

Ponar Grab: Number of Jars Filled with Sediments   Replicate: #1: ____   Replicate #2: ____   Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C   Dissolved Oxygen: NE mg/L   pH: NE S.U.

Conductivity: NE Micromhos/cm   Salinity: NE ppt

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other: ______

Water Surface Oils: Slick   Sheen   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color: Rust color, blue sheen

Weather Conditions: Sunny, some clouds, appx. 30°C   Tide: In   Out

Comments: NA= Not Applicable; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC01-SW/SD Date: 8/30/92 Time: 07:45

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Deciduous trees

Estimated Stream Width: 1.8 m Est. Stream Depth: 1.8 m Riffle: NA m Run: NA m Pool: .5-1.8 m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Fine Sand with layers of organic matter within

Water:

Temp.: 21° C Dissolved Oxygen: 5.8 mg/L pH: 3.9 S.U.

Conductivity: 30.0 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Sunny, appx 20°C Tide: In Out

Comments: NA= Not Applicable; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC02-SW/SD Date: 8/26/92 Time: 17:30

Sample Type: Fish Benthic Macroinvertebrate **Sediment** **Surface Water**

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer **Sediment Corer** Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ______

Vegetation Type: Hardwoods

Estimated Stream Width: 12.2 m Est. Stream Depth: 2.1 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water **Warm Water** Velocity: NA Channelized: Yes X No __

Canopy Cover: Open Partly Open **Partly Shaded** 50% Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic **None** Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Silty, Sandy, Compacted, black color, gray mottled sands

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ______

Water Surface Oils: Slick Sheen **None**

Turbidity: **Clear** Slightly Turbid Turbid Opaque Water Color: Tannic

Weather Conditions: Sunny, Appx. 32°C Tide: In **Out**

Comments: NA = Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC03-SW/SD Date: 8/26/92 Time: SW = 09:55 SD = 15:40

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Deciduous Shrubs

Estimated Stream Width: 12.2 m Est. Stream Depth: NE m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

30%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Flocculent

Water:

Temp.: S= 22°; B=22° C Dissolved Oxygen: S=6.1; B=6.05 mg/L pH: S=6.3; B=6.3 S.U.

Conductivity: S=85; B= 85 Micromhos/cm Salinity: S=0.0; B=0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Tannic

Weather Conditions: Sunny, appx. 32°C Tide: In SW Out SD

Comments: S= Surface; B= Bottom; NA= Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC04-SW/SD Date: 8/26/92 Time: 09:20

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Deciduous shrubs and trees, few dead falls

Estimated Stream Width: 9.1 m Est. Stream Depth: 0.46 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ___ Replicate #2: ___ Replicate #3: ___

Sediment Description: Sandy/muck, organics

Water:

Temp.: S=21.8°; B=21.8°C Dissolved Oxygen: S=6.0; B=6.8 mg/L pH: S=6.6; B=6.8 S.U.

Conductivity: S=89.1; B=89.1 Micromhos/cm Salinity: S=0.0; B=0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Tannic

Weather Conditions: Sunny, appx. 32°C Tide: In Out

Comments: S=Surface; B=Bottom; NA=Not Applicable; NE=Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC05- SW/SD Date: SW: 8/25/92 SD = 8/27/92 Time: SW= 11:30 SD = 10:10

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

UPstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Deciduous trees, with a few evergreens

Estimated Stream Width: 13.3 m Est. Stream Depth: 0.2 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded 85% Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Silty/Muck

Water:

Temp.: BA=22.5°; M=22.9°C Dissolved Oxygen: BA=6.0; M=6.0 mg/L pH: BA=6.5; M=6.5 S.U.

Conductivity: BA=91.0; M=83.0 Micromhos/cm Salinity: BA=0.0; M=0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Tannic

Weather Conditions: ______ Tide: In Out

Comments: BA=Bank Surface; M=Middle Surface); NA=Not Applicable; NE=Not Analyzed

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WCOLO-SW/SD Date: 8/23/92 Time: 13:50

Sample Type: Fish Benthic Macroinvertebrate **(Sediment)** **(Surface Water)**

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer **(Sediment Corer)** Spoon Other: ______

Downstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **(Forest)** Industrial Other: ______

Vegetation Type: Trees hanging over water, Some dead brush on banks

Estimated Stream Width: 9.15 m Est. Stream Depth: 0.61 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water **(Warm Water)** Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open **(Partly Shaded)** 75% Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic **(None)** Other: ______

Sediment Oils: **(Absent)** Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Flocculent

Water:

Temp.: S= 22.5°; B=22.5°C Dissolved Oxygen: S=6.15; B=6.10 mg/L pH: S=6.7; B=NE S.U.

Conductivity: S=10; B= 85 Micromhos/cm Salinity: S=0.0; B=0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical **(None)** Other: ______

Water Surface Oils: Slick Sheen **(None)**

Turbidity: **(Clear)** Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Partly Sunny, Slight rain Tide: In **(Out)**

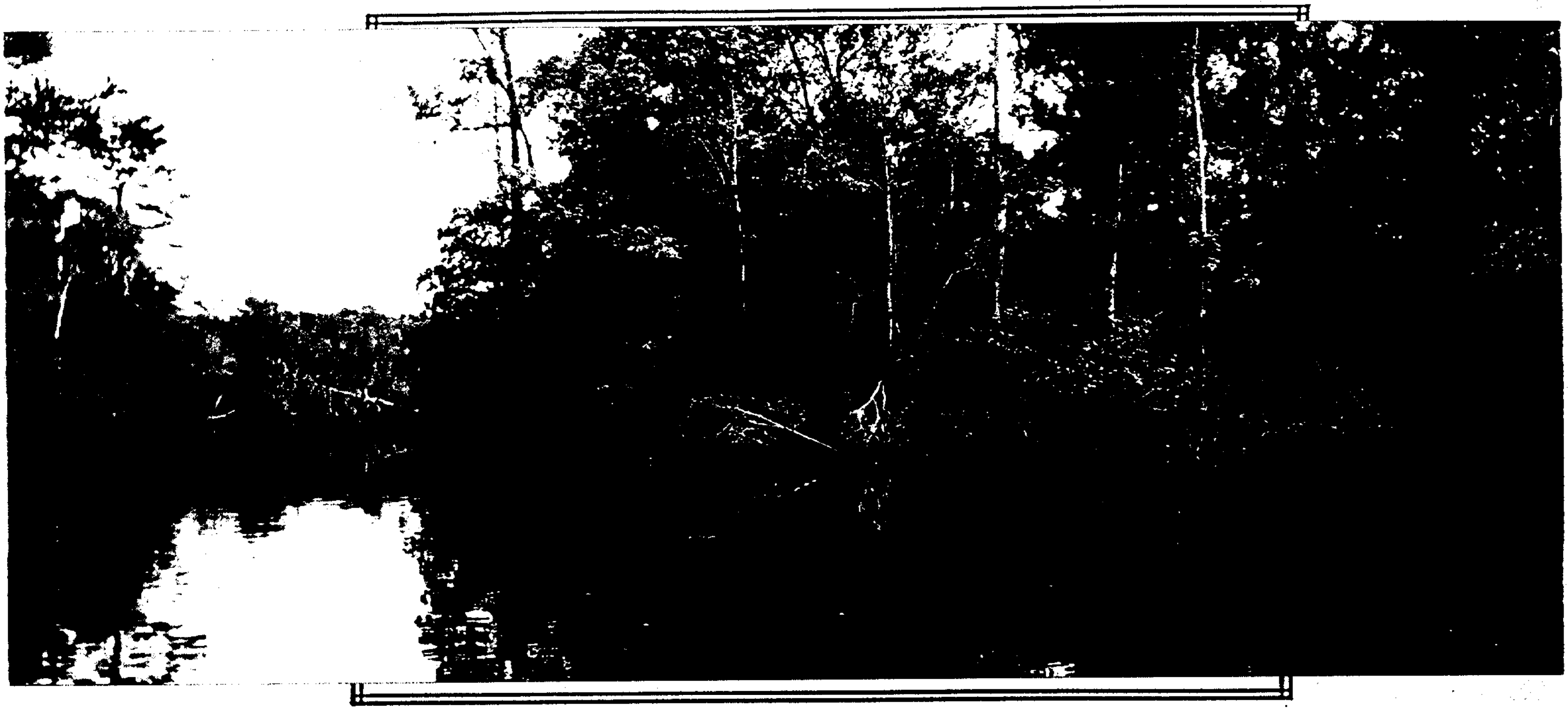
Comments: S= Surface; B= Bottom, NA= Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC07-SW/SD Date: 8/23/92 Time: 12:10

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____



Right of Upstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Trees line the creek

Estimated Stream Width: 13.7-15.2 m Est. Stream Depth: 1.5 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

7%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Sandy and loose

Water:

Temp.: BA=NE; S=23.7°; B=25.0°C Dissolved Oxygen: BA=NE; S=5.8; B=0.2 mg/L pH: BA=6.0; S=6.8; B=NE S.U.

Conductivity: BA=500; S=300; B=9,000 Micromhos/cm Salinity: BA=0; S=0; B=6 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Sunny, 36°C Tide: In Out

Comments: BA= Bank; S= Surface; B= Bottom; NA= Not Applicable; NE= Not Available

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC08-SW/SD Date: 8/23/92 Time: 11:10

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Hand Auger

Left of Upstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Low trees hanging towards the stream

Estimated Stream Width: 10.6-12.2 m **Est. Stream Depth:** .1.8 m **Riffle:** NA m **Run:** NA m **Pool:** NA m

Stream Type: Cold Water Warm Water **Velocity:** NE **Channelized:** Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: BA=22.9°; S=22.9°; B=25.5° C Dissolved Oxygen: BA=5.25; S=5.35; B=0.15 mg/L pH: BA=6.2; S=6.2; B=NE S.U.

Conductivity: BA=550; S=500; B=12,500 Micromhos/cm Salinity: BA=0.1; S=0; B=7.5 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Sunny; 24.2° Tide: In Out

Comments: BA = Bank; S = Surface; B = Bottom; NA = Not Applicable; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC09-SW/SD Date: 8/23/92 Time: 09:08

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

Downstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: Trees line bank

Estimated Stream Width: 1.5 m Est. Stream Depth: NE m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: Flocculent

Water:

Temp.: BA=22.8°; S=23.0°; B=25.3 C Dissolved Oxygen: BA=4.6; S=5.25; B=0.6 mg/L pH: BA=6.1; S=6.1; B=NE S.U.

Conductivity: BA=2,100; S=900 B=14,600 Micromhos/cm Salinity: BA=1.2; S=0.3; B=8.5 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Sunny, 24.2°C Tide: In Out

Comments: BA= Bank; S= Surface; B= Bottom; NA= Not Applicable; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC 1B-SW/SD Date: 8/22/92 Time: 10:30

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Core Spoon Other: ______

Upstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Zone of dead trees along bank

Estimated Stream Width: 91.4 m Est. Stream Depth: .108 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: BA=24.2°; S=24.9° B=26.1° C Dissolved Oxygen: BA=3.0; S=3.2; B=0.15 mg/L pH: BA=6.3; S=6.3; B=NE S.U.

Conductivity: BA=5,000; S=4,900 B=14,000 Micromhos/cm Salinity: BA=2.5; S=2.9; B=8.2 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber-Brown

Weather Conditions: Sunny, Appx. 27°C Tide: In Out

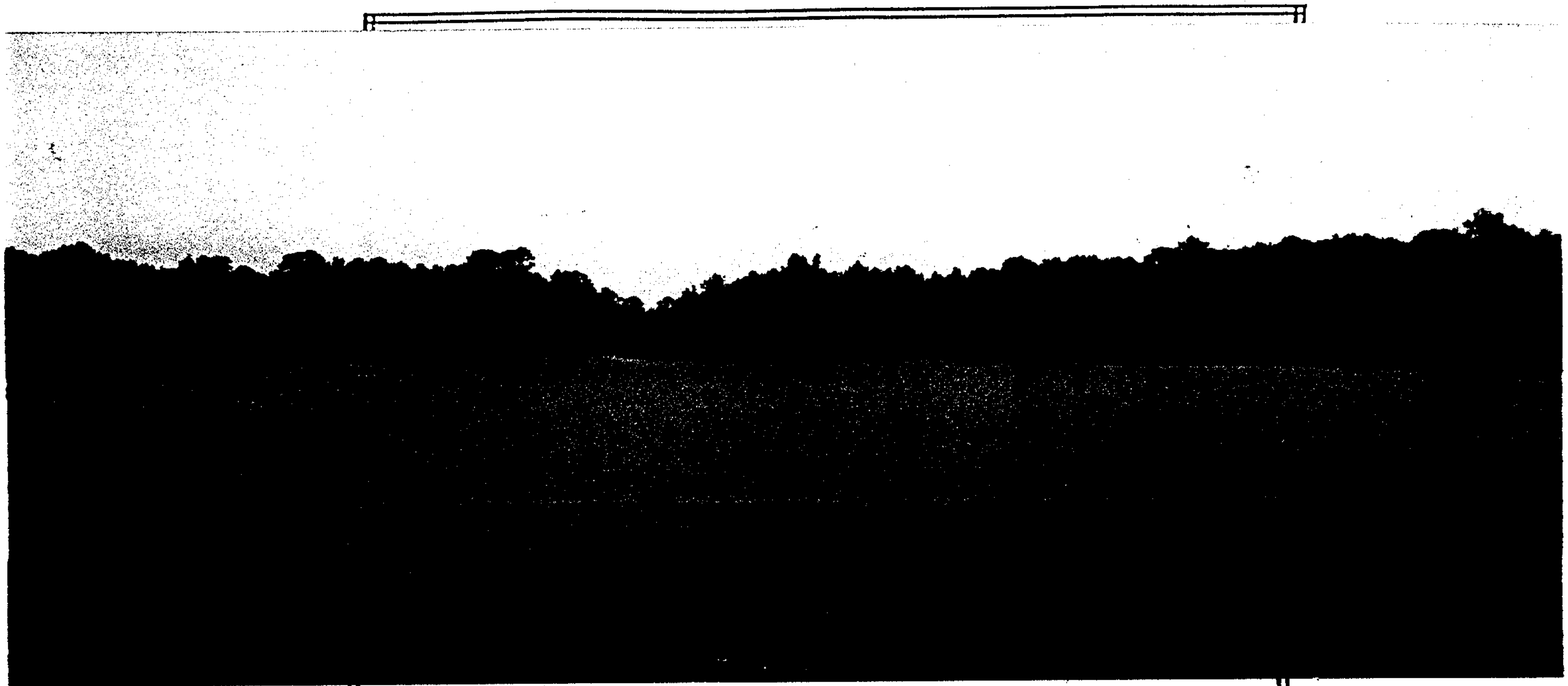
Comments: BA=Bank; S=Surface; B=Bottom; NE=Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC-11-SW/SD   Date: 8/22/92   Time: 09:10

Sample Type: Fish   Benthic Macroinvertebrate   Sediment   Surface Water

SAMPLING EQUIPMENT: Seine   Gill Net   Ponar   Kemmerer   Sediment Corer   Spoon   Other: ______



UPSTREAM

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest   Industrial   Other: ______

Vegetation Type: NE

Estimated Stream Width: NE m   Est. Stream Depth: 1.2 m   Riffle: NE m   Run: NE m   Pool: NE m

Stream Type: Cold Water   Warm Water   Velocity: NE   Channelized: Yes __   No __

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

Sediment/Substrate:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other: ______

Sediment Oils: Absent   Slight   Moderate   Profuse

Ponar Grab: Number of Jars Filled with Sediments   Replicate: #1: ____   Replicate #2: ____   Replicate #3: ____

Sediment Description: Flocculent

Water:

Temp.: BA=24°; S=24.2; 26°C   Dissolved Oxygen: BA=2.2; S=3.2; B=0.3 mg/L   pH: BA=6.1; S=6.3; B=NE S.U.

Conductivity: BA=5,500; S=7,000; B=13,500 Micromhos/cm   Salinity: BA=3.5; S=4.0; B=8.0 ppt

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other: ______

Water Surface Oils: Slick   Sheen   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color: NE

Weather Conditions: Sunny, appx. 27°C   Tide: In   Out

Comments: BA=Bank; S=Surface; B=Bottom; NE=Not Evaluated

APPENDIX D
DATA AND FREQUENCY SUMMARIES
SURFACE WATER SAMPLES

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC01-SW-06B	6-WC01-SW-06M	6-WC02-SW-06B	6-WC03-SW-06B	6-WC03-SW-06M	6-WC03-SW-312M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-25	00464-26	00445-16	00439-18	00439-19	00439-20
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
BETA-BHC	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DELTA-BHC	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
HEPTACHLOR	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
ALDRIN	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
ENDOSULFAN I	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DIELDRIN	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDE	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDRIN	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDOSULFAN II	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDD	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDT	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
METHOXYCHLOR	UG/L	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
ENDRIN KETONE	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ALPHA CHLORDANE	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
GAMMA CHLORDANE	UG/L	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
TOXAPHENE	UG/L	5 U	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
PCB-1016	UG/L	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1221	UG/L	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
PCB-1232	UG/L	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1242	UG/L	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1248	UG/L	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1254	UG/L	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1260	UG/L	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	UG/L	10 U	10 U	10 U	10 U	10 U	46
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC01-SW-06B	6-WC01-SW-06M	6-WC02-SW-06B	6-WC03-SW-06B	6-WC03-SW-06M	6-WC03-SW-312M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-25	00464-26	00445-16	00439-18	00439-19	00439-20
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	UG/L	10 UJ	10 UJ	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC01-SW-06B	6-WC01-SW-06M	6-WC02-SW-06B	6-WC03-SW-06B	6-WC03-SW-06M	6-WC03-SW-312M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-25	00464-26	00445-16	00439-18	00439-19	00439-20
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 UJ	10 UJ	10 U	10 U	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 UJ	10 UJ	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
BENZO(B)FLUORANTHENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
BENZO(K)FLUORANTHENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
BENZO(A)PYRENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
INDENO(1,2,3-CD) PYRENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
DIBENZ(A,H)ANTHRACENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U
BENZO(G,H,I)PERYLENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC04-SW-06B	6-WC04-SW-06M	6-WC05-SW-06B	6-WC05-SW-06M	6-WC05-SW-312M	6-WC06-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/25/92	8/25/92	8/25/92	8/25/92	8/23/92
	Lab Id:	00439-21	00439-22	00437-19	00437-20	00437-21	00429-05
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
BETA-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
DELTA-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
GAMMA-BHC(LINDANE)	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
HEPTACHLOR	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
ALDRIN	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
ENDOSULFAN I	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
DIELDRIN	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
4,4'-DDE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
ENDRIN	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
ENDOSULFAN II	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
4,4'-DDD	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
ENDOSULFAN SULFATE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
METHOXYCHLOR	UG/L	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 U	0.5 U
ENDRIN KETONE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
ENDRIN ALDEHYDE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ	0.1 U	0.1 U
ALPHA CHLORDANE	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
GAMMA CHLORDANE	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.05 U	0.05 U
TOXAPHENE	UG/L	5 UJ	5 UJ	5 UJ	5 UJ	5 U	5 U
PCB-1016	UG/L	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U
PCB-1221	UG/L	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 U
PCB-1232	UG/L	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U
PCB-1242	UG/L	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U
PCB-1248	UG/L	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U
PCB-1254	UG/L	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U
PCB-1260	UG/L	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 U
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	UG/L	14	10 U	10 U	10 U	10 U	10 UJ
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	4 J	4 J	10 U	10 U	10 U	10 U
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC04-SW-06B	6-WC04-SW-06M	6-WC05-SW-06B	6-WC05-SW-06M	6-WC05-SW-312M	6-WC06-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/25/92	8/25/92	8/25/92	8/25/92	8/23/92
Lab Id:		00439-21	00439-22	00437-19	00437-20	00437-21	00429-05
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	2 J
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC04-SW-06B	6-WC04-SW-06M	6-WC05-SW-06B	6-WC05-SW-06M	6-WC05-SW-312M	6-WC06-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/25/92	8/25/92	8/25/92	8/25/92	8/23/92
Lab Id:		00439-21	00439-22	00437-19	00437-20	00437-21	00429-05
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 UJ	10 UJ	10 U	10 UJ	10 UJ	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U	25 UJ	25 UJ	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	10 U	10 U	2 J	10 U
DI-N-OCTYL PHTHALATE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
BENZO(A)PYRENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
INDENO(1,2,3-CD) PYRENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
DIBENZ(A,H)ANTHRACENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC06-SW-06M	6-WC07-SW-06B	6-WC07-SW-06M	6-WC07-SW-312M	6-WC08-SW-06B	6-WC08-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-06	00429-10	00429-11	00429-12	00429-18	00429-19
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
BETA-BHC	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
DELTA-BHC	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
HEPTACHLOR	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
ALDRIN	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
ENDOSULFAN I	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
DIELDRIN	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
4,4'-DDE	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDRIN	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDOSULFAN II	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
4,4'-DDD	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
4,4'-DDT	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
METHOXYCHLOR	UG/L	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ
ENDRIN KETONE	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 UJ
ALPHA CHLORDANE	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
GAMMA CHLORDANE	UG/L	0.05 U	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 UJ
TOXAPHENE	UG/L	5 U	5 UJ	5 U	5 U	5 U	5 UJ
PCB-1016	UG/L	1 U	1 UJ	1 U	1 U	1 U	1 UJ
PCB-1221	UG/L	2 U	2 UJ	2 U	2 U	2 U	2 UJ
PCB-1232	UG/L	1 U	1 UJ	1 U	1 U	1 U	1 UJ
PCB-1242	UG/L	1 U	1 UJ	1 U	1 U	1 U	1 UJ
PCB-1248	UG/L	1 U	1 UJ	1 U	1 U	1 U	1 UJ
PCB-1254	UG/L	1 U	1 UJ	1 U	1 U	1 U	1 UJ
PCB-1260	UG/L	1 U	1 UJ	1 U	1 U	1 U	1 UJ
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	6 J	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	UG/L	4 J	10 UJ	10 UJ	5 J	10 UJ	6 J
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	85	10 U	9 J	13	23
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC06-SW-06M	6-WC07-SW-06B	6-WC07-SW-06M	6-WC07-SW-312M	6-WC08-SW-06B	6-WC08-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-06	00429-10	00429-11	00429-12	00429-18	00429-19
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	98	10 U	4 J	16	28
DIBROMOCHLOROMETHANE	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	4 J	10 U	10 U	10 U	1 J
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	3 J	10 U	10 U	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC06-SW-06M	6-WC07-SW-06B	6-WC07-SW-06M	6-WC07-SW-312M	6-WC08-SW-06B	6-WC08-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-06	00429-10	00429-11	00429-12	00429-18	00429-19
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 UJ	25 UJ	25 UJ	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 UJ	10 UJ	10 UJ	10 U
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	UG/L	10 U	10 U	10 UJ	10 UJ	10 UJ	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(B)FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(K)FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)PYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
INDENO(1,2,3-CD) PYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(G,H,I)PERYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC08-SW-312M	6-WC09-SW-06B	6-WC09-SW-06M	6-WC09-SW-312M	6-WC10-SW-06B	6-WC10-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-20	00429-26	00429-28	00429-29	00426-06	00426-08
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
BETA-BHC	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DELTA-BHC	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
HEPTACHLOR	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
ALDRIN	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
ENDOSULFAN I	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DIELDRIN	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDE	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDRIN	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDOSULFAN II	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDD	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDT	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
METHOXYCHLOR	UG/L	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
ENDRIN KETONE	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 U	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ALPHA CHLORDANE	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
GAMMA CHLORDANE	UG/L	0.05 U	0.05 U	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
TOXAPHENE	UG/L	5 U	5 U	5 UJ	5 UJ	5 UJ	5 UJ
PCB-1016	UG/L	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1221	UG/L	2 U	2 U	2 UJ	2 UJ	2 UJ	2 UJ
PCB-1232	UG/L	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1242	UG/L	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1248	UG/L	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1254	UG/L	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1260	UG/L	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
ACETONE	UG/L	27 J	10 UJ	10 UJ	900 J	10 UJ	10 UJ
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	9 J	17	21	100 U	4 J	6 J
CHLOROFORM	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC08-SW-312M	6-WC09-SW-06B	6-WC09-SW-06M	6-WC09-SW-312M	6-WC10-SW-06B	6-WC10-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-20	00429-26	00429-28	00429-29	00426-06	00426-08
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
TRICHLOROETHENE	UG/L	10	22	28	100 U	5 J	7 J
DIBROMOCHLOROMETHANE	UG/L	10 UJ	10 UJ	10 UJ	100 UJ	10 UJ	10 UJ
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	1 J	100 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
TOLUENE	UG/L	10 U	10 U	10 U	100 U	1 J	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	100 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
N-NITROSODI-N-PROPYLAMINE	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC08-SW-312M	6-WC09-SW-06B	6-WC09-SW-06M	6-WC09-SW-312M	6-WC10-SW-06B	6-WC10-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-20	00429-26	00429-28	00429-29	00426-06	00426-08
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	1 J
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
2,4-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
FLUORENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 UJ
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
PYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
CHRYSENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	2 J
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ
BENZO(B)FLUORANTHENE	UG/L	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ
BENZO(K)FLUORANTHENE	UG/L	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ
BENZO(A)PYRENE	UG/L	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ
INDENO(1,2,3-CD) PYRENE	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 UJ	10 U	10 U	10 UJ	10 UJ
BENZO(G,H,I)PERYLENE	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	Sample No: 6-WC10-SW-312M Depth: N/A Date Sampled: 8/22/92 Lab Id: 00426-09	6-WC11-SW-06B N/A 8/22/92 00426-12	6-WC11-SW-06M N/A 8/22/92 00426-13	6-WC11-SW-312M N/A 8/22/92 00426-14
PESTICIDE/PCBS					
ALPHA-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
BETA-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DELTA-BHC	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
GAMMA-BHC(LINDANE)	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
HEPTACHLOR	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
ALDRIN	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
HEPTACHLOR EPOXIDE	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
ENDOSULFAN I	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
DIELDRIN	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDRIN	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDOSULFAN II	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDD	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDOSULFAN SULFATE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
4,4'-DDT	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
METHOXYCHLOR	UG/L	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
ENDRIN KETONE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ENDRIN ALDEHYDE	UG/L	0.1 UJ	0.1 UJ	0.1 UJ	0.1 UJ
ALPHA CHLORDANE	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
GAMMA CHLORDANE	UG/L	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ
TOXAPHENE	UG/L	5 UJ	5 UJ	5 UJ	5 UJ
PCB-1016	UG/L	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1221	UG/L	2 UJ	2 UJ	2 UJ	2 UJ
PCB-1232	UG/L	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1242	UG/L	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1248	UG/L	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1254	UG/L	1 UJ	1 UJ	1 UJ	1 UJ
PCB-1260	UG/L	1 UJ	1 UJ	1 UJ	1 UJ
VOLATILES					
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U
ACETONE	UG/L	10 UJ	10 UJ	9 J	14 J
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	2 J	10 U	2 J
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC10-SW-312M	6-WC11-SW-06B	6-WC11-SW-06M	6-WC11-SW-312M
Depth:		N/A	N/A	N/A	N/A
Date Sampled:		8/22/92	8/22/92	8/22/92	8/22/92
Lab Id:		00426-09	00426-12	00426-13	00426-14
Parameter	Units				
VOLATILES Cont.					
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	3 J	3 J	4 J
DIBROMOCHLOROMETHANE	UG/L	10 UJ	10 UJ	10 UJ	10 UJ
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	1 J	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U
SEMIVOLATILES					
PHENOL	UG/L	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 UJ	10 U	10 UJ
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC10-SW-312M	6-WC11-SW-06B	6-WC11-SW-06M	6-WC11-SW-312M
Depth:		N/A	N/A	N/A	N/A
Date Sampled:		8/22/92	8/22/92	8/22/92	8/22/92
Lab Id:		00426-09	00426-12	00426-13	00426-14
Parameter	Units				
SEMIVOLATILES Cont.					
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 UJ	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U
PYRENE	UG/L	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	1 J	10 U	2 J	2 J
DI-N-OCTYL PHTHALATE	UG/L	10 UJ	10 U	10 U	10 UJ
BENZO(B)FLUORANTHENE	UG/L	10 UJ	10 U	10 U	10 UJ
BENZO(K)FLUORANTHENE	UG/L	10 UJ	10 U	10 U	10 UJ
BENZO(A)PYRENE	UG/L	10 UJ	10 U	10 U	10 UJ
INDENO(1,2,3-CD) PYRENE	UG/L	10 UJ	10 UJ	10 U	10 UJ
DIBENZ(A,H)ANTHRACENE	UG/L	10 UJ	10 U	10 U	10 UJ
BENZO(G,H,I)PERYLENE	UG/L	10 UJ	10 UJ	10 U	10 UJ

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: / Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 U	ND	ND		0/28
BETA-BHC	UG/L	0.05 U	0.05 U	ND	ND		0/28
DELTA-BHC	UG/L	0.05 U	0.05 U	ND	ND		0/28
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 U	ND	ND		0/28
HEPTACHLOR	UG/L	0.05 U	0.05 U	ND	ND		0/28
ALDRIN	UG/L	0.05 U	0.05 U	ND	ND		0/28
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 U	ND	ND		0/28
ENDOSULFAN I	UG/L	0.05 U	0.05 U	ND	ND		0/28
DIELDRIN	UG/L	0.1 U	0.1 U	ND	ND		0/28
4,4'-DDE	UG/L	0.1 U	0.1 U	ND	ND		0/28
ENDRIN	UG/L	0.1 U	0.1 U	ND	ND		0/28
ENDOSULFAN II	UG/L	0.1 U	0.1 U	ND	ND		0/28
4,4'-DDD	UG/L	0.1 U	0.1 U	ND	ND		0/28
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 U	ND	ND		0/28
4,4'-DDT	UG/L	0.1 U	0.1 U	ND	ND		0/28
METHOXYCHLOR	UG/L	0.5 U	0.5 U	ND	ND		0/28
ENDRIN KETONE	UG/L	0.1 U	0.1 U	ND	ND		0/28
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 U	ND	ND		0/28
ALPHA CHLORDANE	UG/L	0.05 U	0.05 U	ND	ND		0/28
GAMMA CHLORDANE	UG/L	0.05 U	0.05 U	ND	ND		0/28
TOXAPHENE	UG/L	5 U	5 U	ND	ND		0/28
PCB-1016	UG/L	1 U	1 U	ND	ND		0/28
PCB-1221	UG/L	2 U	2 U	ND	ND		0/28
PCB-1232	UG/L	1 U	1 U	ND	ND		0/28
PCB-1242	UG/L	1 U	1 U	ND	ND		0/28
PCB-1248	UG/L	1 U	1 U	ND	ND		0/28
PCB-1254	UG/L	1 U	1 U	ND	ND		0/28
PCB-1260	UG/L	1 U	1 U	ND	ND		0/28
VOLATILES							
CHLOROMETHANE	UG/L	10 U	100 U	ND	ND		0/28
BROMOMETHANE	UG/L	10 U	100 U	ND	ND		0/28
VINYL CHLORIDE	UG/L	10 U	100 U	6 J	6 J	6-WC07-SW-06B	1/28
CHLOROETHANE	UG/L	10 U	100 U	ND	ND		0/28
METHYLENE CHLORIDE	UG/L	10 U	100 U	ND	ND		0/28
ACETONE	UG/L	10 U	10 U	4 J	900 J	6-WC09-SW-312M	9/28
CARBON DISULFIDE	UG/L	10 U	100 U	ND	ND		0/28
1,1-DICHLOROETHENE	UG/L	10 U	100 U	ND	ND		0/28
1,1-DICHLOROETHANE	UG/L	10 U	100 U	ND	ND		0/28
1,2-DICHLOROETHENE	UG/L	10 U	100 U	2 J	85	6-WC07-SW-06B	13/28
CHLOROFORM	UG/L	10 U	100 U	ND	ND		0/28
1,2-DICHLOROETHANE	UG/L	10 U	100 U	ND	ND		0/28
2-BUTANONE	UG/L	10 U	100 U	ND	ND		0/28

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter (Sample No: / Depth: / Date Sampled: / Lab Id:)	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	100 U	ND	ND		0/28
CARBON TETRACHLORIDE	UG/L	10 U	100 U	ND	ND		0/28
BROMODICHLOROMETHANE	UG/L	10 U	100 U	ND	ND		0/28
1,2-DICHLOROPROPANE	UG/L	10 U	100 U	ND	ND		0/28
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	100 U	ND	ND		0/28
TRICHLOROETHENE	UG/L	10 U	100 U	3 J	98	6-WC07-SW-06B	12/28
DIBROMOCHLOROMETHANE	UG/L	10 U	100 UJ	ND	ND		0/28
1,1,2-TRICHLOROETHANE	UG/L	10 U	100 U	ND	ND		0/28
BENZENE	UG/L	10 U	100 U	ND	ND		0/28
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	100 U	ND	ND		0/28
BROMOFORM	UG/L	10 U	100 U	ND	ND		0/28
4-METHYL-2-PENTANONE	UG/L	10 U	100 U	ND	ND		0/28
2-HEXANONE	UG/L	10 U	100 U	ND	ND		0/28
TETRACHLOROETHENE	UG/L	10 U	100 U	1 J	4 J	6-WC07-SW-06B	3/28
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	100 U	ND	ND		0/28
TOLUENE	UG/L	10 U	100 U	1 J	3 J	6-WC07-SW-06B	4/28
CHLOROBENZENE	UG/L	10 U	100 U	ND	ND		0/28
ETHYLBENZENE	UG/L	10 U	100 U	ND	ND		0/28
STYRENE	UG/L	10 U	100 U	ND	ND		0/28
TOTAL XYLENES	UG/L	10 U	100 U	ND	ND		0/28
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	ND	ND		0/28
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	ND	ND		0/28
2-CHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/28
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/28
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/28
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/28
2-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/28
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	ND	ND		0/28
4-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/28
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	ND	ND		0/28
HEXACHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/28
NITROBENZENE	UG/L	10 U	10 U	ND	ND		0/28
ISOPHORONE	UG/L	10 U	10 U	ND	ND		0/28
2-NITROPHENOL	UG/L	10 UJ	10 UJ	ND	ND		0/28
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/28
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	ND	ND		0/28
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/28
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/28
NAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/28
4-CHLORANILINE	UG/L	10 U	10 U	ND	ND		0/28
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	ND	ND		0/28

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No: Depth: Date Sampled: Lab Id: Parameter	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/28
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/28
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	ND	ND		0/28
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	1 J	1 J	6-WC10-SW-06M	1/28
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	ND	ND		0/28
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/28
2-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/28
DIMETHYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/28
ACENAPHTHYLENE	UG/L	10 U	10 U	ND	ND		0/28
2,6-DINITROTOLUENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
3-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/28
ACENAPHTHENE	UG/L	10 U	10 U	ND	ND		0/28
2,4-DINITROPHENOL	UG/L	25 U	25 U	ND	ND		0/28
4-NITROPHENOL	UG/L	25 U	25 U	ND	ND		0/28
DIBENZOFURAN	UG/L	10 U	10 U	ND	ND		0/28
2,4-DINITROTOLUENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
DIETHYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/28
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	ND	ND		0/28
FLUORENE	UG/L	10 U	10 U	ND	ND		0/28
4-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/28
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	ND	ND		0/28
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	ND	ND		0/28
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	ND	ND		0/28
HEXACHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/28
PENTACHLOROPHENOL	UG/L	25 U	25 U	ND	ND		0/28
PHENANTHRENE	UG/L	10 U	10 U	ND	ND		0/28
ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/28
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/28
FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/28
CARBAZOLE	UG/L	10 U	10 U	ND	ND		0/28
PYRENE	UG/L	10 U	10 U	ND	ND		0/28
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/28
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	ND	ND		0/28
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/28
CHRYSENE	UG/L	10 U	10 U	ND	ND		0/28
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	1 J	2 J	6-WC11-SW-312M	5/28
DI-N-OCTYL PHTHALATE	UG/L	10 UJ	10 UJ	ND	ND		0/28
BENZO(B)FLUORANTHENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
BENZO(K)FLUORANTHENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
BENZO(A)PYRENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
INDENO(1,2,3-CD) PYRENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
DIBENZ(A,H)ANTHRACENE	UG/L	10 UJ	10 UJ	ND	ND		0/28
BENZO(G,H,I)PERYLENE	UG/L	10 UJ	10 UJ	ND	ND		0/28

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC01-SW-06B	6-WC01-SW-06M	6-WC02-SW-06B	6-WC03-SW-06B	6-WC03-SW-06M	6-WC03-SW-312M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
	Lab Id:	00464-25	00464-26	00445-16	00439-18	00439-19	00439-20
Parameter	Units						
ALUMINUM	UG/L	1350	1220	633	747	633	676
ANTIMONY	UG/L	14 U	14 U	16.2 UJ	49 U	49 U	49 U
ARSENIC	UG/L	3 UJ	3 UJ	2 U	2 U	2 U	2 U
BARIUM	UG/L	16 JB	16.2 JB	19.3 B	21 U	21 U	21 U
BERYLLIUM	UG/L	0.3 U	0.3 U	0.3 U	1 U	1 U	1 U
CADMIUM	UG/L	1.9 U	1.9 U	1.9 U	3 U	3 U	3 U
CALCIUM	UG/L	3640 B	3670 B	9990	9360	8890	9430
CHROMIUM	UG/L	3.6 UJ	3.6 UJ	3.6 U	5 U	5 U	5 U
COBALT	UG/L	2 U	2 U	2 U	6 U	6 U	6 U
COPPER	UG/L	1.9 U	1.9 U	1.9 U	4 U	4 U	129
CYANIDE	UG/L	10 U	10 U	10 UJ	10 U	10 U	10 U
IRON	UG/L	1050	941	844	849	756	830
LEAD	UG/L	2.3 JB	1.9 JB	1.2 B	5	5	10.4
MAGNESIUM	UG/L	632 B	639 B	1110 B	916 B	883 B	936 B
MANGANESE	UG/L	9 UJ	8.9 UJ	8.8 B	9.8 JB	8.2 JB	9.2 JB
MERCURY	UG/L	0.04 U	0.04 U	0.07 U	0.2 U	0.2 U	0.52
NICKEL	UG/L	7.9 UJ	7.9 UJ	7.9 U	17 U	17 U	1380
POTASSIUM	UG/L	376 B	341 B	604 B	610 B	603 B	640 B
SELENIUM	UG/L	5 UJ	5 UJ	5 U	5 U	5 U	5 U
SILVER	UG/L	2 UJ	2 UJ	3.8 UJ	10 U	10 U	10 U
SODIUM	UG/L	3930 B	3980 B	7790	6240	6100	6500
THALLIUM	UG/L	2 U	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
VANADIUM	UG/L	3.3 JB	1.9 JB	2.1 JB	5 U	5 U	5 U
ZINC	UG/L	8.7 U	7.6 U	7.5 U	7.4 U	10.4 U	111

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC04-SW-06B	6-WC04-SW-06M	6-WC05-SW-06B	6-WC05-SW-06M	6-WC05-SW-312M	6-WC06-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/26/92	8/26/92	8/25/92	8/25/92	8/25/92	8/23/92
	Lab Id:	00439-21	00439-22	00437-19	00437-20	00437-21	00429-05
Parameter	Units						
ALUMINUM	UG/L	697	698	799	945	762	751 J
ANTIMONY	UG/L	49 U	49 U	14 U	14 U	14 U	14 UJ
ARSENIC	UG/L	2 UJ	2 UJ	3 U	3 U	3 U	3 UJ
BARIUM	UG/L	21 U	21 U	18.9 B	22.6 B	17.6 B	17 UJ
BERYLLIUM	UG/L	1 U	1 U	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM	UG/L	3 U	3.2 JB	1.9 U	1.9 U	1.9 U	1.9 U
CALCIUM	UG/L	9720	9520	9440	11200	8850	6640 UJ
CHROMIUM	UG/L	5 UJ	5 UJ	3.6 U	3.6 U	4.9 B	3.6 UJ
COBALT	UG/L	6 U	6 U	2 U	2 U	2.9 B	2 U
COPPER	UG/L	4 U	4 U	5.5 B	3 B	43.8	1.9 U
CYANIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
IRON	UG/L	834	812	854	1020	818	701
LEAD	UG/L	3.5 U	4 U	1.8 B	2 B	3.1	1.2 U
MAGNESIUM	UG/L	1080 B	995 B	1060 B	1230 B	985 B	1090 U
MANGANESE	UG/L	10 JB	10.5 JB	10.6 JB	12.2 JB	10 JB	12.5 B
MERCURY	UG/L	0.2 U	0.2 U	0.05 U	0.05 U	0.24 B	0.11 U
NICKEL	UG/L	17 U	17 U	7.9 U	7.9 U	177	7.9 U
POTASSIUM	UG/L	636 B	614 B	821 B	821 B	700 B	677 U
SELENIUM	UG/L	5 U	5 U	5 U	5 UJ	5 UJ	5 U
SILVER	UG/L	10 U	10 U	2 U	2 U	2.6 B	3.3 U
SODIUM	UG/L	7400 J	6810 J	7400	8430	6710	122000 U
THALLIUM	UG/L	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 UJ
VANADIUM	UG/L	5 U	5 U	1.8 U	1.8 U	1.8 U	1.8 U
ZINC	UG/L	8 U	9.5 U	20.6	9.9 B	26.8	6.4 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC06-SW-06M	6-WC07-SW-06B	6-WC07-SW-06M	6-WC07-SW-312M	6-WC08-SW-06B	6-WC08-SW-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-06	00429-10	00429-11	00429-12	00429-18	00429-19
Parameter	Units						
ALUMINUM	UG/L	798 J	881 J	814 J	696 J	811 J	845 J
ANTIMONY	UG/L	14 UJ	14 UJ	14 UJ	14 UJ	14 UJ	14 UJ
ARSENIC	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
BARIUM	UG/L	18.3 UJ	18.4 UJ	19.3 UJ	16.6 UJ	18 UJ	20 UJ
BERYLLIUM	UG/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
CADMIUM	UG/L	1.9 U	1.9 U	2.3 UJ	17.4 J	1.9 U	1.9 U
CALCIUM	UG/L	7310 UJ	13700 UJ	9200 UJ	8180 UJ	9600 UJ	10200 UJ
CHROMIUM	UG/L	3.6 UJ	3.6 UJ	3.6 UJ	3.6 UJ	3.6 UJ	3.6 UJ
COBALT	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
COPPER	UG/L	1.9 U	1.9 U	1.9 U	63.9 UJ	1.9 U	2.4 UJ
CYANIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
IRON	UG/L	775	800	823	724	790	831
LEAD	UG/L	1 U	2.3 UJ	1.3 UJ	2 UJ	1.2 UJ	1.4 UJ
MAGNESIUM	UG/L	1170 U	14400	4810 U	6030 U	8990 U	7710 U
MANGANESE	UG/L	13.8 B	17.8	17.6	14.7 B	16.2	16.9
MERCURY	UG/L	0.09 U	0.1 U	0.11 U	0.69 U	0.1 U	0.11 U
NICKEL	UG/L	7.9 U	7.9 U	7.9 U	274 U	7.9 U	7.9 U
POTASSIUM	UG/L	677 U	4820 U	1940 U	2230 U	3180 U	3020 U
SELENIUM	UG/L	5 UJ	5 U	5 UJ	5 UJ	5 UJ	5 UJ
SILVER	UG/L	3.6 U	3.1 U	4 U	4.3 U	4.4 U	2.4 U
SODIUM	UG/L	8190 U	119000 U	41200 U	51100 U	74300 U	65200 U
THALLIUM	UG/L	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
VANADIUM	UG/L	1.8 U	1.9 JB	2 JB	1.8 U	2.1 JB	1.9 JB
ZINC	UG/L	9.2 U	9.8 U	8.3 U	32.2 U	12.5 U	8.3 U

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC08-SW-312M	6-WC09-SW-06B	6-WC09-SW-06M	6-WC09-SW-312M	6-WC10-SW-06B	6-WC10-SW-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
	Lab Id:	00429-20	00429-26	00429-28	00429-29	00426-06	00426-08
Parameter	Units						
ALUMINUM	UG/L	719 J	746 J	745 J	480 J	621	523 U
ANTIMONY	UG/L	14 UJ	14 UJ	14 UJ	14 UJ	49 U	49 U
ARSENIC	UG/L	3 U	3.7 B	3 U	2 U	2 U	2 U
BARIUM	UG/L	17.9 UJ	18.1 UJ	18.3 UJ	19.4 UJ	21 U	21 U
BERYLLIUM	UG/L	0.3 U	0.3 U	0.3 U	0.3 U	1 U	1 U
CADMIUM	UG/L	5.5 UJ	1.9 U	1.9 U	2.4 UJ	3 U	3 UJ
CALCIUM	UG/L	11100 UJ	12500 UJ	10900 UJ	56000 J	30900	32500
CHROMIUM	UG/L	3.6 UJ	3.6 UJ	3.6 UJ	3.6 UJ	5 U	5 U
COBALT	UG/L	2 U	2 U	2 U	2 U	6 U	6 UJ
COPPER	UG/L	64.2 UJ	1.9 U	2.3 UJ	22.8 UJ	6 UJ	4 UJ
CYANIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
IRON	UG/L	749	704	740	477	599	498
LEAD	UG/L	3.2 U	2 U	1.3 U	1 U	1 UJ	1.4 U
MAGNESIUM	UG/L	12600	18300	12800	146000	76600	83300
MANGANESE	UG/L	16.5	15.5	15.8	17.3	15 J	16 J
MERCURY	UG/L	0.73 U	0.1 U	0.1 U	0.37 U	0.2 U	0.2 U
NICKEL	UG/L	160 U	7.9 U	7.9 U	94.4 U	17 U	17 U
POTASSIUM	UG/L	4400 U	6300 U	4410 U	53700	25500	27700
SELENIUM	UG/L	5 U	5 U	5 U	5 U	5 U	5 U
SILVER	UG/L	2.6 U	2 U	2 U	2.2 U	10 U	10 U
SODIUM	UG/L	107000 U	154000 J	107000 U	1340000	661000	714000
THALLIUM	UG/L	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
VANADIUM	UG/L	2.5 JB	1.8 U	2 JB	1.8 U	7 UJ	7 UJ
ZINC	UG/L	28.4 U	9.4 U	8.4 U	16.9 U	9 B	7.3 B

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC10-SW-312M	6-WC11-SW-06B	6-WC11-SW-06M	6-WC11-SW-312M
	Depth:	N/A	N/A	N/A	N/A
	Date Sampled:	8/22/92	8/22/92	8/22/92	8/22/92
	Lab Id:	00426-09	00426-12	00426-13	00426-14
Parameter	Units				
ALUMINUM	UG/L	529 U	807	469 U	682
ANTIMONY	UG/L	49 U	49 U	49 U	49 U
ARSENIC	UG/L	2 U	2 U	2 U	2 U
BARIUM	UG/L	21 U	21 U	21 U	21 U
BERYLLIUM	UG/L	1 U	1 U	1 U	1 U
CADMIUM	UG/L	3 UJ	3 U	3 U	3 UJ
CALCIUM	UG/L	53400	40300	36000	64100
CHROMIUM	UG/L	6 UJ	5 U	7 U	5 U
COBALT	UG/L	6 U	6 U	6 U	6 U
COPPER	UG/L	66	4 UJ	6 U	209
CYANIDE	UG/L	10 U	10 U	10 U	10 U
IRON	UG/L	494	881	546	649
LEAD	UG/L	1.3 UJ	2.2 U	2.9 U	2.6 UJ
MAGNESIUM	UG/L	143000	98900	88200	174000
MANGANESE	UG/L	18 J	18 J	14 JB	25 J
MERCURY	UG/L	0.2 U	0.2 U	0.2 U	0.52
NICKEL	UG/L	102	17 U	17 U	213
POTASSIUM	UG/L	48500	32000	28000	55700
SELENIUM	UG/L	5 U	5 U	5 U	5 UJ
SILVER	UG/L	10 U	10 U	10 U	10 U
SODIUM	UG/L	1620000	726000	700000	1260000
THALLIUM	UG/L	2 UJ	2 UJ	2 UJ	2 UJ
VANADIUM	UG/L	5 UJ	8 UJ	8 UJ	7 UJ
ZINC	UG/L	30.7	8.4 B	17.6 B	95.1

SITE 6 WALLACE CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No: / Depth: / Date Sampled: / Lab Id:		MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
Parameter	Units						
ALUMINUM	UG/L	469 U	529 U	480 J	1350	6-WC01-SW-06B	25/28
ANTIMONY	UG/L	14 U	49 U	ND	ND		0/28
ARSENIC	UG/L	2 U	3 UJ	3.7 B	3.7 B	6-WC09-SW-06B	1/28
BARIUM	UG/L	16.6 UJ	21 U	16 JB	22.6 B	6-WC05-SW-06M	6/28
BERYLLIUM	UG/L	0.3 U	1 U	ND	ND		0/28
CADMIUM	UG/L	1.9 U	5.5 UJ	3.2 JB	17.4 J	6-WC07-SW-312M	2/28
CALCIUM	UG/L	6640 UJ	13700 UJ	3640 B	64100	6-WC11-SW-312M	18/28
CHROMIUM	UG/L	3.6 UJ	7 U	4.9 B	4.9 B	6-WC05-SW-312M	1/28
COBALT	UG/L	2 U	6 U	2.9 B	2.9 B	6-WC05-SW-312M	1/28
COPPER	UG/L	1.9 U	64.2 UJ	3 B	209	6-WC11-SW-312M	6/28
CYANIDE	UG/L	10 U	10 U	ND	ND		0/28
IRON	UG/L	NA	NA	477	1050	6-WC01-SW-06B	28/28
LEAD	UG/L	1 U	4 U	1.2 B	10.4	6-WC03-SW-312M	9/28
MAGNESIUM	UG/L	1090 U	8990 U	632 B	174000	6-WC11-SW-312M	22/28
MANGANESE	UG/L	8.9 UJ	9 UJ	8.2 JB	25 J	6-WC11-SW-312M	26/28
MERCURY	UG/L	0.04 U	0.73 U	0.24 B	0.52	6-WC11-SW-312M	3/28
NICKEL	UG/L	7.9 UJ	274 U	102	1380	6-WC03-SW-312M	4/28
POTASSIUM	UG/L	677 U	6300 U	341 B	55700	6-WC11-SW-312M	18/28
SELENIUM	UG/L	5 UJ	5 UJ	ND	ND		0/28
SILVER	UG/L	2 UJ	10 U	2.6 B	2.6 B	6-WC08-SW-312M	1/28
SODIUM	UG/L	8190 U	122000 U	3930 B	1620000	6-WC10-SW-312M	19/28
THALLIUM	UG/L	2 U	2 U	ND	ND		0/28
VANADIUM	UG/L	1.8 U	8 UJ	1.9 JB	3.3 JB	6-WC01-SW-06B	9/28
ZINC	UG/L	6.4 U	32.2 U	7.3 B	111	6-WC03-SW-312M	10/28

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-BH01-SW-06B	6-BH01-SW-06M	6-BH02-SW-06M	6-BH03-SW-06B	6-BH03-SW-06M	6-BH04-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		10/23/92	10/23/92	8/28/92	8/28/92	8/28/92	8/28/92
Lab Id:		00591-05	00591-06	00458-04	00458-10	00458-11	00454-03
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
BETA-BHC	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
DELTA-BHC	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
GAMMA-BHC(LINDANE)	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
HEPTACHLOR	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
ALDRIN	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
HEPTACHLOR EPOXIDE	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
ENDOSULFAN I	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
DIELDRIN	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
4,4'-DDE	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDRIN	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDOSULFAN II	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
4,4'-DDD	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDOSULFAN SULFATE	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
4,4'-DDT	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
METHOXYCHLOR	UG/L	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
ENDRIN KETONE	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
ENDRIN ALDEHYDE	UG/L	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ
ALPHA CHLORDANE	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
GAMMA CHLORDANE	UG/L	0.05 UJ	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ
TOXAPHENE	UG/L	5 UJ	5 U	5 U	5 U	5 U	5 UJ
PCB-1016	UG/L	1 UJ	1 U	1 U	1 U	1 U	1 UJ
PCB-1221	UG/L	2 UJ	2 U	2 U	2 U	2 U	2 UJ
PCB-1232	UG/L	1 UJ	1 U	1 U	1 U	1 U	1 UJ
PCB-1242	UG/L	1 UJ	1 U	1 U	1 U	1 U	1 UJ
PCB-1248	UG/L	1 UJ	1 U	1 U	1 U	1 U	1 UJ
PCB-1254	UG/L	1 UJ	1 U	1 U	1 U	1 U	1 UJ
PCB-1260	UG/L	1 UJ	1 U	1 U	1 U	1 U	1 UJ
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH01-SW-06B	6-BH01-SW-06M	6-BH02-SW-06M	6-BH03-SW-06B	6-BH03-SW-06M	6-BH04-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	10/23/92	10/23/92	8/28/92	8/28/92	8/28/92	8/28/92
	Lab Id:	00591-05	00591-06	00458-04	00458-10	00458-11	00454-03
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 UJ
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 UJ	10 UJ	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U		10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U		10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U		10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U		10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U		10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	10 U		10 U	10 U
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U		10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U		10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U		10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U	10 U		10 UJ	10 UJ
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U		10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U		10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U		10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U		10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U		10 U	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH01-SW-06B	6-BH01-SW-06M	6-BH02-SW-06M	6-BH03-SW-06B	6-BH03-SW-06M	6-BH04-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		10/23/92	10/23/92	8/28/92	8/28/92	8/28/92	8/28/92
Lab Id:		00591-05	00591-06	00458-04	00458-10	00458-11	00454-03
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U		10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U		10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U		10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U		25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U		10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U		25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U		10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U		10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U		10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U		25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U		10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U		25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U		25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U		10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 U	10 U	10 UJ		10 UJ	10 UJ
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U		10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U		10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U		10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U		25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U		25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U		10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U		10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 U		10 U	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U		25 U	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U		10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U		10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U		10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 U		10 UJ	10 UJ
CARBAZOLE	UG/L	10 U	10 U	10 U		10 U	10 U
PYRENE	UG/L	10 U	10 U	10 U		10 U	10 UJ
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U		10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U		10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U		10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U		10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	1 J	10 U		10 U	1 J
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 U	10 U		10 UJ	10 UJ
BENZO(B)FLUORANTHENE	UG/L	10 U	10 U	10 U		10 U	10 UJ
BENZO(K)FLUORANTHENE	UG/L	10 U	10 U	10 U		10 U	10 UJ
BENZO(A)PYRENE	UG/L	10 U	10 U	10 U		10 U	10 UJ
INDENO(1,2,3-CD) PYRENE	UG/L	10 U	10 U	10 U		10 U	10 UJ
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 U	10 U		10 UJ	10 UJ
BENZO(G,H,I)PERYLENE	UG/L	10 U	10 U	10 U		10 U	10 UJ

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH04-SW-06M	6-BH05-SW-06B	6-BH05-SW-06M	6-BH06-SW-06B	6-BH06-SW-06M	6-BH07-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/28/92	8/28/92	8/28/92	8/28/92	8/28/92	8/25/92
Lab Id:		00454-04	00454-05	00454-06	00454-07	00454-09	00437-01
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
BETA-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DELTA-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ALDRIN	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
ENDOSULFAN I	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
DIELDRIN	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDE	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN II	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDD	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
METHOXYCHLOR	UG/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
ENDRIN KETONE	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
ALPHA CHLORDANE	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
GAMMA CHLORDANE	UG/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
TOXAPHENE	UG/L	5 U	5 U	5 U	5 U	5 U	5 U
PCB-1016	UG/L	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1221	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
PCB-1232	UG/L	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1242	UG/L	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1248	UG/L	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1254	UG/L	1 U	1 U	1 U	1 U	1 U	1 U
PCB-1260	UG/L	1 U	1 U	1 U	1 U	1 U	1 U
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH04-SW-06M	6-BH05-SW-06B	6-BH05-SW-06M	6-BH06-SW-06B	6-BH06-SW-06M	6-BH07-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/28/92	8/28/92	8/28/92	8/28/92	8/28/92	8/25/92
	Lab Id:	00454-04	00454-05	00454-06	00454-07	00454-09	00437-01
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH04-SW-06M	6-BH05-SW-06B	6-BH05-SW-06M	6-BH06-SW-06B	6-BH06-SW-06M	6-BH07-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/28/92	8/28/92	8/28/92	8/28/92	8/28/92	8/25/92
Lab Id:		00454-04	00454-05	00454-06	00454-07	00454-09	00437-01
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 UJ	10 UJ	10 UJ	10 U	10 UJ	10 U
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	1 J	2 J	10 U	10 UJ	10 U	10 U
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 UJ	10 UJ	10 U
BENZO(B)FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
BENZO(K)FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
BENZO(A)PYRENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
INDENO(1,2,3-CD) PYRENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U
BENZO(G,H,I)PERYLENE	UG/L	10 U	10 U	10 U	10 U	10 UJ	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH07-SW-06M	6-BH07-SW-312M
Depth:		N/A	N/A
Date Sampled:		8/25/92	8/25/92
Lab Id:		00437-02	00437-03
Parameter	Units		
PESTICIDE/PCBS			
ALPHA-BHC	UG/L	0.05 U	0.05 U
BETA-BHC	UG/L	0.05 U	0.05 U
DELTA-BHC	UG/L	0.05 U	0.05 U
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 U
HEPTACHLOR	UG/L	0.05 U	0.05 U
ALDRIN	UG/L	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 U
ENDOSULFAN I	UG/L	0.05 U	0.05 U
DIELDRIN	UG/L	0.1 U	0.1 U
4,4'-DDE	UG/L	0.1 U	0.1 U
ENDRIN	UG/L	0.1 U	0.1 U
ENDOSULFAN II	UG/L	0.1 U	0.1 U
4,4'-DDD	UG/L	0.1 U	0.1 U
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 U	0.1 U
METHOXYCHLOR	UG/L	0.5 U	0.5 U
ENDRIN KETONE	UG/L	0.1 U	0.1 U
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 U
ALPHA CHLORDANE	UG/L	0.05 U	0.05 U
GAMMA CHLORDANE	UG/L	0.05 U	0.05 U
TOXAPHENE	UG/L	5 U	5 U
PCB-1016	UG/L	1 U	1 U
PCB-1221	UG/L	2 U	2 U
PCB-1232	UG/L	1 U	1 U
PCB-1242	UG/L	1 U	1 U
PCB-1248	UG/L	1 U	1 U
PCB-1254	UG/L	1 U	1 U
PCB-1260	UG/L	1 U	1 U
VOLATILES			
CHLOROMETHANE	UG/L	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U
ACETONE	UG/L	10 U	10 U
CARBON DISULFIDE	UG/L	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	10 U
CHLOROFORM	UG/L	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U

	Sample No:	6-BH07-SW-06M	6-BH07-SW-312M
	Depth:	N/A	N/A
	Date Sampled:	8/25/92	8/25/92
	Lab Id:	00437-02	00437-03
Parameter	Units		
VOLATILES Cont.			
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	10 U
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U
BENZENE	UG/L	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U
BROMOFORM	UG/L	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U
TOLUENE	UG/L	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U
STYRENE	UG/L	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U
SEMIVOLATILES			
PHENOL	UG/L	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U
HEXACHLOROETHANE	UG/L	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-BH07-SW-06M	6-BH07-SW-312M
Sample No:		6-BH07-SW-06M	6-BH07-SW-312M
Depth:		N/A	N/A
Date Sampled:		8/25/92	8/25/92
Lab Id:		00437-02	00437-03
SEMIVOLATILES Cont.			
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 U	10 U
DIETHYL PHTHALATE	UG/L	10 U	2 J
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U
FLUORENE	UG/L	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U
PHENANTHRENE	UG/L	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U
CARBAZOLE	UG/L	10 U	10 U
PYRENE	UG/L	10 U	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U
CHRYSENE	UG/L	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U
DI-N-OCTYL PHTHALATE	UG/L	10 UJ	10 U
BENZO(B)FLUORANTHENE	UG/L	10 UJ	10 U
BENZO(K)FLUORANTHENE	UG/L	10 UJ	10 U
BENZO(A)PYRENE	UG/L	10 UJ	10 U
INDENO(1,2,3-CD) PYRENE	UG/L	10 UJ	10 U
DIBENZ(A,H)ANTHRACENE	UG/L	10 UJ	10 U
BENZO(G,H,I)PERYLENE	UG/L	10 UJ	10 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: Depth: Date Sampled: Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
BETA-BHC	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
DELTA-BHC	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
GAMMA-BHC(LINDANE)	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
HEPTACHLOR	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
ALDRIN	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
HEPTACHLOR EPOXIDE	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
ENDOSULFAN I	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
DIELDRIN	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
4,4'-DDE	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
ENDRIN	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
ENDOSULFAN II	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
4,4'-DDD	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
ENDOSULFAN SULFATE	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
4,4'-DDT	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
METHOXYCHLOR	UG/L	0.5 UJ	0.5 UJ	ND	ND		0/14
ENDRIN KETONE	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
ENDRIN ALDEHYDE	UG/L	0.1 UJ	0.1 UJ	ND	ND		0/14
ALPHA CHLORDANE	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
GAMMA CHLORDANE	UG/L	0.05 UJ	0.05 UJ	ND	ND		0/14
TOXAPHENE	UG/L	5 UJ	5 UJ	ND	ND		0/14
PCB-1016	UG/L	1 UJ	1 UJ	ND	ND		0/14
PCB-1221	UG/L	2 UJ	2 UJ	ND	ND		0/14
PCB-1232	UG/L	1 UJ	1 UJ	ND	ND		0/14
PCB-1242	UG/L	1 UJ	1 UJ	ND	ND		0/14
PCB-1248	UG/L	1 UJ	1 UJ	ND	ND		0/14
PCB-1254	UG/L	1 UJ	1 UJ	ND	ND		0/14
PCB-1260	UG/L	1 UJ	1 UJ	ND	ND		0/14
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	ND	ND		0/14
BROMOMETHANE	UG/L	10 U	10 U	ND	ND		0/14
VINYL CHLORIDE	UG/L	10 U	10 U	ND	ND		0/14
CHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/14
METHYLENE CHLORIDE	UG/L	10 U	10 U	ND	ND		0/14
ACETONE	UG/L	10 U	10 U	ND	ND		0/14
CARBON DISULFIDE	UG/L	10 U	10 U	ND	ND		0/14
1,1-DICHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/14
1,1-DICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/14
1,2-DICHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/14
CHLOROFORM	UG/L	10 U	10 U	ND	ND		0/14
1,2-DICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/14
2-BUTANONE	UG/L	10 U	10 U	ND	ND		0/14

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No: / Depth: / Date Sampled: / Lab Id: Parameter	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/14
CARBON TETRACHLORIDE	UG/L	10 U	10 U	ND	ND		0/14
BROMODICHLOROMETHANE	UG/L	10 U	10 U	ND	ND		0/14
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	ND	ND		0/14
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	ND	ND		0/14
TRICHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/14
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	ND	ND		0/14
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/14
BENZENE	UG/L	10 U	10 U	ND	ND		0/14
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	ND	ND		0/14
BROMOFORM	UG/L	10 U	10 U	ND	ND		0/14
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	ND	ND		0/14
2-HEXANONE	UG/L	10 U	10 U	ND	ND		0/14
TETRACHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/14
1,1,2,2-TETRACHLOROETHANE	UG/L	10 UJ	10 UJ	ND	ND		0/14
TOLUENE	UG/L	10 U	10 U	ND	ND		0/14
CHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/14
ETHYLBENZENE	UG/L	10 U	10 U	ND	ND		0/14
STYRENE	UG/L	10 U	10 U	ND	ND		0/14
TOTAL XYLENES	UG/L	10 U	10 U	ND	ND		0/14
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	ND	ND		0/13
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	ND	ND		0/13
2-CHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/13
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/13
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/13
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/13
2-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/13
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	ND	ND		0/13
4-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/13
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	ND	ND		0/13
HEXACHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/13
NITROBENZENE	UG/L	10 U	10 U	ND	ND		0/13
ISOPHORONE	UG/L	10 U	10 U	ND	ND		0/13
2-NITROPHENOL	UG/L	10 U	10 U	ND	ND		0/13
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/13
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	ND	ND		0/13
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/13
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/13
NAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/13
4-CHLORANILINE	UG/L	10 U	10 U	ND	ND		0/13
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	ND	ND		0/13

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter (Sample No: / Depth: / Date Sampled: / Lab Id:)	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/13
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/13
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	ND	ND		0/13
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/13
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	ND	ND		0/13
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/13
2-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/13
DIMETHYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/13
ACENAPHTHYLENE	UG/L	10 U	10 U	ND	ND		0/13
2,6-DINITROTOLUENE	UG/L	10 U	10 U	ND	ND		0/13
3-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/13
ACENAPHTHENE	UG/L	10 U	10 U	ND	ND		0/13
2,4-DINITROPHENOL	UG/L	25 U	25 U	ND	ND		0/13
4-NITROPHENOL	UG/L	25 U	25 U	ND	ND		0/13
DIBENZOFURAN	UG/L	10 U	10 U	ND	ND		0/13
2,4-DINITROTOLUENE	UG/L	10 U	10 U	ND	ND		0/13
DIETHYL PHTHALATE	UG/L	10 U	10 U	2 J	2 J	6-BH07-SW-312M	1/13
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	ND	ND		0/13
FLUORENE	UG/L	10 U	10 U	ND	ND		0/13
4-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/13
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	ND	ND		0/13
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	ND	ND		0/13
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	ND	ND		0/13
HEXACHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/13
PENTACHLOROPHENOL	UG/L	25 U	25 U	ND	ND		0/13
PHENANTHRENE	UG/L	10 U	10 U	ND	ND		0/13
ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/13
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/13
FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/13
CARBAZOLE	UG/L	10 U	10 U	ND	ND		0/13
PYRENE	UG/L	10 U	10 U	ND	ND		0/13
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/13
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	ND	ND		0/13
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/13
CHRYSENE	UG/L	10 U	10 U	ND	ND		0/13
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	1 J	2 J	6-BH05-SW-06B	4/13
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/13
BENZO(B)FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/13
BENZO(K)FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/13
BENZO(A)PYRENE	UG/L	10 U	10 U	ND	ND		0/13
INDENO(1,2,3-CD) PYRENE	UG/L	10 U	10 U	ND	ND		0/13
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/13
BENZO(G,H,I)PERYLENE	UG/L	10 U	10 U	ND	ND		0/13

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH01-SW-06B	6-BH01-SW-06M	6-BH02-SW-06M	6-BH03-SW-06B	6-BH03-SW-06M	6-BH04-SW-06B
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	10/23/92	10/23/92	8/28/92	8/28/92	8/28/92	8/28/92
	Lab Id:	00591-05	00591-06	00458-04	00458-10	00458-11	00454-03
Parameter	Units						
ALUMINUM	UG/L	1210	1230	868	494	1560	714 U
ANTIMONY	UG/L	17.2 UJ	14 U	14 U	14 U	14 U	49 UJ
ARSENIC	UG/L	3 U	3 U	3 UJ	3 UJ	3 U	3 UJ
BARIUM	UG/L	13.4 JB	14 JB	25.1 JB	25.6 JB	31.3 B	22 B
BERYLLIUM	UG/L	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	5 UJ
CADMIUM	UG/L	1.9 UJ	2.6 UJ	1.9 U	1.9 U	1.9 U	3 U
CALCIUM	UG/L	612 B	600 B	16100	17200	19100	20600
CHROMIUM	UG/L	3.6 U	3.6 U	7 U	9 U	3.6 U	5 U
COBALT	UG/L	2 U	2 U	3 UJ	3 UJ	2 UJ	6 U
COPPER	UG/L	3.2 UJ	3 UJ	7 UJ	8 UJ	6 UJ	7 UJ
CYANIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
IRON	UG/L	958	818	921	989	1790	1180
LEAD	UG/L	1 U	1 U	3 U	2.4 U	5.9	1.8 JB
MAGNESIUM	UG/L	588 B	612 B	1010 B	1050 B	1120 B	1010 B
MANGANESE	UG/L	6.5 B	6.2 B	14 JB	16 J	23 J	17
MERCURY	UG/L	0.04 U	0.05 U	0.04 U	0.04 U	0.04 U	0.06 U
NICKEL	UG/L	7.9 UJ	7.9 UJ	7.9 U	8 JB	7.9 U	17 U
POTASSIUM	UG/L	117 UJ	146 UJ	685 B	713 B	721 B	1030 UJ
SELENIUM	UG/L	5 U	5 U	5 U	5 U	5 U	5 U
SILVER	UG/L	2 UJ	2 UJ	4 UJ	5 UJ	4 UJ	10 UJ
SODIUM	UG/L	4680 B	4850 B	5250	5480	5620	4420 JB
THALLIUM	UG/L	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ	2 UJ
VANADIUM	UG/L	1.8 UJ	1.8 UJ	2 JB	2 JB	3 JB	5 U
ZINC	UG/L	4.5 U	4.9 U	13.1 U	13.2 U	21.3 U	9 U

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-BH04-SW-06M	6-BH05-SW-06B	6-BH05-SW-06M	6-BH06-SW-06B	6-BH06-SW-06M	6-BH07-SW-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/28/92	8/28/92	8/28/92	8/28/92	8/28/92	8/25/92
Lab Id:		00454-04	00454-05	00454-06	00454-07	00454-09	00437-01
Parameter	Units						
ALUMINUM	UG/L	782	320 U	2700	317 U	342 U	408
ANTIMONY	UG/L	49 UJ	49 UJ	49 UJ	49 UJ	49 UJ	14 U
ARSENIC	UG/L	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ	3 U
BARIUM	UG/L	24 B	22 B	36 B	24 B	27 B	20.6 B
BERYLLIUM	UG/L	5 UJ	5 UJ	4 UJ	5 UJ	4 UJ	0.3 U
CADMIUM	UG/L	3 U	3 U	3 UJ	3 UJ	3 U	1.9 U
CALCIUM	UG/L	20000	20000	22500	20100	23000	24900
CHROMIUM	UG/L	5 U	5 U	8 B	5 B	5 U	4.4 B
COBALT	UG/L	8 UJ	6 UJ	6 U	6 U	7 UJ	2 U
COPPER	UG/L	5 UJ	6 UJ	7 UJ	5 UJ	5 UJ	4 B
CYANIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
IRON	UG/L	1650	1120	6200	1150	1180	679
LEAD	UG/L	1.8 JB	1.5 JB	8.2	2 JB	2.2 JB	2.4 B
MAGNESIUM	UG/L	1060 B	1240 B	1160 B	1010 B	1130 B	37900
MANGANESE	UG/L	17	18	65	20	20	13.5 JB
MERCURY	UG/L	0.05 U	0.05 U	0.05 B	0.05 U	0.05 U	0.04 U
NICKEL	UG/L	17 U	17 U	17 U	17 U	17 U	7.9 U
POTASSIUM	UG/L	965 UJ	10100	439 UJ	725 UJ	1050 UJ	13000
SELENIUM	UG/L	5 U	5 U	5 U	5 U	5 U	5 U
SILVER	UG/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	3.6 B
SODIUM	UG/L	4580 JB	4310 JB	50 U	5140 J	4510 JB	319000
THALLIUM	UG/L	2 UJ	10 UJ	10 UJ	2 UJ	2 UJ	2 UJ
VANADIUM	UG/L	5 UJ	5 UJ	9 UJ	5 U	5 UJ	1.8 U
ZINC	UG/L	7 U	18 U	22 U	8 U	6 U	6.4 B

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH07-SW-06M	6-BH07-SW-312M
	Depth:	N/A	N/A
	Date Sampled:	8/25/92	8/25/92
	Lab Id:	00437-02	00437-03
Parameter	Units		
ALUMINUM	UG/L	418	334
ANTIMONY	UG/L	14 U	14 U
ARSENIC	UG/L	3 U	3 U
BARIUM	UG/L	20.5 B	18.6 B
BERYLLIUM	UG/L	0.3 U	0.3 U
CADMIUM	UG/L	1.9 U	1.9 U
CALCIUM	UG/L	23900	54900
CHROMIUM	UG/L	3.6 U	3.6 U
COBALT	UG/L	2 U	2 U
COPPER	UG/L	5.2 B	55.8
CYANIDE	UG/L	10 U	10 U
IRON	UG/L	725	501
LEAD	UG/L	2 B	2.6 B
MAGNESIUM	UG/L	33600	136000
MANGANESE	UG/L	13.5 JB	16.2 J
MERCURY	UG/L	0.04 U	0.34
NICKEL	UG/L	7.9 U	244
POTASSIUM	UG/L	11600	49000
SELENIUM	UG/L	5 U	5 U
SILVER	UG/L	2.1 B	2 U
SODIUM	UG/L	284000	1260000
THALLIUM	UG/L	2 UJ	10 UJ
VANADIUM	UG/L	1.8 U	1.8 U
ZINC	UG/L	6.2 B	30.7

SITE 6 BEAR HEAD CREEK SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: / Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
ALUMINUM	UG/L	317 U	714 U	334	2700	6-BH05-SW-06M	10/14
ANTIMONY	UG/L	14 U	49 UJ	ND	ND		0/14
ARSENIC	UG/L	3 U	3 U	ND	ND		0/14
BARIUM	UG/L	NA	NA	13.4 JB	36 B	6-BH05-SW-06M	14/14
BERYLLIUM	UG/L	0.3 U	5 UJ	ND	ND		0/14
CADMIUM	UG/L	1.9 UJ	3 U	ND	ND		0/14
CALCIUM	UG/L	NA	NA	600 B	54900	6-BH07-SW-312M	14/14
CHROMIUM	UG/L	3.6 U	9 U	4.4 B	8 B	6-BH05-SW-06M	3/14
COBALT	UG/L	2 U	8 UJ	ND	ND		0/14
COPPER	UG/L	3 UJ	8 UJ	4 B	55.8	6-BH07-SW-312M	3/14
CYANIDE	UG/L	10 U	10 U	ND	ND		0/14
IRON	UG/L	NA	NA	501	6200	6-BH05-SW-06M	14/14
LEAD	UG/L	1 U	3 U	1.5 JB	8.2	6-BH05-SW-06M	10/14
MAGNESIUM	UG/L	NA	NA	588 B	136000	6-BH07-SW-312M	14/14
MANGANESE	UG/L	NA	NA	6.2 B	65	6-BH05-SW-06M	14/14
MERCURY	UG/L	0.04 U	0.06 U	0.05 B	0.34	6-BH07-SW-312M	2/14
NICKEL	UG/L	7.9 UJ	17 U	8 JB	244	6-BH07-SW-312M	2/14
POTASSIUM	UG/L	117 UJ	1050 UJ	685 B	49000	6-BH07-SW-312M	7/14
SELENIUM	UG/L	5 U	5 U	ND	ND		0/14
SILVER	UG/L	2 UJ	10 UJ	2.1 B	3.6 B	6-BH07-SW-06B	2/14
SODIUM	UG/L	50 U	50 U	4310 JB	1260000	6-BH07-SW-312M	13/14
THALLIUM	UG/L	2 UJ	10 UJ	ND	ND		0/14
VANADIUM	UG/L	1.8 UJ	9 UJ	2 JB	3 JB	6-BH03-SW-06M	3/14
ZINC	UG/L	4.5 U	22 U	6.2 B	30.7	6-BH07-SW-312M	3/14

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-RV2-SW-06	6-RV3-SW-06	6-RV5-SW-06	6-RV6-SW-06	6-RV7-SW-06	6-RV8-SW-06
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/24/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-14	00437-06	00439-16	00439-17	00437-15	00437-18
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
BETA-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
DELTA-BHC	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
HEPTACHLOR	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
ALDRIN	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
ENDOSULFAN I	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
DIELDRIN	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
4,4'-DDE	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
ENDRIN	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
ENDOSULFAN II	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
4,4'-DDD	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
4,4'-DDT	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
METHOXYCHLOR	UG/L	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U
ENDRIN KETONE	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U	0.1 U
ALPHA CHLORDANE	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
GAMMA CHLORDANE	UG/L	0.05 U	0.05 U	0.05 U	0.05 UJ	0.05 U	0.05 U
TOXAPHENE	UG/L	5 U	5 U	5 U	5 UJ	5 U	5 U
PCB-1016	UG/L	1 U	1 U	1 U	1 UJ	1 U	1 U
PCB-1221	UG/L	2 U	2 U	2 U	2 UJ	2 U	2 U
PCB-1232	UG/L	1 U	1 U	1 U	1 UJ	1 U	1 U
PCB-1242	UG/L	1 U	1 U	1 U	1 UJ	1 U	1 U
PCB-1248	UG/L	1 U	1 U	1 U	1 UJ	1 U	1 U
PCB-1254	UG/L	1 U	1 U	1 U	1 UJ	1 U	1 U
PCB-1260	UG/L	1 U	1 U	1 U	1 UJ	1 U	1 U
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACETONE	UG/L	10 U	10 U	140	10 U	10 U	10 U
CARBON DISULFIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-BUTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-RV2-SW-06	6-RV3-SW-06	6-RV5-SW-06	6-RV6-SW-06	6-RV7-SW-06	6-RV8-SW-06
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/24/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-14	00437-06	00439-16	00439-17	00437-15	00437-18
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMODICHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRICHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BROMOFORM	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-HEXANONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TETRACHLOROETHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
STYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
TOTAL XYLENES	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-CHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROETHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NITROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ISOPHORONE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
NAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLORANILINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-RV2-SW-06	6-RV3-SW-06	6-RV5-SW-06	6-RV6-SW-06	6-RV7-SW-06	6-RV8-SW-06
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/24/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-14	00437-06	00439-16	00439-17	00437-15	00437-18
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIMETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ACENAPHTHYLENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,6-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
ACENAPHTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4-NITROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
DIBENZOFURAN	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
2,4-DINITROTOLUENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DIETHYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-NITROANILINE	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
HEXACHLOROBENZENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PENTACHLOROPHENOL	UG/L	25 U	25 U	25 U	25 U	25 U	25 U
PHENANTHRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
FLUORANTHENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CARBAZOLE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
PYRENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
CHRYSENE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
BENZO(B)FLUORANTHENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
BENZO(K)FLUORANTHENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
BENZO(A)PYRENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
INDENO(1,2,3-CD) PYRENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U
BENZO(G,H,I)PERYLENE	UG/L	10 U	10 U	10 U	10 UJ	10 U	10 U

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No: / Depth: / Date Sampled: / Lab Id: Parameter	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PESTICIDE/PCBS							
ALPHA-BHC	UG/L	0.05 U	0.05 U	ND	ND		0/6
BETA-BHC	UG/L	0.05 U	0.05 U	ND	ND		0/6
DELTA-BHC	UG/L	0.05 U	0.05 U	ND	ND		0/6
GAMMA-BHC(LINDANE)	UG/L	0.05 U	0.05 U	ND	ND		0/6
HEPTACHLOR	UG/L	0.05 U	0.05 U	ND	ND		0/6
ALDRIN	UG/L	0.05 U	0.05 U	ND	ND		0/6
HEPTACHLOR EPOXIDE	UG/L	0.05 U	0.05 U	ND	ND		0/6
ENDOSULFAN I	UG/L	0.05 U	0.05 U	ND	ND		0/6
DIELDRIN	UG/L	0.1 U	0.1 U	ND	ND		0/6
4,4'-DDE	UG/L	0.1 U	0.1 U	ND	ND		0/6
ENDRIN	UG/L	0.1 U	0.1 U	ND	ND		0/6
ENDOSULFAN II	UG/L	0.1 U	0.1 U	ND	ND		0/6
4,4'-DDD	UG/L	0.1 U	0.1 U	ND	ND		0/6
ENDOSULFAN SULFATE	UG/L	0.1 U	0.1 U	ND	ND		0/6
4,4'-DDT	UG/L	0.1 U	0.1 U	ND	ND		0/6
METHOXYCHLOR	UG/L	0.5 U	0.5 U	ND	ND		0/6
ENDRIN KETONE	UG/L	0.1 U	0.1 U	ND	ND		0/6
ENDRIN ALDEHYDE	UG/L	0.1 U	0.1 U	ND	ND		0/6
ALPHA CHLORDANE	UG/L	0.05 U	0.05 U	ND	ND		0/6
GAMMA CHLORDANE	UG/L	0.05 U	0.05 U	ND	ND		0/6
TOXAPHENE	UG/L	5 U	5 U	ND	ND		0/6
PCB-1016	UG/L	1 U	1 U	ND	ND		0/6
PCB-1221	UG/L	2 U	2 U	ND	ND		0/6
PCB-1232	UG/L	1 U	1 U	ND	ND		0/6
PCB-1242	UG/L	1 U	1 U	ND	ND		0/6
PCB-1248	UG/L	1 U	1 U	ND	ND		0/6
PCB-1254	UG/L	1 U	1 U	ND	ND		0/6
PCB-1260	UG/L	1 U	1 U	ND	ND		0/6
VOLATILES							
CHLOROMETHANE	UG/L	10 U	10 U	ND	ND		0/6
BROMOMETHANE	UG/L	10 U	10 U	ND	ND		0/6
VINYL CHLORIDE	UG/L	10 U	10 U	ND	ND		0/6
CHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
METHYLENE CHLORIDE	UG/L	10 U	10 U	ND	ND		0/6
ACETONE	UG/L	10 U	10 U	140	140	6-RV5-SW-06	1/6
CARBON DISULFIDE	UG/L	10 U	10 U	ND	ND		0/6
1,1-DICHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/6
1,1-DICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
1,2-DICHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/6
CHLOROFORM	UG/L	10 U	10 U	ND	ND		0/6
1,2-DICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
2-BUTANONE	UG/L	10 U	10 U	ND	ND		0/6

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No: / Depth: / Date Sampled: / Lab Id: Parameter	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
CARBON TETRACHLORIDE	UG/L	10 U	10 U	ND	ND		0/6
BROMODICHLOROMETHANE	UG/L	10 U	10 U	ND	ND		0/6
1,2-DICHLOROPROPANE	UG/L	10 U	10 U	ND	ND		0/6
CIS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	ND	ND		0/6
TRICHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/6
DIBROMOCHLOROMETHANE	UG/L	10 U	10 U	ND	ND		0/6
1,1,2-TRICHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
BENZENE	UG/L	10 U	10 U	ND	ND		0/6
TRANS-1,3-DICHLOROPROPENE	UG/L	10 U	10 U	ND	ND		0/6
BROMOFORM	UG/L	10 U	10 U	ND	ND		0/6
4-METHYL-2-PENTANONE	UG/L	10 U	10 U	ND	ND		0/6
2-HEXANONE	UG/L	10 U	10 U	ND	ND		0/6
TETRACHLOROETHENE	UG/L	10 U	10 U	ND	ND		0/6
1,1,2,2-TETRACHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
TOLUENE	UG/L	10 U	10 U	ND	ND		0/6
CHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
ETHYLBENZENE	UG/L	10 U	10 U	ND	ND		0/6
STYRENE	UG/L	10 U	10 U	ND	ND		0/6
TOTAL XYLENES	UG/L	10 U	10 U	ND	ND		0/6
SEMIVOLATILES							
PHENOL	UG/L	10 U	10 U	ND	ND		0/6
BIS(2-CHLOROETHYL) ETHER	UG/L	10 U	10 U	ND	ND		0/6
2-CHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/6
1,3-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
1,4-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
1,2-DICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
2-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/6
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/L	10 U	10 U	ND	ND		0/6
4-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/6
N-NITROSODI-N-PROPYLAMINE	UG/L	10 U	10 U	ND	ND		0/6
HEXACHLOROETHANE	UG/L	10 U	10 U	ND	ND		0/6
NITROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
ISOPHORONE	UG/L	10 U	10 U	ND	ND		0/6
2-NITROPHENOL	UG/L	10 U	10 U	ND	ND		0/6
2,4-DIMETHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/6
BIS(2-CHLOROETHOXY) METHANE	UG/L	10 U	10 U	ND	ND		0/6
2,4-DICHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/6
1,2,4-TRICHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
NAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/6
4-CHLORANILINE	UG/L	10 U	10 U	ND	ND		0/6
HEXACHLOROBUTADIENE	UG/L	10 U	10 U	ND	ND		0/6

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:
Depth:
Date Sampled:
Lab Id:

Parameter	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/L	10 U	10 U	ND	ND		0/6
2-METHYLNAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/6
HEXACHLOROCYCLOPENTADIENE	UG/L	10 U	10 U	ND	ND		0/6
2,4,6-TRICHLOROPHENOL	UG/L	10 U	10 U	ND	ND		0/6
2,4,5-TRICHLOROPHENOL	UG/L	25 U	25 U	ND	ND		0/6
2-CHLORONAPHTHALENE	UG/L	10 U	10 U	ND	ND		0/6
2-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/6
DIMETHYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/6
ACENAPHTHYLENE	UG/L	10 U	10 U	ND	ND		0/6
2,6-DINITROTOLUENE	UG/L	10 U	10 U	ND	ND		0/6
3-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/6
ACENAPHTHENE	UG/L	10 U	10 U	ND	ND		0/6
2,4-DINITROPHENOL	UG/L	25 U	25 U	ND	ND		0/6
4-NITROPHENOL	UG/L	25 U	25 U	ND	ND		0/6
DIBENZOFURAN	UG/L	10 U	10 U	ND	ND		0/6
2,4-DINITROTOLUENE	UG/L	10 U	10 U	ND	ND		0/6
DIETHYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/6
4-CHLOROPHENYL PHENYL ETHER	UG/L	10 U	10 U	ND	ND		0/6
FLUORENE	UG/L	10 U	10 U	ND	ND		0/6
4-NITROANILINE	UG/L	25 U	25 U	ND	ND		0/6
4,6-DINITRO-2-METHYLPHENOL	UG/L	25 U	25 U	ND	ND		0/6
N-NITRISODIPHENYLAMINE	UG/L	10 U	10 U	ND	ND		0/6
4-BROMOPHENYL PHENYL ETHER	UG/L	10 U	10 U	ND	ND		0/6
HEXACHLOROBENZENE	UG/L	10 U	10 U	ND	ND		0/6
PENTACHLOROPHENOL	UG/L	25 U	25 U	ND	ND		0/6
PHENANTHRENE	UG/L	10 U	10 U	ND	ND		0/6
ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/6
DI-N-BUTYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/6
FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/6
CARBAZOLE	UG/L	10 U	10 U	ND	ND		0/6
PYRENE	UG/L	10 U	10 U	ND	ND		0/6
BUTYL BENZYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/6
3,3-DICHLOROBENZIDINE	UG/L	10 U	10 U	ND	ND		0/6
BENZO(A)ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/6
CHRYSENE	UG/L	10 U	10 U	ND	ND		0/6
BIS(2-ETHYLHEXYL)PHTHALATE	UG/L	10 U	10 U	ND	ND		0/6
DI-N-OCTYL PHTHALATE	UG/L	10 U	10 U	ND	ND		0/6
BENZO(B)FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/6
BENZO(K)FLUORANTHENE	UG/L	10 U	10 U	ND	ND		0/6
BENZO(A)PYRENE	UG/L	10 U	10 U	ND	ND		0/6
INDENO(1,2,3-CD) PYRENE	UG/L	10 U	10 U	ND	ND		0/6
DIBENZ(A,H)ANTHRACENE	UG/L	10 U	10 U	ND	ND		0/6
BENZO(G,H,I)PERYLENE	UG/L	10 U	10 U	ND	ND		0/6

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-RV2-SW-06	6-RV3-SW-06	6-RV5-SW-06	6-RV6-SW-06	6-RV7-SW-06	6-RV8-SW-06
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/24/92	8/25/92	8/25/92	8/25/92	8/25/92
	Lab Id:	00439-14	00437-06	00439-16	00439-17	00437-15	00437-18
Parameter	Units						
ALUMINUM	UG/L	613	119 B	148 B	612	279	487
ANTIMONY	UG/L	49 U	14 U	49 U	49 U	14 U	14 U
ARSENIC	UG/L	2.2 B	3 U	3.5 B	2 U	3 U	10.5
BARIUM	UG/L	91 B	79.1 B	37.1 JB	39.5 JB	49.6 B	56.9 B
BERYLLIUM	UG/L	1 U	0.3 U	1 U	1 U	0.3 U	0.3 U
CADMIUM	UG/L	3.7 JB	1.9 U	4.3 JB	3 U	1.9 U	1.9 U
CALCIUM	UG/L	102000	79900	23100	19700	12300	15800
CHROMIUM	UG/L	8 U	3.6 U	5 U	5.7 U	6.5 B	4.2 B
COBALT	UG/L	6 U	2 U	6 U	6 U	2 U	2.3 B
COPPER	UG/L	9 JB	4.7 B	9 JB	5.7 JB	7.5 B	7.2 B
CYANIDE	UG/L	10 U	10 U	10 U	10 U	10 U	10 U
IRON	UG/L	733	127 J	641	827	1910	9600
LEAD	UG/L	6.1	1.9 B	4.8	8	2.8 B	12.2
MAGNESIUM	UG/L	7100	4650 B	1200 B	1930 B	2980 B	1790 B
MANGANESE	UG/L	319	38.6 J	597	204	267	253
MERCURY	UG/L	0.2 U	0.05 U	0.2 U	0.2 U	0.04 U	0.04 U
NICKEL	UG/L	17 U	7.9 U	17 U	17 U	7.9 U	7.9 U
POTASSIUM	UG/L	2910 B	2720 B	1620 B	393 B	607 B	844 B
SELENIUM	UG/L	5 UJ	5 U	5 U	5 U	5 U	5 UJ
SILVER	UG/L	10 U	3.6 B	10 U	67.6	2 U	2.9 B
SODIUM	UG/L	6480	4380 JB	2860 JB	5920	8260	8960
THALLIUM	UG/L	2 UJ	2 UJ	2 UJ	2 UJ	2 U	2 UJ
VANADIUM	UG/L	5 U	1.8 U	5 U	5 U	1.8 U	6.2 B
ZINC	UG/L	452	113	374	495	248	72.7

SITE 6 RAVINE SURFACE WATER
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: / Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
ALUMINUM	UG/L	NA	NA	119 B	613	6-RV2-SW-06	6/6
ANTIMONY	UG/L	14 U	49 U	ND	ND		0/6
ARSENIC	UG/L	2 U	3 U	2.2 B	10.5	6-RV8-SW-06	3/6
BARIUM	UG/L	NA	NA	37.1 JB	91 B	6-RV2-SW-06	6/6
BERYLLIUM	UG/L	0.3 U	1 U	ND	ND		0/6
CADMIUM	UG/L	1.9 U	3 U	3.7 JB	4.3 JB	6-RV5-SW-06	2/6
CALCIUM	UG/L	NA	NA	12300	102000	6-RV2-SW-06	6/6
CHROMIUM	UG/L	3.6 U	8 U	4.2 B	6.5 B	6-RV7-SW-06	2/6
COBALT	UG/L	2 U	6 U	2.3 B	2.3 B	6-RV8-SW-06	1/6
COPPER	UG/L	NA	NA	4.7 B	9 JB	6-RV5-SW-06	6/6
CYANIDE	UG/L	10 U	10 U	ND	ND		0/6
IRON	UG/L	NA	NA	127 J	9600	6-RV8-SW-06	6/6
LEAD	UG/L	NA	NA	1.9 B	12.2	6-RV8-SW-06	6/6
MAGNESIUM	UG/L	NA	NA	1200 B	7100	6-RV2-SW-06	6/6
MANGANESE	UG/L	NA	NA	38.6 J	597	6-RV5-SW-06	6/6
MERCURY	UG/L	0.04 U	0.2 U	ND	ND		0/6
NICKEL	UG/L	7.9 U	17 U	ND	ND		0/6
POTASSIUM	UG/L	NA	NA	393 B	2910 B	6-RV2-SW-06	6/6
SELENIUM	UG/L	5 UJ	5 UJ	ND	ND		0/6
SILVER	UG/L	2 U	10 U	2.9 B	67.6	6-RV6-SW-06	3/6
SODIUM	UG/L	NA	NA	2860 JB	8960	6-RV8-SW-06	6/6
THALLIUM	UG/L	2 UJ	2 UJ	ND	ND		0/6
VANADIUM	UG/L	1.8 U	5 U	6.2 B	6.2 B	6-RV8-SW-06	1/6
ZINC	UG/L	NA	NA	72.7	495	6-RV6-SW-06	6/6

APPENDIX E
DATA AND FREQUENCY SUMMARIES
SEDIMENT SAMPLES

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-WC01-SD-06B	6-WC01-SD-612D	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-22	00464-24	00445-03	00445-04	00445-05	00445-06
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
BETA-BHC	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
DELTA-BHC	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
GAMMA-BHC(LINDANE)	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
HEPTACHLOR	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
ALDRIN	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
HEPTACHLOR EPOXIDE	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
ENDOSULFAN I	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
DIELDRIN	UG/KG	4.6 UJ	4.8 J	4.6 U	4.9 U	30 U	23 U
4,4'-DDE	UG/KG	4.6 UJ	7.6 UJ	4.6 U	4.9 U	30 U	23 U
ENDRIN	UG/KG	4.6 UJ	4.8 UJ	4.6 U	4.9 U	30 U	23 U
ENDOSULFAN II	UG/KG	4.6 UJ	4.8 UJ	4.6 U	4.9 U	30 U	23 U
4,4'-DDD	UG/KG	4.6 UJ	16 J	4.6 U	4.9 U	30 U	23 U
ENDOSULFAN SULFATE	UG/KG	4.6 UJ	4.8 UJ	4.6 U	4.9 U	30 U	23 U
4,4'-DDT	UG/KG	4.6 UJ	4.8 UJ	4.6 U	4.9 U	30 U	23 U
METHOXYCHLOR	UG/KG	24 UJ	25 UJ	24 U	25 U	150 U	120 U
ENDRIN KETONE	UG/KG	4.6 UJ	4.8 UJ	4.6 U	4.9 U	30 U	23 U
ENDRIN ALDEHYDE	UG/KG	4.6 UJ	4.8 UJ	4.6 U	4.9 U	30 U	23 U
ALPHA CHLORDANE	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
GAMMA CHLORDANE	UG/KG	2.4 UJ	2.5 UJ	2.4 U	2.5 U	15 U	12 U
TOXAPHENE	UG/KG	240 UJ	250 UJ	240 U	250 U	1500 U	1200 U
PCB-1016	UG/KG	46 UJ	48 UJ	46 U	49 U	300 U	230 U
PCB-1221	UG/KG	93 UJ	98 UJ	93 U	100 U	600 U	460 U
PCB-1232	UG/KG	46 UJ	48 UJ	46 U	49 U	300 U	230 U
PCB-1242	UG/KG	46 UJ	48 UJ	46 U	49 U	300 U	230 U
PCB-1248	UG/KG	46 UJ	48 UJ	46 U	49 U	300 U	230 U
PCB-1254	UG/KG	46 UJ	48 UJ	46 U	49 U	300 U	230 U
PCB-1260	UG/KG	46 UJ	48 UJ	46 U	49 U	300 U	230 U
VOLATILES							
CHLOROMETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
BROMOMETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
VINYL CHLORIDE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
CHLOROETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
METHYLENE CHLORIDE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
ACETONE	UG/KG	26	16 UJ	320 J	95 J	8400 J	470 UJ
CARBON DISULFIDE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
1,1-DICHLOROETHENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
1,1-DICHLOROETHANE	UG/KG	16 U	16 U	21 UJ	14 UJ	1900 U	120 UJ
1,2-DICHLOROETHENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
CHLOROFORM	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
1,2-DICHLOROETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
2-BUTANONE	UG/KG	16 U	16 U	21 J	14 U	4200	120 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC01-SD-06B	6-WC01-SD-612D	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-22	00464-24	00445-03	00445-04	00445-05	00445-06
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
CARBON TETRACHLORIDE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
BROMODICHLOROMETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
1,2-DICHLOROPROPANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
CIS-1,3-DICHLOROPROPENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
TRICHLOROETHENE	UG/KG	16 U	16 U	23	7 J	1900 U	120 U
DIBROMOCHLOROMETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
1,1,2-TRICHLOROETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
BENZENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
BROMOFORM	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
4-METHYL-2-PENTANONE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
2-HEXANONE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
TETRACHLOROETHENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
TOLUENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
CHLOROBENZENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
ETHYLBENZENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
STYRENE	UG/KG	16 U	16 U	21 U	14 U	1900 U	120 U
TOTAL XYLENES	UG/KG	16 U	16 U	70	26	1900 U	120 J
SEMIVOLATILES							
PHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
BIS(2-CHLOROETHYL) ETHER	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2-CHLOROPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
1,3-DICHLOROBENZENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
1,4-DICHLOROBENZENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
1,2-DICHLOROBENZENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2-METHYLPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	460 U	490 UJ	460 U	490 U	990 U	450 UR
4-METHYLPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
N-NITROSODI-N-PROPYLAMINE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
HEXACHLOROETHANE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
NITROBENZENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
ISOPHORONE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2-NITROPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,4-DIMETHYLPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
BIS(2-CHLOROETHOXY) METHANE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,4-DICHLOROPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
1,2,4-TRICHLOROBENZENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
NAPHTHALENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
4-CHLORANILINE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
HEXACHLOROBUTADIENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC01-SD-06B	6-WC01-SD-612D	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00464-22	00464-24	00445-03	00445-04	00445-05	00445-06
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2-METHYLNAPHTHALENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
HEXACHLOROCYCLOPENTADIENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,4,6-TRICHLOROPHENOL	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,4,5-TRICHLOROPHENOL	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
2-CHLORONAPHTHALENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2-NITROANILINE	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
DIMETHYL PHTHALATE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
ACENAPHTHYLENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,6-DINITROTOLUENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
3-NITROANILINE	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
ACENAPHTHENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,4-DINITROPHENOL	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
4-NITROPHENOL	UG/KG	1100 U	1200 UJ	1100 U	1200 U	2400 U	1100 UR
DIBENZOFURAN	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
2,4-DINITROTOLUENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
DIETHYL PHTHALATE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
4-CHLOROPHENYL PHENYL ETHER	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
FLUORENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
4-NITROANILINE	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
N-NITRISODIPHENYLAMINE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
4-BROMOPHENYL PHENYL ETHER	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
HEXACHLOROBENZENE	UG/KG	460 U	490 UJ	460 U	490 U	990 U	450 UR
PENTACHLOROPHENOL	UG/KG	1100 U	1200 U	1100 U	1200 U	2400 U	1100 UR
PHENANTHRENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
ANTHRACENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
DI-N-BUTYL PHTHALATE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
FLUORANTHENE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
CARBAZOLE	UG/KG	460 U	490 U	460 U	490 U	990 U	450 UR
PYRENE	UG/KG	460 U	490 U	460 U	490 UJ	990 UJ	450 UR
BUTYL BENZYL PHTHALATE	UG/KG	460 U	490 U	460 U	490 UJ	990 UJ	450 UR
3,3-DICHLOROBENZIDINE	UG/KG	460 U	490 U	460 U	490 UJ	990 UJ	450 UR
BENZO(A)ANTHRACENE	UG/KG	460 U	490 U	460 U	490 UJ	990 UJ	450 UR
CHRYSENE	UG/KG	460 U	490 U	460 U	490 UJ	990 UJ	450 UR
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	460 U	490 U	460 U	490 UJ	990 UJ	1200 UR
DI-N-OCTYL PHTHALATE	UG/KG	460 UJ	490 U	460 U	490 UJ	990 UJ	450 UR
BENZO(B)FLUORANTHENE	UG/KG	460 UJ	490 U	460 U	490 UJ	990 UJ	450 UR
BENZO(K)FLUORANTHENE	UG/KG	460 UJ	490 U	460 U	490 UJ	990 UJ	450 UR
BENZO(A)PYRENE	UG/KG	460 UJ	63 J	460 U	490 UJ	990 UJ	450 UR
INDENO(1,2,3-CD) PYRENE	UG/KG	460 UJ	490 UJ	460 U	490 UJ	990 UJ	450 UR
DIBENZ(A,H)ANTHRACENE	UG/KG	460 UJ	490 UJ	460 U	490 UJ	990 UJ	450 UR
BENZO(G,H,I)PERYLENE	UG/KG	460 UJ	490 UJ	460 U	490 UJ	990 UJ	450 UR

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC03-SD-612B	6-WC04-SD-06B	6-WC04-SD-06M	6-WC04-SD-612B	6-WC05-SD-06B	6-WC05-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
Lab Id:		00445-07	00445-08	00445-09	00445-10	00445-11	00445-13
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
BETA-BHC	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
DELTA-BHC	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
GAMMA-BHC(LINDANE)	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
HEPTACHLOR	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
ALDRIN	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
HEPTACHLOR EPOXIDE	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
ENDOSULFAN I	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
DIELDRIN	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
4,4'-DDE	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
ENDRIN	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
ENDOSULFAN II	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
4,4'-DDD	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
ENDOSULFAN SULFATE	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
4,4'-DDT	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
METHOXYCHLOR	UG/KG	47 U	240 U	65 U	24 U	25 U	56 UJ
ENDRIN KETONE	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
ENDRIN ALDEHYDE	UG/KG	9.2 U	47 U	13 U	4.6 U	4.9 U	11 UJ
ALPHA CHLORDANE	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
GAMMA CHLORDANE	UG/KG	4.7 U	24 U	6.5 U	2.4 U	2.5 U	5.6 UJ
TOXAPHENE	UG/KG	470 U	2400 U	650 U	240 U	250 U	560 UJ
PCB-1016	UG/KG	92 U	470 U	130 U	46 U	49 U	110 UJ
PCB-1221	UG/KG	190 U	940 U	260 U	93 U	100 U	220 UJ
PCB-1232	UG/KG	92 U	470 U	130 U	46 U	49 U	110 UJ
PCB-1242	UG/KG	92 U	470 U	130 U	46 U	49 U	110 UJ
PCB-1248	UG/KG	92 U	470 U	130 U	46 U	49 U	110 UJ
PCB-1254	UG/KG	92 U	470 U	130 U	46 U	49 U	110 UJ
PCB-1260	UG/KG	92 U	470 U	760	46 U	49 U	330 J
VOLATILES							
CHLOROMETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
BROMOMETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
VINYL CHLORIDE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
CHLOROETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
METHYLENE CHLORIDE	UG/KG	910 J	19 U	17 U	19 U	16 U	16 U
ACETONE	UG/KG	15000 J	180 J	54 UJ	160 J	25 UJ	110 UJ
CARBON DISULFIDE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
1,1-DICHLOROETHENE	UG/KG	2200 U	19 UJ	17 UJ	19 UJ	16 UJ	16 U
1,1-DICHLOROETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
1,2-DICHLOROETHENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
CHLOROFORM	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
1,2-DICHLOROETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
2-BUTANONE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC03-SD-612B	6-WC04-SD-06B	6-WC04-SD-06M	6-WC04-SD-612B	6-WC05-SD-06B	6-WC05-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
Lab Id:		00445-07	00445-08	00445-09	00445-10	00445-11	00445-13
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
CARBON TETRACHLORIDE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 UJ
BROMODICHLOROMETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
1,2-DICHLOROPROPANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
CIS-1,3-DICHLOROPROPENE	UG/KG	2200 U	19 UJ	17 UJ	19 UJ	16 UJ	16 U
TRICHLOROETHENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
DIBROMOCHLOROMETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
1,1,2-TRICHLOROETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
BENZENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
BROMOFORM	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
4-METHYL-2-PENTANONE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
2-HEXANONE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
TETRACHLOROETHENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
TOLUENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
CHLOROBENZENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
ETHYLBENZENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
STYRENE	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
TOTAL XYLENES	UG/KG	2200 U	19 U	17 U	19 U	16 U	16 U
SEMIVOLATILES							
PHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	120 J
BIS(2-CHLOROETHYL) ETHER	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2-CHLOROPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
1,3-DICHLOROBENZENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
1,4-DICHLOROBENZENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
1,2-DICHLOROBENZENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2-METHYLPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
4-METHYLPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
HEXACHLOROETHANE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
NITROBENZENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
ISOPHORONE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2-NITROPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,4-DIMETHYLPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,4-DICHLOROPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
1,2,4-TRICHLOROBENZENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
NAPHTHALENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
4-CHLORANILINE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
HEXACHLOROBUTADIENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC03-SD-612B	6-WC04-SD-06B	6-WC04-SD-06M	6-WC04-SD-612B	6-WC05-SD-06B	6-WC05-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
Lab Id:		00445-07	00445-08	00445-09	00445-10	00445-11	00445-13
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2-METHYLNAPHTHALENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,4,6-TRICHLOROPHENOL	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,4,5-TRICHLOROPHENOL	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
2-CHLORONAPHTHALENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2-NITROANILINE	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
DIMETHYL PHTHALATE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
ACENAPHTHYLENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,6-DINITROTOLUENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
3-NITROANILINE	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
ACENAPHTHENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,4-DINITROPHENOL	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
4-NITROPHENOL	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
DIBENZOFURAN	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
2,4-DINITROTOLUENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
DIETHYL PHTHALATE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
FLUORENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
4-NITROANILINE	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
N-NITRISODIPHENYLAMINE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
HEXACHLOROBENZENE	UG/KG	910 U	470 UR	420 U	460 U	490 UJ	1100 UJ
PENTACHLOROPHENOL	UG/KG	2200 U	1100 UR	1000 U	1100 U	1200 U	2600 U
PHENANTHRENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
ANTHRACENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
DI-N-BUTYL PHTHALATE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
FLUORANTHENE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
CARBAZOLE	UG/KG	910 U	470 UR	420 U	460 U	490 U	1100 U
PYRENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
BUTYL BENZYL PHTHALATE	UG/KG	910 U	200 J	420 UJ	460 U	490 U	1100 U
3,3-DICHLOROBENZIDINE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
BENZO(A)ANTHRACENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
CHRYSENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
DI-N-OCTYL PHTHALATE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
BENZO(B)FLUORANTHENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
BENZO(K)FLUORANTHENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 U	1100 U
BENZO(A)PYRENE	UG/KG	910 U	470 UR	420 UJ	460 U	850 J	1100 U
INDENO(1,2,3-CD) PYRENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 UJ	1100 UJ
DIBENZ(A,H)ANTHRACENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 UJ	1100 UJ
BENZO(G,H,I)PERYLENE	UG/KG	910 U	470 UR	420 UJ	460 U	490 UJ	1100 UJ

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-WC05-SD-612B	6-WC06-SD-06B	6-WC06-SD-06M	6-WC06-SD-612B	6-WC06-SD-612M	6-WC07-SD-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/27/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00445-14	00429-01	00429-02	00429-03	00429-04	00429-07
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
BETA-BHC	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
DELTA-BHC	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
GAMMA-BHC(LINDANE)	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
HEPTACHLOR	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
ALDRIN	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
HEPTACHLOR EPOXIDE	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
ENDOSULFAN I	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
DIELDRIN	UG/KG	4.7 U	27 UJ	6.9 U	12 UJ	4.1 U	33 UJ
4,4'-DDE	UG/KG	4.7 U	25 J	6.9 U	16 J	7.9 J	48 J
ENDRIN	UG/KG	4.7 U	27 UJ	6.9 U	12 UJ	4.1 U	33 UJ
ENDOSULFAN II	UG/KG	4.7 U	27 UJ	6.9 U	12 UJ	4.1 U	33 UJ
4,4'-DDD	UG/KG	4.7 U	80 J	6.9 U	12 UJ	4.1 U	33 UJ
ENDOSULFAN SULFATE	UG/KG	4.7 U	27 UJ	6.9 U	12 UJ	4.1 U	33 UJ
4,4'-DDT	UG/KG	4.7 U	200 J	6.9 U	12 UJ	4.1 U	33 UJ
METHOXYCHLOR	UG/KG	24 U	140 UJ	35 U	61 UJ	21 U	170 UJ
ENDRIN KETONE	UG/KG	4.7 U	27 UJ	6.9 U	12 UJ	4.1 U	33 UJ
ENDRIN ALDEHYDE	UG/KG	4.7 U	27 UJ	6.9 U	12 UJ	4.1 U	33 UJ
ALPHA CHLORDANE	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
GAMMA CHLORDANE	UG/KG	2.4 U	14 UJ	3.5 U	6.1 UJ	2.1 U	17 UJ
TOXAPHENE	UG/KG	240 U	1400 UJ	350 U	610 UJ	210 U	1700 UJ
PCB-1016	UG/KG	47 U	270 UJ	69 U	120 UJ	41 U	330 UJ
PCB-1221	UG/KG	94 U	550 UJ	140 U	240 UJ	83 U	660 UJ
PCB-1232	UG/KG	47 U	270 UJ	69 U	120 UJ	41 U	330 UJ
PCB-1242	UG/KG	47 U	270 UJ	69 U	120 UJ	41 U	330 UJ
PCB-1248	UG/KG	47 U	270 UJ	69 U	120 UJ	41 U	330 UJ
PCB-1254	UG/KG	47 U	270 UJ	69 U	120 UJ	41 U	330 UJ
PCB-1260	UG/KG	47 U	1300 J	400 J	120 UJ	41 U	330 UJ
VOLATILES							
CHLOROMETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
BROMOMETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
VINYL CHLORIDE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
CHLOROETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
METHYLENE CHLORIDE	UG/KG	14 U	42 U	21 U	36 U	13 U	30 J
ACETONE	UG/KG	14 UJ	42 U	240	220	44 U	160 UJ
CARBON DISULFIDE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
1,1-DICHLOROETHENE	UG/KG	14 UJ	42 U	21 U	36 U	13 U	100 U
1,1-DICHLOROETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
1,2-DICHLOROETHENE	UG/KG	14 U	42 U	21 U	36 U	13 U	31 J
CHLOROFORM	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
1,2-DICHLOROETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
2-BUTANONE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC05-SD-612B	6-WC06-SD-06B	6-WC06-SD-06M	6-WC06-SD-612B	6-WC06-SD-612M	6-WC07-SD-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/27/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00445-14	00429-01	00429-02	00429-03	00429-04	00429-07
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
CARBON TETRACHLORIDE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
BROMODICHLOROMETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
1,2-DICHLOROPROPANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
CIS-1,3-DICHLOROPROPENE	UG/KG	14 UJ	42 U	21 U	36 U	13 U	100 U
TRICHLOROETHENE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
DIBROMOCHLOROMETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
1,1,2-TRICHLOROETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
BENZENE	UG/KG	14 U	42 UJ	21 UJ	36 UJ	13 UJ	100 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
BROMOFORM	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
4-METHYL-2-PENTANONE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
2-HEXANONE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
TETRACHLOROETHENE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
TOLUENE	UG/KG	4 J	42 UJ	5 J	36 UJ	13 UJ	100 U
CHLOROBENZENE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
ETHYLBENZENE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
STYRENE	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
TOTAL XYLENES	UG/KG	14 U	42 U	21 U	36 U	13 U	100 U
SEMIVOLATILES							
PHENOL	UG/KG	460 UJ	190 J	690 U	1200 U	420 U	3200 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	460 UJ	1400 U	690 U	1200 U	420 U	3200 U
2-CHLOROPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
1,3-DICHLOROBENZENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
1,4-DICHLOROBENZENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
1,2-DICHLOROBENZENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2-METHYLPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
4-METHYLPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	460 UJ	1400 U	690 U	1200 U	420 U	3200 U
HEXACHLOROETHANE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
NITROBENZENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
ISOPHORONE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2-NITROPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,4-DIMETHYLPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	460 UJ	1400 U	690 U	1200 U	420 U	3200 U
2,4-DICHLOROPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
1,2,4-TRICHLOROBENZENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
NAPHTHALENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
4-CHLORANILINE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
HEXACHLOROBUTADIENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC05-SD-612B	6-WC06-SD-06B	6-WC06-SD-06M	6-WC06-SD-612B	6-WC06-SD-612M	6-WC07-SD-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/27/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00445-14	00429-01	00429-02	00429-03	00429-04	00429-07
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2-METHYLNAPHTHALENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,4,6-TRICHLOROPHENOL	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,4,5-TRICHLOROPHENOL	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
2-CHLORONAPHTHALENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2-NITROANILINE	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
DIMETHYL PHTHALATE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
ACENAPHTHYLENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,6-DINITROTOLUENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
3-NITROANILINE	UG/KG	1100 U	3300 UJ	1700 U	2800 U	1000 UJ	7900 U
ACENAPHTHENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,4-DINITROPHENOL	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
4-NITROPHENOL	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
DIBENZOFURAN	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
2,4-DINITROTOLUENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
DIETHYL PHTHALATE	UG/KG	460 U	530 J	690 U	1200 U	420 U	3200 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
FLUORENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
4-NITROANILINE	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
N-NITRISODIPHENYLAMINE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
HEXACHLOROBENZENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
PENTACHLOROPHENOL	UG/KG	1100 U	3300 U	1700 U	2800 U	1000 U	7900 U
PHENANTHRENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
ANTHRACENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
DI-N-BUTYL PHTHALATE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
FLUORANTHENE	UG/KG	460 U	290 J	100 J	1200 U	420 U	3200 U
CARBAZOLE	UG/KG	460 U	1400 UJ	690 U	1200 U	420 UJ	3200 U
PYRENE	UG/KG	460 U	210 J	200 J	1200 U	420 UJ	3200 U
BUTYL BENZYL PHTHALATE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	920 J
3,3-DICHLOROBENZIDINE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BENZO(A)ANTHRACENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
CHRYSENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
DI-N-OCTYL PHTHALATE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BENZO(B)FLUORANTHENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BENZO(K)FLUORANTHENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BENZO(A)PYRENE	UG/KG	1600	1400 U	690 U	1200 U	420 U	3200 U
INDENO(1,2,3-CD) PYRENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
DIBENZ(A,H)ANTHRACENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U
BENZO(G,H,I)PERYLENE	UG/KG	460 U	1400 U	690 U	1200 U	420 U	3200 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC07-SD-06M	6-WC07-SD-612M	6-WC08-SD-06B	6-WC08-SD-06M	6-WC08-SD-612B	6-WC08-SD-612M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
	Lab Id:	00429-08	00429-09	00429-13	00429-15	00429-16	00429-17
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
BETA-BHC	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
DELTA-BHC	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
GAMMA-BHC(LINDANE)	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
HEPTACHLOR	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
ALDRIN	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
HEPTACHLOR EPOXIDE	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
ENDOSULFAN I	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
DIELDRIN	UG/KG	26 U	8.1 U	35 U	23 UJ	6.3 U	7.1 U
4,4'-DDE	UG/KG	26 U	8.1 U	47 J	18 J	27.9	7.6 J
ENDRIN	UG/KG	26 U	8.1 U	35 U	23 UJ	6.3 U	7.1 U
ENDOSULFAN II	UG/KG	26 U	8.1 U	35 U	23 UJ	6.3 U	7.1 U
4,4'-DDD	UG/KG	26 U	67	50 J	200 J	23 J	49
ENDOSULFAN SULFATE	UG/KG	26 U	8.1 U	35 U	23 UJ	6.3 U	7.1 U
4,4'-DDT	UG/KG	26 U	220 J	35 U	1200 J	6.3 U	7.1 U
METHOXYCHLOR	UG/KG	130 U	42 U	180 U	120 UJ	32 U	36 U
ENDRIN KETONE	UG/KG	26 U	8.1 U	35 U	23 UJ	6.3 U	7.1 U
ENDRIN ALDEHYDE	UG/KG	26 U	8.1 U	35 U	23 UJ	6.3 U	7.1 U
ALPHA CHLORDANE	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
GAMMA CHLORDANE	UG/KG	13 U	4.2 U	18 U	12 UJ	3.2 U	3.6 U
TOXAPHENE	UG/KG	1300 U	420 U	1800 U	1200 UJ	320 U	360 U
PCB-1016	UG/KG	260 U	81 U	350 U	230 UJ	63 U	71 U
PCB-1221	UG/KG	520 U	160 U	710 U	480 UJ	130 U	140 U
PCB-1232	UG/KG	260 U	81 U	350 U	230 UJ	63 U	71 U
PCB-1242	UG/KG	260 U	81 U	350 U	230 UJ	63 U	71 U
PCB-1248	UG/KG	260 U	81 U	350 U	230 UJ	63 U	71 U
PCB-1254	UG/KG	260 U	81 U	350 U	230 UJ	63 U	71 U
PCB-1260	UG/KG	2000 J	81 U	310 J	2100 J	32 J	71 U
VOLATILES							
CHLOROMETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
BROMOMETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
VINYL CHLORIDE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
CHLOROETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
METHYLENE CHLORIDE	UG/KG	1200 U	6 J	36 U	24 U	48 U	22 U
ACETONE	UG/KG	1800 U	12 U	70 UJ	350	590 J	22 U
CARBON DISULFIDE	UG/KG	1200 U	2 J	36 U	24 U	5 J	22 U
1,1-DICHLOROETHENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
1,1-DICHLOROETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
1,2-DICHLOROETHENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
CHLOROFORM	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
1,2-DICHLOROETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
2-BUTANONE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC07-SD-06M	6-WC07-SD-612M	6-WC08-SD-06B	6-WC08-SD-06M	6-WC08-SD-612B	6-WC08-SD-612M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-08	00429-09	00429-13	00429-15	00429-16	00429-17
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
CARBON TETRACHLORIDE	UG/KG	1200 UJ	12 U	36 U	24 U	48 U	22 U
BROMODICHLOROMETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
1,2-DICHLOROPROPANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
CIS-1,3-DICHLOROPROPENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
TRICHLOROETHENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
DIBROMOCHLOROMETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
1,1,2-TRICHLOROETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
BENZENE	UG/KG	1200 U	12 U	36 U	24 UJ	48 U	22 UJ
TRANS-1,3-DICHLOROPROPENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
BROMOFORM	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
4-METHYL-2-PENTANONE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 U
2-HEXANONE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
TETRACHLOROETHENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
1,1,2,2-TETRACHLOROETHANE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
TOLUENE	UG/KG	1200 U	12 U	36 U	24 UJ	48 U	22 UJ
CHLOROBENZENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
ETHYLBENZENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
STYRENE	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
TOTAL XYLENES	UG/KG	1200 U	12 U	36 U	24 U	48 U	22 UJ
SEMIVOLATILES							
PHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2-CHLOROPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
1,3-DICHLOROBENZENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
1,4-DICHLOROBENZENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
1,2-DICHLOROBENZENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2-METHYLPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
4-METHYLPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	640 U	410 U	1200 U	770 UJ	630 U	710 U
HEXACHLOROETHANE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
NITROBENZENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
ISOPHORONE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2-NITROPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,4-DIMETHYLPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,4-DICHLOROPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
1,2,4-TRICHLOROBENZENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
NAPHTHALENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
4-CHLORANILINE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
HEXACHLOROBUTADIENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-WC07-SD-06M	6-WC07-SD-612M	6-WC08-SD-06B	6-WC08-SD-06M	6-WC08-SD-612B	6-WC08-SD-612M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00429-08	00429-09	00429-13	00429-15	00429-16	00429-17
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2-METHYLNAPHTHALENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,4,6-TRICHLOROPHENOL	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,4,5-TRICHLOROPHENOL	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
2-CHLORONAPHTHALENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2-NITROANILINE	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
DIMETHYL PHTHALATE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
ACENAPHTHYLENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,6-DINITROTOLUENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
3-NITROANILINE	UG/KG	1600 U	990 UJ	2800 U	1900 U	1500 U	1700 U
ACENAPHTHENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,4-DINITROPHENOL	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
4-NITROPHENOL	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
DIBENZOFURAN	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
2,4-DINITROTOLUENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
DIETHYL PHTHALATE	UG/KG	640 U	410 U	1200 U	120 J	630 U	710 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
FLUORENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
4-NITROANILINE	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
N-NITRISODIPHENYLAMINE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
HEXACHLOROBENZENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
PENTACHLOROPHENOL	UG/KG	1600 U	990 U	2800 U	1900 U	1500 U	1700 U
PHENANTHRENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	76 J
ANTHRACENE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
DI-N-BUTYL PHTHALATE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
FLUORANTHENE	UG/KG	640 U	410 U	760 J	250 J	180 J	94 J
CARBAZOLE	UG/KG	640 U	410 UJ	1200 U	770 U	630 U	710 U
PYRENE	UG/KG	95 J	410 UJ	810 J	220 J	350 J	130 J
BUTYL BENZYL PHTHALATE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
3,3-DICHLOROBENZIDINE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
BENZO(A)ANTHRACENE	UG/KG	640 U	410 U	210 J	770 U	67 J	710 U
CHRYSENE	UG/KG	640 U	410 U	230 J	770 U	74 J	710 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	640 U	410 U	1200 U	770 U	630 U	710 U
DI-N-OCTYL PHTHALATE	UG/KG	640 U	410 U	1200 U	770 UJ	630 U	710 U
BENZO(B)FLUORANTHENE	UG/KG	640 U	410 U	420 J	140 J	95 J	710 U
BENZO(K)FLUORANTHENE	UG/KG	640 U	410 U	140 J	770 UJ	67 J	710 U
BENZO(A)PYRENE	UG/KG	640 U	410 U	150 J	770 UJ	630 U	710 U
INDENO(1,2,3-CD) PYRENE	UG/KG	640 U	410 U	1200 U	770 UJ	630 U	710 U
DIBENZ(A,H)ANTHRACENE	UG/KG	640 U	410 U	1200 U	770 UJ	630 U	710 U
BENZO(G,H,I)PERYLENE	UG/KG	640 U	410 U	1200 U	770 UJ	630 U	710 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-WC09-SD-06B	6-WC09-SD-06M	6-WC09-SD-612B	6-WC09-SD-612M	6-WC10-SD-06B	6-WC10-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-21	00429-22	00429-23	00429-24	00426-02	00426-04
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
BETA-BHC	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
DELTA-BHC	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
GAMMA-BHC(LINDANE)	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 UJ
HEPTACHLOR	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
ALDRIN	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
HEPTACHLOR EPOXIDE	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
ENDOSULFAN I	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
DIELDRIN	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
4,4'-DDE	UG/KG	5.9	69	16 U	83	30 UJ	32
ENDRIN	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
ENDOSULFAN II	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
4,4'-DDD	UG/KG	7.4 J	80 J	16 J	49 J	30 UJ	44
ENDOSULFAN SULFATE	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
4,4'-DDT	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
METHOXYCHLOR	UG/KG	26 U	110 U	84 U	150 U	150 UJ	70 U
ENDRIN KETONE	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
ENDRIN ALDEHYDE	UG/KG	5 U	22 U	16 U	30 U	30 UJ	14 U
ALPHA CHLORDANE	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
GAMMA CHLORDANE	UG/KG	2.6 U	11 U	8.4 U	15 U	15 UJ	7 U
TOXAPHENE	UG/KG	260 U	1100 U	840 U	1500 U	1500 UJ	700 U
PCB-1016	UG/KG	50 U	220 U	160 U	300 U	300 UJ	140 U
PCB-1221	UG/KG	100 U	450 U	330 U	610 U	600 UJ	280 U
PCB-1232	UG/KG	50 U	220 U	160 U	300 U	300 UJ	140 U
PCB-1242	UG/KG	50 U	220 U	160 U	300 U	300 UJ	140 U
PCB-1248	UG/KG	50 U	220 U	160 U	300 U	300 UJ	140 U
PCB-1254	UG/KG	50 U	220 U	160 U	300 U	300 UJ	140 U
PCB-1260	UG/KG	31 J	290 J	160 U	730 J	300 UJ	420
VOLATILES							
CHLOROMETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
BROMOMETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
VINYL CHLORIDE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
CHLOROETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
METHYLENE CHLORIDE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
ACETONE	UG/KG	240	170 UJ	24000 J	140 UJ	110 U	140 J
CARBON DISULFIDE	UG/KG	15 U	67 U	3100 U	5 J	110 U	56 U
1,1-DICHLOROETHENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
1,1-DICHLOROETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
1,2-DICHLOROETHENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
CHLOROFORM	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
1,2-DICHLOROETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
2-BUTANONE	UG/KG	15 U	67 U	9300	30 U	110 U	56 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC09-SD-06B	6-WC09-SD-06M	6-WC09-SD-612B	6-WC09-SD-612M	6-WC10-SD-06B	6-WC10-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-21	00429-22	00429-23	00429-24	00426-02	00426-04
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
CARBON TETRACHLORIDE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
BROMODICHLOROMETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
1,2-DICHLOROPROPANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
CIS-1,3-DICHLOROPROPENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
TRICHLOROETHENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
DIBROMOCHLOROMETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
1,1,2-TRICHLOROETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
BENZENE	UG/KG	15 UJ	67 U	3100 U	30 U	110 U	56 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
BROMOFORM	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
4-METHYL-2-PENTANONE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
2-HEXANONE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
TETRACHLOROETHENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
TOLUENE	UG/KG	15 UJ	67 U	3100 U	30 U	110 U	56 U
CHLOROBENZENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
ETHYLBENZENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
STYRENE	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
TOTAL XYLENES	UG/KG	15 U	67 U	3100 U	30 U	110 U	56 U
SEMIVOLATILES							
PHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2-CHLOROPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
1,3-DICHLOROBENZENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
1,4-DICHLOROBENZENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 UJ
1,2-DICHLOROBENZENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2-METHYLPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
4-METHYLPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	500 U	2200 UJ	1600 U	980 UJ	3000 U	1400 UJ
HEXACHLOROETHANE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
NITROBENZENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
ISOPHORONE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2-NITROPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,4-DIMETHYLPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,4-DICHLOROPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
1,2,4-TRICHLOROBENZENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 UJ
NAPHTHALENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
4-CHLORANILINE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
HEXACHLOROBUTADIENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC09-SD-06B	6-WC09-SD-06M	6-WC09-SD-612B	6-WC09-SD-612M	6-WC10-SD-06B	6-WC10-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
Lab Id:		00429-21	00429-22	00429-23	00429-24	00426-02	00426-04
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 UJ
2-METHYLNAPHTHALENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,4,6-TRICHLOROPHENOL	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,4,5-TRICHLOROPHENOL	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 U
2-CHLORONAPHTHALENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2-NITROANILINE	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 U
DIMETHYL PHTHALATE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
ACENAPHTHYLENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,6-DINITROTOLUENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
3-NITROANILINE	UG/KG	1200 U	5300 U	4000 UJ	2400 UJ	7200 UJ	3300 U
ACENAPHTHENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 UJ
2,4-DINITROPHENOL	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 U
4-NITROPHENOL	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 U
DIBENZOFURAN	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
2,4-DINITROTOLUENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 UJ
DIETHYL PHTHALATE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
FLUORENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
4-NITROANILINE	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 U
N-NITRISODIPHENYLAMINE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
HEXACHLOROBENZENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
PENTACHLOROPHENOL	UG/KG	1200 U	5300 U	4000 U	2400 UJ	7200 U	3300 UJ
PHENANTHRENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
ANTHRACENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
DI-N-BUTYL PHTHALATE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
FLUORANTHENE	UG/KG	330 J	2200 U	1600 U	250 J	3000 U	260 J
CARBAZOLE	UG/KG	500 U	2200 U	1600 UJ	980 UJ	3000 UJ	1400 U
PYRENE	UG/KG	410 J	2200 U	1600 UJ	190 J	3000 UJ	300 J
BUTYL BENZYL PHTHALATE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
3,3-DICHLOROBENZIDINE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
BENZO(A)ANTHRACENE	UG/KG	120 J	2200 U	1600 U	980 UJ	3000 U	1400 U
CHRYSENE	UG/KG	74 J	2200 U	1600 U	980 UJ	3000 U	1400 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	500 U	2200 U	2100 U	980 UJ	3000 U	1400 U
DI-N-OCTYL PHTHALATE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
BENZO(B)FLUORANTHENE	UG/KG	140 J	2200 U	190 J	980 UJ	3000 U	1400 U
BENZO(K)FLUORANTHENE	UG/KG	500 U	2200 U	1600 U	980 UJ	3000 U	1400 U
BENZO(A)PYRENE	UG/KG	75 J	2200 U	1600 U	480 J	3000 U	1400 U
INDENO(1,2,3-CD) PYRENE	UG/KG	500 U	2200 UJ	1600 U	980 UJ	3000 U	1400 U
DIBENZ(A,H)ANTHRACENE	UG/KG	500 U	2200 UJ	1600 U	980 UJ	3000 U	1400 U
BENZO(G,H,I)PERYLENE	UG/KG	500 U	2200 UJ	1600 U	980 UJ	3000 U	1400 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC10-SD-612M	6-WC11-SD-06B	6-WC11-SD-06M
	Depth:	N/A	N/A	N/A
	Date Sampled:	8/22/92	8/22/92	8/22/92
	Lab Id:	00426-05	00426-10	00426-11
Parameter	Units			
PESTICIDE/PCBS				
ALPHA-BHC	UG/KG	4.1 UJ	17 U	6.2 UJ
BETA-BHC	UG/KG	4.1 UJ	17 U	6.2 UJ
DELTA-BHC	UG/KG	4.1 UJ	17 U	6.2 UJ
GAMMA-BHC(LINDANE)	UG/KG	4.1 UJ	17 UJ	6.2 UJ
HEPTACHLOR	UG/KG	4.1 UJ	17 U	6.2 UJ
ALDRIN	UG/KG	4.1 UJ	17 U	6.2 UJ
HEPTACHLOR EPOXIDE	UG/KG	4.1 UJ	17 U	6.2 UJ
ENDOSULFAN I	UG/KG	4.1 UJ	17 U	6.2 UJ
DIELDRIN	UG/KG	8 UJ	33 U	12 UJ
4,4'-DDE	UG/KG	34 J	33 U	25 J
ENDRIN	UG/KG	8 UJ	33 U	12 UJ
ENDOSULFAN II	UG/KG	8 UJ	33 U	12 UJ
4,4'-DDD	UG/KG	43 J	35 J	42 J
ENDOSULFAN SULFATE	UG/KG	8 UJ	33 U	12 UJ
4,4'-DDT	UG/KG	8 UJ	33 U	12 UJ
METHOXYCHLOR	UG/KG	41 UJ	170 U	62 UJ
ENDRIN KETONE	UG/KG	8 UJ	33 U	12 UJ
ENDRIN ALDEHYDE	UG/KG	8 UJ	33 U	12 UJ
ALPHA CHLORDANE	UG/KG	4.1 UJ	17 U	6.2 UJ
GAMMA CHLORDANE	UG/KG	4.1 UJ	17 U	6.2 UJ
TOXAPHENE	UG/KG	410 UJ	1700 U	620 UJ
PCB-1016	UG/KG	80 UJ	330 U	120 UJ
PCB-1221	UG/KG	160 UJ	670 U	250 UJ
PCB-1232	UG/KG	80 UJ	330 U	120 UJ
PCB-1242	UG/KG	80 UJ	330 U	120 UJ
PCB-1248	UG/KG	80 UJ	330 U	120 UJ
PCB-1254	UG/KG	80 UJ	330 U	120 UJ
PCB-1260	UG/KG	160 J	330 U	120 J
VOLATILES				
CHLOROMETHANE	UG/KG	29 U	110 U	32 U
BROMOMETHANE	UG/KG	29 U	110 U	32 U
VINYL CHLORIDE	UG/KG	29 U	110 U	32 U
CHLOROETHANE	UG/KG	29 U	110 U	32 U
METHYLENE CHLORIDE	UG/KG	29 U	110 U	32 U
ACETONE	UG/KG	200 J	330 J	72 J
CARBON DISULFIDE	UG/KG	24 J	110 U	15 J
1,1-DICHLOROETHENE	UG/KG	29 U	110 U	32 U
1,1-DICHLOROETHANE	UG/KG	29 U	110 U	32 U
1,2-DICHLOROETHENE	UG/KG	29 U	110 U	32 U
CHLOROFORM	UG/KG	29 U	110 U	32 U
1,2-DICHLOROETHANE	UG/KG	29 U	110 U	32 U
2-BUTANONE	UG/KG	22 J	110 U	32 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-WC10-SD-612M	6-WC11-SD-06B	6-WC11-SD-06M
	Depth:	N/A	N/A	N/A
	Date Sampled:	8/22/92	8/22/92	8/22/92
	Lab Id:	00426-05	00426-10	00426-11
Parameter	Units			
VOLATILES Cont.				
1,1,1-TRICHLOROETHANE	UG/KG	29 U	110 U	32 U
CARBON TETRACHLORIDE	UG/KG	29 U	110 U	32 U
BROMODICHLOROMETHANE	UG/KG	29 U	110 U	32 U
1,2-DICHLOROPROPANE	UG/KG	29 U	110 U	32 U
CIS-1,3-DICHLOROPROPENE	UG/KG	29 U	110 U	32 U
TRICHLOROETHENE	UG/KG	29 U	110 U	32 U
DIBROMOCHLOROMETHANE	UG/KG	29 U	110 U	32 U
1,1,2-TRICHLOROETHANE	UG/KG	29 U	110 U	32 U
BENZENE	UG/KG	29 U	110 U	32 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	29 U	110 U	32 U
BROMOFORM	UG/KG	29 U	110 U	32 U
4-METHYL-2-PENTANONE	UG/KG	29 U	110 U	32 U
2-HEXANONE	UG/KG	29 U	110 U	32 U
TETRACHLOROETHENE	UG/KG	29 U	110 U	32 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	29 U	110 U	32 U
TOLUENE	UG/KG	29 U	110 U	32 U
CHLOROBENZENE	UG/KG	29 U	110 U	32 U
ETHYLBENZENE	UG/KG	29 U	110 U	32 U
STYRENE	UG/KG	29 U	110 U	32 U
TOTAL XYLENES	UG/KG	29 U	110 U	32 U
SEMIVOLATILES				
PHENOL	UG/KG	790 U	3300 UR	1200 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	790 U	3300 UR	1200 U
2-CHLOROPHENOL	UG/KG	790 U	3300 UR	1200 U
1,3-DICHLOROBENZENE	UG/KG	790 U	3300 UR	1200 U
1,4-DICHLOROBENZENE	UG/KG	790 U	3300 UR	1200 U
1,2-DICHLOROBENZENE	UG/KG	790 U	3300 UR	1200 U
2-METHYLPHENOL	UG/KG	790 U	3300 UR	1200 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	790 U	3300 UR	1200 U
4-METHYLPHENOL	UG/KG	790 U	3300 UR	1200 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	790 U	3300 UR	1200 U
HEXACHLOROETHANE	UG/KG	790 U	3300 UR	1200 U
NITROBENZENE	UG/KG	790 U	3300 UR	1200 U
ISOPHORONE	UG/KG	790 U	3300 UR	1200 U
2-NITROPHENOL	UG/KG	790 U	3300 UR	1200 U
2,4-DIMETHYLPHENOL	UG/KG	790 U	3300 UR	1200 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	790 U	3300 UR	1200 U
2,4-DICHLOROPHENOL	UG/KG	790 U	3300 UR	1200 U
1,2,4-TRICHLOROBENZENE	UG/KG	790 U	3300 UR	1200 U
NAPHTHALENE	UG/KG	790 U	3300 UR	1200 U
4-CHLORANILINE	UG/KG	790 U	3300 UR	1200 U
HEXACHLOROBUTADIENE	UG/KG	790 U	3300 UR	1200 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-WC10-SD-612M	6-WC11-SD-06B	6-WC11-SD-06M
Depth:		N/A	N/A	N/A
Date Sampled:		8/22/92	8/22/92	8/22/92
Lab Id:		00426-05	00426-10	00426-11
Parameter	Units			
SEMIVOLATILES Cont.				
4-CHLORO-3-METHYLPHENOL	UG/KG	790 U	3300 UR	1200 U
2-METHYLNAPHTHALENE	UG/KG	790 U	3300 UR	1200 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	790 U	3300 UR	1200 U
2,4,6-TRICHLOROPHENOL	UG/KG	790 U	3300 UR	1200 U
2,4,5-TRICHLOROPHENOL	UG/KG	1900 U	7900 UR	3000 U
2-CHLORONAPHTHALENE	UG/KG	790 U	3300 UR	1200 U
2-NITROANILINE	UG/KG	1900 U	7900 UR	3000 U
DIMETHYL PHTHALATE	UG/KG	790 U	3300 UR	1200 U
ACENAPHTHYLENE	UG/KG	790 U	3300 UR	1200 U
2,6-DINITROTOLUENE	UG/KG	790 U	3300 UR	1200 U
3-NITROANILINE	UG/KG	1900 UJ	7900 UR	3000 U
ACENAPHTHENE	UG/KG	790 U	3300 UR	1200 U
2,4-DINITROPHENOL	UG/KG	1900 U	7900 UR	3000 U
4-NITROPHENOL	UG/KG	1900 U	7900 UR	3000 U
DIBENZOFURAN	UG/KG	790 U	3300 UR	1200 U
2,4-DINITROTOLUENE	UG/KG	790 U	3300 UR	1200 U
DIETHYL PHTHALATE	UG/KG	790 U	3300 UR	1200 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	790 U	3300 UR	1200 U
FLUORENE	UG/KG	790 U	3300 UR	1200 U
4-NITROANILINE	UG/KG	1900 U	7900 UR	3000 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1900 U	7900 UR	3000 U
N-NITRISODIPHENYLAMINE	UG/KG	790 U	3300 UR	1200 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	790 U	3300 UR	1200 U
HEXACHLOROBENZENE	UG/KG	790 U	3300 UR	1200 U
PENTACHLOROPHENOL	UG/KG	1900 U	7900 UR	3000 U
PHENANTHRENE	UG/KG	790 U	3300 UR	1200 U
ANTHRACENE	UG/KG	790 U	3300 UR	1200 U
DI-N-BUTYL PHTHALATE	UG/KG	790 U	3300 UR	1200 U
FLUORANTHENE	UG/KG	330 J	3300 UR	200 J
CARBAZOLE	UG/KG	790 UJ	3300 UR	1200 U
PYRENE	UG/KG	230 J	3300 UR	120 J
BUTYL BENZYL PHTHALATE	UG/KG	790 U	3300 UR	1200 U
3,3-DICHLOROBENZIDINE	UG/KG	790 U	3300 UR	1200 U
BENZO(A)ANTHRACENE	UG/KG	130 J	3300 UR	1200 U
CHRYSENE	UG/KG	790 U	3300 UR	1200 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	790 U	960 J	1200 U
DI-N-OCTYL PHTHALATE	UG/KG	790 U	3300 UR	1200 UJ
BENZO(B)FLUORANTHENE	UG/KG	94 J	3300 UR	1200 UJ
BENZO(K)FLUORANTHENE	UG/KG	790 U	3300 UR	1200 UJ
BENZO(A)PYRENE	UG/KG	790 U	3300 UR	1200 UJ
INDENO(1,2,3-CD) PYRENE	UG/KG	790 U	3300 UR	1200 UJ
DIBENZ(A,H)ANTHRACENE	UG/KG	790 U	3300 UR	1200 UJ
BENZO(G,H,I)PERYLENE	UG/KG	790 U	3300 UR	1200 UJ

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2.1 U	24 U	ND	ND		0/33
BETA-BHC	UG/KG	2.1 U	24 U	ND	ND		0/33
DELTA-BHC	UG/KG	2.1 U	24 U	ND	ND		0/33
GAMMA-BHC(LINDANE)	UG/KG	2.1 U	24 U	ND	ND		0/33
HEPTACHLOR	UG/KG	2.1 U	24 U	ND	ND		0/33
ALDRIN	UG/KG	2.1 U	24 U	ND	ND		0/33
HEPTACHLOR EPOXIDE	UG/KG	2.1 U	24 U	ND	ND		0/33
ENDOSULFAN I	UG/KG	2.1 U	24 U	ND	ND		0/33
DIELDRIN	UG/KG	4.1 U	47 U	4.8 J	4.8 J	6-WC01-SD-612D	1/33
4,4'-DDE	UG/KG	4.6 UJ	47 U	5.9	83	6-WC09-SD-612M	14/33
ENDRIN	UG/KG	4.1 U	47 U	ND	ND		0/33
ENDOSULFAN II	UG/KG	4.1 U	47 U	ND	ND		0/33
4,4'-DDD	UG/KG	4.1 U	47 U	7.4 J	200 J	6-WC08-SD-06M	15/33
ENDOSULFAN SULFATE	UG/KG	4.1 U	47 U	ND	ND		0/33
4,4'-DDT	UG/KG	4.1 U	47 U	200 J	1200 J	6-WC08-SD-06M	3/33
METHOXYCHLOR	UG/KG	21 U	240 U	ND	ND		0/33
ENDRIN KETONE	UG/KG	4.1 U	47 U	ND	ND		0/33
ENDRIN ALDEHYDE	UG/KG	4.1 U	47 U	ND	ND		0/33
ALPHA CHLORDANE	UG/KG	2.1 U	24 U	ND	ND		0/33
GAMMA CHLORDANE	UG/KG	2.1 U	24 U	ND	ND		0/33
TOXAPHENE	UG/KG	210 U	2400 U	ND	ND		0/33
PCB-1016	UG/KG	41 U	470 U	ND	ND		0/33
PCB-1221	UG/KG	83 U	940 U	ND	ND		0/33
PCB-1232	UG/KG	41 U	470 U	ND	ND		0/33
PCB-1242	UG/KG	41 U	470 U	ND	ND		0/33
PCB-1248	UG/KG	41 U	470 U	ND	ND		0/33
PCB-1254	UG/KG	41 U	470 U	ND	ND		0/33
PCB-1260	UG/KG	41 U	470 U	31 J	2100 J	6-WC08-SD-06M	14/33
VOLATILES							
CHLOROMETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
BROMOMETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
VINYL CHLORIDE	UG/KG	12 U	3100 U	ND	ND		0/33
CHLOROETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
METHYLENE CHLORIDE	UG/KG	13 U	3100 U	6 J	910 J	6-WC03-SD-612B	3/33
ACETONE	UG/KG	12 U	1800 U	26	24000 J	6-WC09-SD-612B	17/33
CARBON DISULFIDE	UG/KG	13 U	3100 U	2 J	24 J	6-WC10-SD-612M	5/33
1,1-DICHLOROETHENE	UG/KG	12 U	3100 U	ND	ND		0/33
1,1-DICHLOROETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
1,2-DICHLOROETHENE	UG/KG	12 U	3100 U	31 J	31 J	6-WC07-SD-06B	1/33
CHLOROFORM	UG/KG	12 U	3100 U	ND	ND		0/33
1,2-DICHLOROETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
2-BUTANONE	UG/KG	12 U	2200 U	21 J	9300	6-WC09-SD-612B	4/33

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No: Depth: Date Sampled: Lab Id: Parameter	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
CARBON TETRACHLORIDE	UG/KG	12 U	3100 U	ND	ND		0/33
BROMODICHLOROMETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
1,2-DICHLOROPROPANE	UG/KG	12 U	3100 U	ND	ND		0/33
CIS-1,3-DICHLOROPROPENE	UG/KG	12 U	3100 U	ND	ND		0/33
TRICHLOROETHENE	UG/KG	12 U	3100 U	7 J	23	6-WC02-SD-06B	2/33
DIBROMOCHLOROMETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
1,1,2-TRICHLOROETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
BENZENE	UG/KG	12 U	3100 U	ND	ND		0/33
TRANS-1,3-DICHLOROPROPENE	UG/KG	12 U	3100 U	ND	ND		0/33
BROMOFORM	UG/KG	12 U	3100 U	ND	ND		0/33
4-METHYL-2-PENTANONE	UG/KG	12 U	3100 U	ND	ND		0/33
2-HEXANONE	UG/KG	12 U	3100 U	ND	ND		0/33
TETRACHLOROETHENE	UG/KG	12 U	3100 U	ND	ND		0/33
1,1,2,2-TETRACHLOROETHANE	UG/KG	12 U	3100 U	ND	ND		0/33
TOLUENE	UG/KG	12 U	3100 U	4 J	5 J	6-WC06-SD-06M	2/33
CHLOROBENZENE	UG/KG	12 U	3100 U	ND	ND		0/33
ETHYLBENZENE	UG/KG	12 U	3100 U	ND	ND		0/33
STYRENE	UG/KG	12 U	3100 U	ND	ND		0/33
TOTAL XYLENES	UG/KG	12 U	3100 U	26	120 J	6-WC03-SD-06M	3/33
SEMIVOLATILES							
PHENOL	UG/KG	410 U	3300 UR	120 J	190 J	6-WC06-SD-06B	2/33
BIS(2-CHLOROETHYL) ETHER	UG/KG	410 U	3300 UR	ND	ND		0/33
2-CHLOROPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
1,3-DICHLOROBENZENE	UG/KG	410 U	3300 UR	ND	ND		0/33
1,4-DICHLOROBENZENE	UG/KG	410 U	3300 UR	ND	ND		0/33
1,2-DICHLOROBENZENE	UG/KG	410 U	3300 UR	ND	ND		0/33
2-METHYLPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	410 U	3300 UR	ND	ND		0/33
4-METHYLPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
N-NITROSODI-N-PROPYLAMINE	UG/KG	410 U	3300 UR	ND	ND		0/33
HEXACHLOROETHANE	UG/KG	410 U	3300 UR	ND	ND		0/33
NITROBENZENE	UG/KG	410 U	3300 UR	ND	ND		0/33
ISOPHORONE	UG/KG	410 U	3300 UR	ND	ND		0/33
2-NITROPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
2,4-DIMETHYLPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
BIS(2-CHLOROETHOXY) METHANE	UG/KG	410 U	3300 UR	ND	ND		0/33
2,4-DICHLOROPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
1,2,4-TRICHLOROBENZENE	UG/KG	410 U	3300 UR	ND	ND		0/33
NAPHTHALENE	UG/KG	410 U	3300 UR	ND	ND		0/33
4-CHLORANILINE	UG/KG	410 U	3300 UR	ND	ND		0/33
HEXACHLOROBUTADIENE	UG/KG	410 U	3300 UR	ND	ND		0/33

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: Depth: Date Sampled: Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
2-METHYLNAPHTHALENE	UG/KG	410 U	3300 UR	ND	ND		0/33
HEXACHLOROCYCLOPENTADIENE	UG/KG	410 U	3300 UR	ND	ND		0/33
2,4,6-TRICHLOROPHENOL	UG/KG	410 U	3300 UR	ND	ND		0/33
2,4,5-TRICHLOROPHENOL	UG/KG	990 U	7900 U	ND	ND		0/33
2-CHLORONAPHTHALENE	UG/KG	410 U	3300 UR	ND	ND		0/33
2-NITROANILINE	UG/KG	990 U	7900 U	ND	ND		0/33
DIMETHYL PHTHALATE	UG/KG	410 U	3300 UR	ND	ND		0/33
ACENAPHTHYLENE	UG/KG	410 U	3300 UR	ND	ND		0/33
2,6-DINITROTOLUENE	UG/KG	410 U	3300 UR	ND	ND		0/33
3-NITROANILINE	UG/KG	990 UJ	7900 U	ND	ND		0/33
ACENAPHTHENE	UG/KG	410 U	3300 UR	ND	ND		0/33
2,4-DINITROPHENOL	UG/KG	990 U	7900 U	ND	ND		0/33
4-NITROPHENOL	UG/KG	990 U	7900 U	ND	ND		0/33
DIBENZOFURAN	UG/KG	410 U	3300 UR	ND	ND		0/33
2,4-DINITROTOLUENE	UG/KG	410 U	3300 UR	ND	ND		0/33
DIETHYL PHTHALATE	UG/KG	410 U	3300 UR	120 J	530 J	6-WC06-SD-06B	2/33
4-CHLOROPHENYL PHENYL ETHER	UG/KG	410 U	3300 UR	ND	ND		0/33
FLUORENE	UG/KG	410 U	3300 UR	ND	ND		0/33
4-NITROANILINE	UG/KG	990 U	7900 U	ND	ND		0/33
4,6-DINITRO-2-METHYLPHENOL	UG/KG	990 U	7900 U	ND	ND		0/33
N-NITRISODIPHENYLAMINE	UG/KG	410 U	3300 UR	ND	ND		0/33
4-BROMOPHENYL PHENYL ETHER	UG/KG	410 U	3300 UR	ND	ND		0/33
HEXACHLOROBENZENE	UG/KG	410 U	3300 UR	ND	ND		0/33
PENTACHLOROPHENOL	UG/KG	990 U	7900 U	ND	ND		0/33
PHENANTHRENE	UG/KG	410 U	3300 UR	76 J	76 J	6-WC08-SD-612M	1/33
ANTHRACENE	UG/KG	410 U	3300 UR	ND	ND		0/33
DI-N-BUTYL PHTHALATE	UG/KG	410 U	3300 UR	ND	ND		0/33
FLUORANTHENE	UG/KG	410 U	3300 UR	94 J	760 J	6-WC08-SD-06B	11/33
CARBAZOLE	UG/KG	410 UJ	3300 UR	ND	ND		0/33
PYRENE	UG/KG	410 UJ	3300 UR	95 J	810 J	6-WC08-SD-06B	12/33
BUTYL BENZYL PHTHALATE	UG/KG	410 U	3300 UR	200 J	920 J	6-WC07-SD-06B	2/33
3,3-DICHLOROBENZIDINE	UG/KG	410 U	3300 UR	ND	ND		0/33
BENZO(A)ANTHRACENE	UG/KG	410 U	3300 UR	67 J	210 J	6-WC08-SD-06B	4/33
CHRYSENE	UG/KG	410 U	3300 UR	74 J	230 J	6-WC08-SD-06B	3/33
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	410 U	3200 U	960 J	960 J	6-WC11-SD-06B	1/33
DI-N-OCTYL PHTHALATE	UG/KG	410 U	3300 UR	ND	ND		0/33
BENZO(B)FLUORANTHENE	UG/KG	410 U	3300 UR	94 J	420 J	6-WC08-SD-06B	6/33
BENZO(K)FLUORANTHENE	UG/KG	410 U	3300 UR	67 J	140 J	6-WC08-SD-06B	2/33
BENZO(A)PYRENE	UG/KG	410 U	3300 UR	63 J	1600	6-WC09-SD-612B	6/33
INDENO(1,2,3-CD) PYRENE	UG/KG	410 U	3300 UR	ND	ND		0/33
DIBENZ(A,H)ANTHRACENE	UG/KG	410 U	3300 UR	ND	ND		0/33
BENZO(G,H,I)PERYLENE	UG/KG	410 U	3300 UR	ND	ND		0/33

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC01-SD-06B	6-WC01-SD-612B	6-WC02-SD-06B	6-WC02-SD-612B	6-WC03-SD-06B	6-WC03-SD-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/30/92	8/30/92	8/26/92	8/26/92	8/26/92	8/26/92
	Lab Id:	00464-22	00464-24	00445-03	00445-04	00445-05	00445-06
Parameter	Units						
ALUMINUM	MG/KG	2090 J	2510	6540 J	5390 J	6480 J	4780 J
ANTIMONY	MG/KG	3.3 U	3.1 U	3.1 U	4.1 U	6.8 UJ	3.4 U
ARSENIC	MG/KG	1.2 JB	0.73 UJ	0.81 U	0.64 U	1.4 UJ	0.82 UJ
BARIUM	MG/KG	5.2 JB	15.3 B	19.6 JB	23.7 JB	15.8 JB	37.1 JB
BERYLLIUM	MG/KG	0.07 U	0.07 U	0.26 U	0.33 U	0.27 U	0.32 U
CADMIUM	MG/KG	0.45 U	0.42 U	0.42 U	0.74 UJ	1.2 UJ	0.46 U
CALCIUM	MG/KG	329 B	1060 B	1090 JB	1790 J	2850 J	22200 J
CHROMIUM	MG/KG	3 UJ	2.5 UJ	4.2	3.4	6.2	6.4
COBALT	MG/KG	0.48 U	0.44 U	0.6 JB	0.87 JB	0.94 U	1.3 JB
COPPER	MG/KG	0.86 UJ	0.64 UJ	0.43 JB	0.62 JB	5.8 JB	53200
IRON	MG/KG	724 J	1430 J	1200 J	1570 J	6870 J	6940 J
LEAD	MG/KG	9.7 J	2.3 J	4.8 J	4.8 J	9 J	314 J
MAGNESIUM	MG/KG	50.5 B	57 B	372 JB	356 JB	440 JB	852 JB
MANGANESE	MG/KG	2.4 UJ	4.7 J	8.8	6.5	9.7	23
MERCURY	MG/KG	0.03 U	0.04 U	0.08 U	0.06 U	0.11 U	0.06 U
NICKEL	MG/KG	1.9 UJ	1.8 UJ	1.7 UJ	2.8 B	3.7 UJ	1.9 UJ
POTASSIUM	MG/KG	92.1 B	98.1 B	145 B	97 U	220 B	360 B
SELENIUM	MG/KG	1.4 UJ	1.2 UJ	1 U	1.3 U	2.7 U	1 UJ
SILVER	MG/KG	0.48 UJ	0.44 UJ	0.52 UJ	1.2 UJ	1.5 UJ	7.3
SODIUM	MG/KG	38.3 UJ	27 UJ	491 JB	469 JB	277 UJ	489 JB
THALLIUM	MG/KG	0.55 U	0.49 U	0.4 UJ	0.5 UJ	1.1 UJ	0.4 UJ
VANADIUM	MG/KG	5.7 B	4.4 B	5.8 B	7 B	11.6 B	9.1 B
ZINC	MG/KG	3.1 U	3.1 U	1.6 U	2.4 U	16.3 U	926

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC03-SD-612B	6-WC04-SD-06B	6-WC04-SD-06M	6-WC04-SD-612B	6-WC05-SD-06B	6-WC05-SD-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/26/92	8/26/92	8/26/92	8/26/92	8/27/92	8/27/92
	Lab Id:	00445-07	00445-08	00445-09	00445-10	00445-11	00445-13
Parameter	Units						
ALUMINUM	MG/KG	7040 J	1830 J	569 J	1950 J	8600 J	2040 J
ANTIMONY	MG/KG	6.8 U	3.5 U	3.2 U	3.6 U	3.7 U	2.7 U
ARSENIC	MG/KG	1.3 JB	0.57 U	1.3 B	0.77 UJ	0.72 U	0.63 U
BARIUM	MG/KG	25.2 JB	4.2 JB	4.3 JB	4.8 JB	18.1 JB	4.7 JB
BERYLLIUM	MG/KG	0.26 U	0.12 U	0.07 U	0.13 U	0.43 U	0.09 U
CADMIUM	MG/KG	0.92 U	0.47 U	0.43 U	0.49 U	0.9 UJ	0.59 UJ
CALCIUM	MG/KG	4500 J	407 JB	90000 J	1090 JB	1300 JB	2430 J
CHROMIUM	MG/KG	8.3	2.7	3.7	2 B	4.3	2.4
COBALT	MG/KG	0.97 U	0.49 U	0.45 U	0.63 JB	1.1 JB	0.62 JB
COPPER	MG/KG	79.6	8.7 J	2.5 JB	1.8 JB	1.2 JB	1.9 JB
IRON	MG/KG	6050 J	1920 J	1160 J	2050 J	1680 J	1450 J
LEAD	MG/KG	10.3 J	3 J	4.4 J	4.4 J	6.2 J	7.1 J
MAGNESIUM	MG/KG	333 JB	160 JB	1380 J	311 JB	673 JB	209 JB
MANGANESE	MG/KG	8.3	5	18.7	5.1	6.4	7.1
MERCURY	MG/KG	0.11 U	0.05 U	0.04 U	0.06 U	0.07 U	0.05 U
NICKEL	MG/KG	3.8 UJ	2 UJ	1.8 UJ	2 UJ	2.1 UJ	1.5 UJ
POTASSIUM	MG/KG	457 B	88.5 U	101 B	75.6 U	180 B	74.8 U
SELENIUM	MG/KG	2.3 U	1.1 U	1 U	0.96 U	1.3 U	0.89 U
SILVER	MG/KG	1.3 UJ	0.49 U	0.84 UJ	0.96 UJ	0.81 UJ	0.78 UJ
SODIUM	MG/KG	382 UJ	316 UJ	272 UJ	621 JB	1070 JB	161 UJ
THALLIUM	MG/KG	0.93 UJ	0.43 UJ	0.4 UJ	0.38 UJ	0.54 UJ	0.36 UJ
VANADIUM	MG/KG	15.7 B	3.2 UJ	1.4 UJ	3.5 UJ	4.6 JB	3.5 JB
ZINC	MG/KG	12.3 U	4.1 U	6.6 U	15.9	4 U	8.6 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No:		6-WC05-SD-612B	6-WC06-SD-06B	6-WC06-SD-06M	6-WC06-SD-612B	6-WC06-SD-612M	6-WC07-SD-06B
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/27/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
Lab Id:		00445-14	00429-01	00429-02	00429-03	00429-04	00429-07
Parameter	Units						
ALUMINUM	MG/KG	4130 J	9120	1990	6210	1390	8590
ANTIMONY	MG/KG	2.8 UJ	9.2 U	5 U	8.9 U	3 U	22.7 U
ARSENIC	MG/KG	0.67 U	3.6 B	1 B	2 U	0.58 U	5.2 U
BARIUM	MG/KG	23.4 JB	14.8 B	4.2 JB	14.3 B	2.5 JB	12 B
BERYLLIUM	MG/KG	0.28 U	0.35 B	0.12 B	0.41 B	0.1 B	0.78 B
CADMIUM	MG/KG	0.37 U	2.4 UJ	0.71 UJ	1.6 UJ	0.48 UJ	3.1 UJ
CALCIUM	MG/KG	1530 J	3590	1410 B	3930	1740	8290
CHROMIUM	MG/KG	2.4	5.4 B	1.5 B	3.2 B	1.2 B	5.8 UJ
COBALT	MG/KG	0.89 JB	1.3 U	0.72 U	1.6 JB	0.44 U	3.2 U
COPPER	MG/KG	0.77 JB	13.3 JB	7.3 JB	5.2 JB	1.3 JB	7.2 JB
IRON	MG/KG	1010 J	8080	1480	5410	978	3980
LEAD	MG/KG	3.4 J	70.9	19.9	12.4	5.7	18.8
MAGNESIUM	MG/KG	138 UJ	2250 B	438 B	1110 B	427 B	5650 B
MANGANESE	MG/KG	4.4	25.8	5.8	16.3	5.9	13.1 B
MERCURY	MG/KG	0.04 U	0.19 U	0.07 U	0.14 U	0.05 U	0.42 U
NICKEL	MG/KG	1.5 UJ	5.2 U	2.8 U	5 U	1.7 U	12.8 U
POTASSIUM	MG/KG	81.6 U	533 B	99.8 JB	318 B	124 B	545 B
SELENIUM	MG/KG	1.1 U	3.4 UJ	1.6 UJ	3.3 UJ	0.97 UJ	8.6 UJ
SILVER	MG/KG	0.8 UJ	2.6 UJ	0.72 U	2.2 UJ	0.86 UJ	7.2 UJ
SODIUM	MG/KG	468 JB	4220	481 JB	1630 JB	1530 J	6020 B
THALLIUM	MG/KG	0.44 UJ	1.4 UJ	0.66 UJ	1.3 UJ	0.39 UJ	3.4 UJ
VANADIUM	MG/KG	4.7 B	14.2 B	3.5 JB	9.6 JB	2.2 JB	16.7 B
ZINC	MG/KG	1.1 U	39.6	11.5	22.6	6.2	29.9 U

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC07-SD-06M	6-WC07-SD-612M	6-WC08-SD-06B	6-WC08-SD-06M	6-WC08-SD-612B	6-WC08-SD-612M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92	8/23/92
	Lab Id:	00429-08	00429-09	00429-13	00429-15	00429-16	00429-17
Parameter	Units						
ALUMINUM	MG/KG	975	539	10700	9810	4470	18300
ANTIMONY	MG/KG	5.2 U	2.8 U	8 U	6.2 U	5.1 U	5.3 U
ARSENIC	MG/KG	1 U	0.63 U	4.9 B	3.2 B	9.7	10.2
BARIUM	MG/KG	3.6 JB	2.8 JB	12.8 B	38.4 B	5.9 JB	110
BERYLLIUM	MG/KG	0.11 U	0.07 B	0.49 B	0.35 B	0.21 B	0.76 B
CADMIUM	MG/KG	0.93 UJ	0.4 UJ	3 UJ	1.8 UJ	1.4 UJ	2.8 UJ
CALCIUM	MG/KG	457 B	242 B	4560	3080	2080	5270
CHROMIUM	MG/KG	1.3 UJ	0.73 UJ	8.4	9.2	2.7 B	19.2
COBALT	MG/KG	0.74 U	0.4 U	1.1 U	0.88 U	0.73 U	2 JB
COPPER	MG/KG	0.7 U	0.89 JB	21.5	13.7 J	16.7 J	27.2
IRON	MG/KG	695	390	8680	7450	4090	11300
LEAD	MG/KG	8.7	1.5	97	44.1 J	49.7	156
MAGNESIUM	MG/KG	140 B	62.7 B	3620	1650 B	701 B	906 B
MANGANESE	MG/KG	3.7 B	3.1	27.8	21.3	12	28.4
MERCURY	MG/KG	0.07 U	0.05 U	0.14 U	0.17 U	0.11 U	0.37 U
NICKEL	MG/KG	2.9 U	1.6 U	4.5 U	3.5 U	2.9 U	7.4 JB
POTASSIUM	MG/KG	71.4 JB	38.5 JB	862 B	807 B	233 B	834 B
SELENIUM	MG/KG	1.7 UJ	1.1 U	3 UJ	1.9 UJ	1.7 UJ	1.9 UJ
SILVER	MG/KG	1.4 UJ	0.56 UJ	2.3 UJ	2.4 UJ	1.6 UJ	1.6 UJ
SODIUM	MG/KG	553 JB	224 JB	6740	3730	1140 JB	1150 JB
THALLIUM	MG/KG	0.68 UJ	0.42 UJ	1.2 UJ	0.76 UJ	0.66 UJ	7.8 UJ
VANADIUM	MG/KG	1.7 JB	0.82 JB	21.8 B	19.1 B	8.1 JB	33.7
ZINC	MG/KG	4.6 U	2.9 U	106	67.9	29.2	132

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC09-SD-06B	6-WC09-SD-06M	6-WC09-SD-612B	6-WC09-SD-612M	6-WC10-SD-06B	6-WC10-SD-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/23/92	8/23/92	8/23/92	8/23/92	8/22/92	8/22/92
	Lab Id:	00429-21	00429-22	00429-23	00429-24	00426-02	00426-04
Parameter	Units						
ALUMINUM	MG/KG	978	17200	8610	9160	4640	25400
ANTIMONY	MG/KG	3.6 U	17.2 U	11.7 U	6.2 U	82.6 UJ	29.7 UJ
ARSENIC	MG/KG	0.51 U	5.8 B	1.6 U	3.5 B	3.6 U	4.7 B
BARIUM	MG/KG	2.8 JB	19.8 B	15.4 B	10.9 B	35.4 U	23.6 B
BERYLLIUM	MG/KG	0.08 U	0.63 B	0.33 B	0.3 B	1.7 U	0.61 U
CADMIUM	MG/KG	0.49 U	3.3 UJ	1.6 U	1.1 UJ	6.7 UJ	1.8 UJ
CALCIUM	MG/KG	399 B	6150	10300	3410	6500 B	4180
CHROMIUM	MG/KG	1.7 B	17.7	8.2 B	9.6	8.4 U	28.5
COBALT	MG/KG	2.3 JB	3.3 JB	2.9 JB	1.6 JB	10.1 U	6.1 UJ
COPPER	MG/KG	11.9 J	33.5	4.4 JB	10.7 JB	11.8 UJ	20 UJ
IRON	MG/KG	789	14600	11600	7000	4610 J	13900
LEAD	MG/KG	4.9	106	8.8	37.4	22.4 J	68.9 J
MAGNESIUM	MG/KG	213 B	4520 B	730 B	1350 B	6630 B	4630
MANGANESE	MG/KG	3.2 B	50.2	42.5	20.9	11.8 JB	40.6
MERCURY	MG/KG	0.05 U	0.42 U	0.26 U	0.27 U	0.74 U	0.33 U
NICKEL	MG/KG	2.7 JB	9.7 U	6.6 U	4.3 JB	28.7 U	10.7 JB
POTASSIUM	MG/KG	65.5 JB	1390 B	419 B	628 B	829 B	2200 B
SELENIUM	MG/KG	1.3 UJ	6.1 U	4.1 U	2.6 U	6.1 U	3 UJ
SILVER	MG/KG	0.54 UJ	4.6 UJ	3 UJ	1.9 UJ	16.9 U	6.1 U
SODIUM	MG/KG	332 JB	8880	1380 JB	1110 JB	14900	11900
THALLIUM	MG/KG	0.51 U	2.4 U	1.6 U	1 U	2.4 U	1.2 U
VANADIUM	MG/KG	1.9 JB	41.5 B	12.7 JB	18.5 B	23.6 UJ	45.5 J
ZINC	MG/KG	388	137	17.1	43.6	33.1 B	69.6

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-WC10-SD-612M	6-WC11-SD-06B	6-WC11-SD-06M
	Depth:	N/A	N/A	N/A
	Date Sampled:	8/22/92	8/22/92	8/22/92
	Lab Id:	00426-05	00426-10	00426-11
Parameter	Units			
ALUMINUM	MG/KG	8070	3470	12000
ANTIMONY	MG/KG	19.7 UJ	75.6 UJ	28.8 UJ
ARSENIC	MG/KG	1.8 B	8.9 B	4.4 JB
BARIUM	MG/KG	10.4 B	32.4 U	12.3 U
BERYLLIUM	MG/KG	0.4 U	1.5 U	0.59 U
CADMIUM	MG/KG	1.2 UJ	4.6 U	1.8 UJ
CALCIUM	MG/KG	2560	9350	4170
CHROMIUM	MG/KG	10	7.7 B	13.5
COBALT	MG/KG	2.8 UJ	10.8 UJ	4.1 UJ
COPPER	MG/KG	8 UJ	13.9 UJ	12.9 UJ
IRON	MG/KG	6810	3940	11600
LEAD	MG/KG	13.7 J	16.7 J	31.8 J
MAGNESIUM	MG/KG	1620 B	9840	3830
MANGANESE	MG/KG	26.5	12.3 JB	38.8
MERCURY	MG/KG	0.23 U	0.87 U	0.32 U
NICKEL	MG/KG	6.8 U	26.2 U	10 U
POTASSIUM	MG/KG	762 B	1040 B	1280 B
SELENIUM	MG/KG	2.2 UJ	9 UJ	3.6 UJ
SILVER	MG/KG	4 U	15.4 U	5.9 U
SODIUM	MG/KG	2380	18300	10300
THALLIUM	MG/KG	0.89 U	3.6 U	1.4 U
VANADIUM	MG/KG	14.1 UJ	20.1 UJ	25.3 UJ
ZINC	MG/KG	24.3	22.7 B	42.5

SITE 6 WALLACE CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Parameter	Sample No: Depth: Date Sampled: Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
ALUMINUM	MG/KG	NA	NA	539	25400	6-WC10-SD-06M	33/33
ANTIMONY	MG/KG	2.7 U	82.6 UJ	ND	ND		0/33
ARSENIC	MG/KG	0.51 U	5.2 U	1 B	10.2	6-WC08-SD-612M	15/33
BARIUM	MG/KG	12.3 U	35.4 U	2.5 JB	110	6-WC08-SD-612M	30/33
BERYLLIUM	MG/KG	0.07 U	1.7 U	0.07 B	0.78 B	6-WC07-SD-06B	13/33
CADMIUM	MG/KG	0.37 U	6.7 UJ	ND	ND		0/33
CALCIUM	MG/KG	NA	NA	242 B	90000 J	6-WC04-SD-06M	33/33
CHROMIUM	MG/KG	0.73 UJ	8.4 U	1.2 B	28.5	6-WC10-SD-06M	27/33
COBALT	MG/KG	0.4 U	10.8 UJ	0.6 JB	3.3 JB	6-WC09-SD-06M	13/33
COPPER	MG/KG	0.64 UJ	20 UJ	0.43 JB	53200	6-WC03-SD-06M	25/33
IRON	MG/KG	NA	NA	390	14600	6-WC09-SD-06M	33/33
LEAD	MG/KG	NA	NA	1.5	314 J	6-WC03-SD-06M	33/33
MAGNESIUM	MG/KG	138 UJ	138 UJ	50.5 B	9840	6-WC11-SD-06B	32/33
MANGANESE	MG/KG	2.4 UJ	2.4 UJ	3.1	50.2	6-WC09-SD-06M	32/33
MERCURY	MG/KG	0.03 U	0.87 U	ND	ND		0/33
NICKEL	MG/KG	1.5 UJ	28.7 U	2.7 JB	10.7 JB	6-WC10-SD-06M	5/33
POTASSIUM	MG/KG	74.8 U	97 U	38.5 JB	2200 B	6-WC10-SD-06M	28/33
SELENIUM	MG/KG	0.89 U	9 UJ	ND	ND		0/33
SILVER	MG/KG	0.44 UJ	16.9 U	7.3	7.3	6-WC03-SD-06M	1/33
SODIUM	MG/KG	27 UJ	382 UJ	224 JB	18300	6-WC11-SD-06B	26/33
THALLIUM	MG/KG	0.36 UJ	7.8 UJ	ND	ND		0/33
VANADIUM	MG/KG	1.4 UJ	25.3 UJ	0.82 JB	45.5 J	6-WC10-SD-06M	26/33
ZINC	MG/KG	1.1 U	29.9 U	6.2	926	6-WC03-SD-06M	19/33

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH01-SD-06B	6-BH01-SD-06M	6-BH01-SD-612B	6-BH01-SD-612M	6-BH02-SD-06M	6-BH02-SD-612M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	10/23/92	10/23/92	10/23/92	10/23/92	8/28/92	8/28/92
	Lab Id:	00591-01	00591-02	00591-03	00591-04	00458-02	00458-03
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
BETA-BHC	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
DELTA-BHC	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
GAMMA-BHC(LINDANE)	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
HEPTACHLOR	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
ALDRIN	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
HEPTACHLOR EPOXIDE	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
ENDOSULFAN I	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
DIELDRIN	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
4,4'-DDE	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.7	6 U
ENDRIN	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
ENDOSULFAN II	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
4,4'-DDD	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
ENDOSULFAN SULFATE	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
4,4'-DDT	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
METHOXYCHLOR	UG/KG	33 UJ	36 UJ	33 UJ	32 UJ	27 U	31 U
ENDRIN KETONE	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
ENDRIN ALDEHYDE	UG/KG	6.5 UJ	6.9 UJ	6.5 UJ	6.3 UJ	5.2 U	6 U
ALPHA CHLORDANE	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
GAMMA CHLORDANE	UG/KG	3.3 UJ	3.6 UJ	3.3 UJ	3.2 UJ	2.7 U	3.1 U
TOXAPHENE	UG/KG	330 UJ	360 UJ	330 UJ	320 UJ	270 U	310 U
PCB-1016	UG/KG	65 UJ	69 UJ	65 UJ	63 UJ	52 U	60 U
PCB-1221	UG/KG	130 UJ	140 UJ	130 UJ	130 UJ	100 U	120 U
PCB-1232	UG/KG	65 UJ	69 UJ	65 UJ	63 UJ	52 U	60 U
PCB-1242	UG/KG	65 UJ	69 UJ	65 UJ	63 UJ	52 U	60 U
PCB-1248	UG/KG	65 UJ	69 UJ	65 UJ	63 UJ	52 U	60 U
PCB-1254	UG/KG	65 UJ	69 UJ	65 UJ	63 UJ	52 U	60 U
PCB-1260	UG/KG	65 UJ	69 UJ	65 UJ	63 UJ	52 U	60 U
VOLATILES							
CHLOROMETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
BROMOMETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
VINYL CHLORIDE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
CHLOROETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
METHYLENE CHLORIDE	UG/KG	18 U	21 U	19 U	20 U	44 U	2 J
ACETONE	UG/KG	18 U	21 U	19 U	20 U	840	140
CARBON DISULFIDE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,1-DICHLOROETHENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,1-DICHLOROETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,2-DICHLOROETHENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
CHLOROFORM	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,2-DICHLOROETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
2-BUTANONE	UG/KG	18 U	21 U	19 U	20 U	15 J	3 J

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-BH01-SD-06B	6-BH01-SD-06M	6-BH01-SD-612B	6-BH01-SD-612M	6-BH02-SD-06M	6-BH02-SD-612M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		10/23/92	10/23/92	10/23/92	10/23/92	8/28/92	8/28/92
Lab Id:		00591-01	00591-02	00591-03	00591-04	00458-02	00458-03
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
CARBON TETRACHLORIDE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
BROMODICHLOROMETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,2-DICHLOROPROPANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
CIS-1,3-DICHLOROPROPENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
TRICHLOROETHENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
DIBROMOCHLOROMETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,1,2-TRICHLOROETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
BENZENE	UG/KG	5 J	21 U	19 U	20 U	44 U	13 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
BROMOFORM	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
4-METHYL-2-PENTANONE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
2-HEXANONE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
TETRACHLOROETHENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
TOLUENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
CHLOROBENZENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
ETHYLBENZENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
STYRENE	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
TOTAL XYLENES	UG/KG	18 U	21 U	19 U	20 U	44 U	13 U
SEMIVOLATILES							
PHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2-CHLOROPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
1,3-DICHLOROBENZENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
1,4-DICHLOROBENZENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
1,2-DICHLOROBENZENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2-METHYLPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
4-METHYLPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
HEXACHLOROETHANE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
NITROBENZENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
ISOPHORONE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2-NITROPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,4-DIMETHYLPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,4-DICHLOROPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
1,2,4-TRICHLOROBENZENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
NAPHTHALENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
4-CHLORANILINE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
HEXACHLOROBUTADIENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH01-SD-06B	6-BH01-SD-06M	6-BH01-SD-612B	6-BH01-SD-612M	6-BH02-SD-06M	6-BH02-SD-612M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		10/23/92	10/23/92	10/23/92	10/23/92	8/28/92	8/28/92
Lab Id:		00591-01	00591-02	00591-03	00591-04	00458-02	00458-03
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2-METHYLNAPHTHALENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,4,6-TRICHLOROPHENOL	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,4,5-TRICHLOROPHENOL	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
2-CHLORONAPHTHALENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2-NITROANILINE	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
DIMETHYL PHTHALATE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
ACENAPHTHYLENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,6-DINITROTOLUENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
3-NITROANILINE	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
ACENAPHTHENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,4-DINITROPHENOL	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
4-NITROPHENOL	UG/KG	1500 U	1700 U	1600 UJ	1500 UJ	1300 U	1500 U
DIBENZOFURAN	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
2,4-DINITROTOLUENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
DIETHYL PHTHALATE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
FLUORENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
4-NITROANILINE	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
N-NITRISODIPHENYLAMINE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
HEXACHLOROBENZENE	UG/KG	640 U	690 U	660 U	630 U	520 UJ	610 UJ
PENTACHLOROPHENOL	UG/KG	1500 U	1700 U	1600 U	1500 U	1300 U	1500 U
PHENANTHRENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
ANTHRACENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
DI-N-BUTYL PHTHALATE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
FLUORANTHENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
CARBAZOLE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
PYRENE	UG/KG	640 U	690 U	660 UJ	630 U	520 U	610 U
BUTYL BENZYL PHTHALATE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
3,3-DICHLOROBENZIDINE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
BENZO(A)ANTHRACENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
CHRYSENE	UG/KG	640 U	690 U	660 UJ	630 UJ	520 U	610 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
DI-N-OCTYL PHTHALATE	UG/KG	640 U	690 U	660 UJ	630 UJ	520 U	610 U
BENZO(B)FLUORANTHENE	UG/KG	640 U	690 U	660 UJ	630 U	520 U	610 U
BENZO(K)FLUORANTHENE	UG/KG	640 U	690 U	660 UJ	630 U	520 U	610 U
BENZO(A)PYRENE	UG/KG	640 U	690 U	660 U	630 U	520 U	610 U
INDENO(1,2,3-CD) PYRENE	UG/KG	640 U	690 U	660 U	630 U	520 UJ	610 UJ
DIBENZ(A,H)ANTHRACENE	UG/KG	640 U	690 U	660 U	630 U	520 UJ	610 UJ
BENZO(G,H,I)PERYLENE	UG/KG	640 U	690 U	660 U	630 U	520 UJ	610 UJ

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH03-SD-06B	6-BH03-SD-06M	6-BH03-SD-612B	6-BH03-SD-612M	6-BH04-SD-06B	6-BH04-SD-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/28/92	8/28/92	8/28/92	8/28/92	8/26/92	8/26/92
	Lab Id:	00458-05	00458-07	00458-08	00458-09	00439-01	00439-02
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
BETA-BHC	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
DELTA-BHC	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
GAMMA-BHC(LINDANE)	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
HEPTACHLOR	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
ALDRIN	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
HEPTACHLOR EPOXIDE	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
ENDOSULFAN I	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
DIELDRIN	UG/KG	7 U	9.4 U	5.4 U	7.9 U	3.9 U	4.5 UJ
4,4'-DDE	UG/KG	7 U	68	5.4 U	22	14	41 J
ENDRIN	UG/KG	7 U	9.4 U	5.4 U	7.9 U	3.9 U	4.5 UJ
ENDOSULFAN II	UG/KG	7 U	9.4 U	5.4 U	7.9 U	3.9 U	4.5 UJ
4,4'-DDD	UG/KG	7 U	25	5.4 U	9.2 J	8.4 J	42 J
ENDOSULFAN SULFATE	UG/KG	7 U	9.4 U	5.4 U	7.9 U	3.9 U	4.5 UJ
4,4'-DDT	UG/KG	7 U	15	5.4 U	6.6 J	16 J	9.4 J
METHOXYCHLOR	UG/KG	36 U	49 U	28 U	40 U	20 U	23 UJ
ENDRIN KETONE	UG/KG	7 U	9.4 U	5.4 U	7.9 U	3.9 U	4.5 UJ
ENDRIN ALDEHYDE	UG/KG	7 U	9.4 U	5.4 U	7.9 U	3.9 U	4.5 UJ
ALPHA CHLORDANE	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
GAMMA CHLORDANE	UG/KG	3.6 U	4.9 U	2.8 U	4 U	2 U	2.3 UJ
TOXAPHENE	UG/KG	360 U	490 U	280 U	400 U	200 U	230 UJ
PCB-1016	UG/KG	70 U	94 U	54 U	79 U	39 U	45 UJ
PCB-1221	UG/KG	140 U	190 U	110 U	160 U	79 U	91 UJ
PCB-1232	UG/KG	70 U	94 U	54 U	79 U	39 U	45 UJ
PCB-1242	UG/KG	70 U	94 U	54 U	79 U	39 U	45 UJ
PCB-1248	UG/KG	70 U	94 U	54 U	79 U	39 U	45 UJ
PCB-1254	UG/KG	70 U	94 U	54 U	79 U	39 U	45 UJ
PCB-1260	UG/KG	70 U	170	54 U	160	51	110 J
VOLATILES							
CHLOROMETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
BROMOMETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
VINYL CHLORIDE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
CHLOROETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
METHYLENE CHLORIDE	UG/KG	3 J	30 U	4 J	7 J	12 U	880 U
ACETONE	UG/KG	34	99	210	340	140	9900 J
CARBON DISULFIDE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
1,1-DICHLOROETHENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
1,1-DICHLOROETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
1,2-DICHLOROETHENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
CHLOROFORM	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
1,2-DICHLOROETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
2-BUTANONE	UG/KG	10 J	23 J	30	59	12 U	2400

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH03-SD-06B	6-BH03-SD-06M	6-BH03-SD-612B	6-BH03-SD-612M	6-BH04-SD-06B	6-BH04-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/28/92	8/28/92	8/28/92	8/28/92	8/26/92	8/26/92
Lab Id:		00458-05	00458-07	00458-08	00458-09	00439-01	00439-02
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
CARBON TETRACHLORIDE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
BROMODICHLOROMETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
1,2-DICHLOROPROPANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
CIS-1,3-DICHLOROPROPENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
TRICHLOROETHENE	UG/KG	5 J	30 U	16 U	28 U	12 U	880 U
DIBROMOCHLOROMETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
1,1,2-TRICHLOROETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
BENZENE	UG/KG	15 U	30 U	16 U	28 U	12 UJ	880 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	15 U	30 U	16 U	28 U	12 UJ	880 U
BROMOFORM	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
4-METHYL-2-PENTANONE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
2-HEXANONE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
TETRACHLOROETHENE	UG/KG	3 J	30 U	16 U	28 U	12 U	880 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
TOLUENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
CHLOROBENZENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
ETHYLBENZENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
STYRENE	UG/KG	15 U	30 U	16 U	28 U	12 U	880 U
TOTAL XYLENES	UG/KG	3 J	30 U	16 U	28 U	12 U	880 U
SEMIVOLATILES							
PHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2-CHLOROPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
1,3-DICHLOROBENZENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
1,4-DICHLOROBENZENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
1,2-DICHLOROBENZENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2-METHYLPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	700 UJ	930 UJ	540 U	780 U	390 U	450 U
4-METHYLPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
HEXACHLOROETHANE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
NITROBENZENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
ISOPHORONE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2-NITROPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 UJ
2,4-DIMETHYLPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,4-DICHLOROPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
1,2,4-TRICHLOROBENZENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
NAPHTHALENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
4-CHLORANILINE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
HEXACHLOROBUTADIENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH03-SD-06B	6-BH03-SD-06M	6-BH03-SD-612B	6-BH03-SD-612M	6-BH04-SD-06B	6-BH04-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/28/92	8/28/92	8/28/92	8/28/92	8/26/92	8/26/92
Lab Id:		00458-05	00458-07	00458-08	00458-09	00439-01	00439-02
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2-METHYLNAPHTHALENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,4,6-TRICHLOROPHENOL	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,4,5-TRICHLOROPHENOL	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
2-CHLORONAPHTHALENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2-NITROANILINE	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
DIMETHYL PHTHALATE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
ACENAPHTHYLENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,6-DINITROTOLUENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 UJ
3-NITROANILINE	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
ACENAPHTHENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,4-DINITROPHENOL	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
4-NITROPHENOL	UG/KG	1700 UJ	2300 UJ	1300 U	1900 U	950 U	1100 U
DIBENZOFURAN	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
2,4-DINITROTOLUENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 UJ
DIETHYL PHTHALATE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
FLUORENE	UG/KG	700 U	930 U	540 U	780 U	390 UJ	450 U
4-NITROANILINE	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
N-NITRISODIPHENYLAMINE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
HEXACHLOROBENZENE	UG/KG	700 UJ	930 UJ	540 UJ	780 UJ	390 U	450 U
PENTACHLOROPHENOL	UG/KG	1700 U	2300 U	1300 U	1900 U	950 U	1100 U
PHENANTHRENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
ANTHRACENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
DI-N-BUTYL PHTHALATE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
FLUORANTHENE	UG/KG	700 U	930 U	540 U	780 U	390 UJ	450 U
CARBAZOLE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
PYRENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BUTYL BENZYL PHTHALATE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
3,3-DICHLOROBENZIDINE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BENZO(A)ANTHRACENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
CHRYSENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
DI-N-OCTYL PHTHALATE	UG/KG	700 U	930 U	540 U	780 U	390 UJ	450 U
BENZO(B)FLUORANTHENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BENZO(K)FLUORANTHENE	UG/KG	700 U	930 U	540 U	780 U	390 U	450 U
BENZO(A)PYRENE	UG/KG	450 J	190 J	640	230 J	390 U	450 U
INDENO(1,2,3-CD) PYRENE	UG/KG	700 UJ	930 UJ	540 UJ	780 UJ	40 J	450 U
DIBENZ(A,H)ANTHRACENE	UG/KG	700 UJ	930 UJ	540 UJ	780 UJ	390 U	450 U
BENZO(G,H,I)PERYLENE	UG/KG	700 UJ	930 UJ	540 UJ	780 UJ	390 U	450 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH04-SD-612B	6-BH04-SD-612M	6-BH05-SD-06B	6-BH05-SD-06M	6-BH06-SD-06B	6-BH06-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00439-03	00439-04	00439-05	00439-06	00439-07	00439-09
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
BETA-BHC	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
DELTA-BHC	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
GAMMA-BHC(LINDANE)	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
HEPTACHLOR	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
ALDRIN	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
HEPTACHLOR EPOXIDE	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
ENDOSULFAN I	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
DIELDRIN	UG/KG	6.8 UJ	4.4 UJ	4.5 UJ	11 U	6.3 UJ	4.8 UJ
4,4'-DDE	UG/KG	35 J	53 J	30 J	32	68 J	24 J
ENDRIN	UG/KG	6.8 UJ	4.4 UJ	4.5 UJ	11 U	6.3 UJ	4.8 UJ
ENDOSULFAN II	UG/KG	6.8 UJ	4.4 UJ	4.5 UJ	11 U	6.3 UJ	4.8 UJ
4,4'-DDD	UG/KG	11 J	220 J	26 J	23	37 J	22 J
ENDOSULFAN SULFATE	UG/KG	6.8 UJ	4.4 UJ	4.5 UJ	11 U	6.3 UJ	4.8 UJ
4,4'-DDT	UG/KG	6.8 UJ	38 J	4.5 UJ	21 J	14 J	7 J
METHOXYCHLOR	UG/KG	35 UJ	23 UJ	23 UJ	58 U	32 UJ	25 UJ
ENDRIN KETONE	UG/KG	6.8 UJ	4.4 UJ	4.5 UJ	11 U	6.3 UJ	4.8 UJ
ENDRIN ALDEHYDE	UG/KG	6.8 UJ	4.4 UJ	4.5 UJ	11 U	6.3 UJ	4.8 UJ
ALPHA CHLORDANE	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	14 J	2.5 UJ
GAMMA CHLORDANE	UG/KG	3.5 UJ	2.3 UJ	2.3 UJ	5.8 U	3.2 UJ	2.5 UJ
TOXAPHENE	UG/KG	350 UJ	230 UJ	230 UJ	580 U	320 UJ	250 UJ
PCB-1016	UG/KG	68 UJ	44 UJ	45 UJ	110 U	63 UJ	48 UJ
PCB-1221	UG/KG	140 UJ	89 UJ	91 UJ	230 U	130 UJ	98 UJ
PCB-1232	UG/KG	68 UJ	44 UJ	45 UJ	110 U	63 UJ	48 UJ
PCB-1242	UG/KG	68 UJ	44 UJ	45 UJ	110 U	63 UJ	48 UJ
PCB-1248	UG/KG	68 UJ	44 UJ	45 UJ	110 U	63 UJ	48 UJ
PCB-1254	UG/KG	68 UJ	44 UJ	45 UJ	110 U	63 UJ	48 UJ
PCB-1260	UG/KG	240 J	370 J	64 J	110 J	180 J	69 J
VOLATILES							
CHLOROMETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
BROMOMETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
VINYL CHLORIDE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
CHLOROETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
METHYLENE CHLORIDE	UG/KG	12 U	12 U	1990 U	37 U	20 U	14 U
ACETONE	UG/KG	50 J	91	3700 J	470 J	60 J	91 J
CARBON DISULFIDE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,1-DICHLOROETHENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,1-DICHLOROETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,2-DICHLOROETHENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
CHLOROFORM	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,2-DICHLOROETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
2-BUTANONE	UG/KG	5 J	12 U	2600	87 J	20 U	14 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH04-SD-612B	6-BH04-SD-612M	6-BH05-SD-06B	6-BH05-SD-06M	6-BH06-SD-06B	6-BH06-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00439-03	00439-04	00439-05	00439-06	00439-07	00439-09
Parameter	Units						
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
CARBON TETRACHLORIDE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
BROMODICHLOROMETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,2-DICHLOROPROPANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
CIS-1,3-DICHLOROPROPENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
TRICHLOROETHENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
DIBROMOCHLOROMETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,1,2-TRICHLOROETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
BENZENE	UG/KG	12 U	12 UJ	1900 U	37 U	20 U	14 UJ
TRANS-1,3-DICHLOROPROPENE	UG/KG	12 U	12 UJ	1900 U	37 U	20 U	14 UJ
BROMOFORM	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
4-METHYL-2-PENTANONE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
2-HEXANONE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
TETRACHLOROETHENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
TOLUENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
CHLOROBENZENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
ETHYLBENZENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
STYRENE	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
TOTAL XYLENES	UG/KG	12 U	12 U	1900 U	37 U	20 U	14 U
SEMIVOLATILES							
PHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2-CHLOROPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
1,3-DICHLOROBENZENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
1,4-DICHLOROBENZENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
1,2-DICHLOROBENZENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2-METHYLPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
4-METHYLPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
HEXACHLOROETHANE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
NITROBENZENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
ISOPHORONE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2-NITROPHENOL	UG/KG	690 UJ	450 UJ	450 U	1800 U	640 U	480 U
2,4-DIMETHYLPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,4-DICHLOROPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
1,2,4-TRICHLOROBENZENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
NAPHTHALENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
4-CHLORANILINE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
HEXACHLOROBUTADIENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Sample No:		6-BH04-SD-612B	6-BH04-SD-612M	6-BH05-SD-06B	6-BH05-SD-06M	6-BH06-SD-06B	6-BH06-SD-06M
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/26/92	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92
Lab Id:		00439-03	00439-04	00439-05	00439-06	00439-07	00439-09
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2-METHYLNAPHTHALENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,4,6-TRICHLOROPHENOL	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,4,5-TRICHLOROPHENOL	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
2-CHLORONAPHTHALENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2-NITROANILINE	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
DIMETHYL PHTHALATE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
ACENAPHTHYLENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,6-DINITROTOLUENE	UG/KG	690 UJ	450 U	450 U	1800 U	640 U	480 U
3-NITROANILINE	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
ACENAPHTHENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,4-DINITROPHENOL	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
4-NITROPHENOL	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
DIBENZOFURAN	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
2,4-DINITROTOLUENE	UG/KG	690 UJ	450 UJ	450 U	1800 U	640 U	480 U
DIETHYL PHTHALATE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
FLUORENE	UG/KG	690 U	450 U	450 UJ	1800 UJ	640 U	480 UJ
4-NITROANILINE	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
N-NITRISODIPHENYLAMINE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
HEXACHLOROBENZENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
PENTACHLOROPHENOL	UG/KG	1700 U	1100 U	1100 U	4400 U	1600 U	1200 U
PHENANTHRENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
ANTHRACENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
DI-N-BUTYL PHTHALATE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
FLUORANTHENE	UG/KG	690 U	450 U	450 UJ	1800 UJ	640 U	480 UJ
CARBAZOLE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
PYRENE	UG/KG	690 U	60 J	450 U	1800 U	76 J	480 U
BUTYL BENZYL PHTHALATE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
3,3-DICHLOROBENZIDINE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
BENZO(A)ANTHRACENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
CHRYSENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
DI-N-OCTYL PHTHALATE	UG/KG	690 U	450 U	450 UJ	1800 UJ	640 U	480 UJ
BENZO(B)FLUORANTHENE	UG/KG	690 U	450 U	450 U	1800 U	96 J	480 U
BENZO(K)FLUORANTHENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
BENZO(A)PYRENE	UG/KG	93 J	100 J	450 U	1800 U	640 U	480 U
INDENO(1,2,3-CD) PYRENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
DIBENZ(A,H)ANTHRACENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U
BENZO(G,H,I)PERYLENE	UG/KG	690 U	450 U	450 U	1800 U	640 U	480 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH07-SD-06B	6-BH07-SD-06M
	Depth:	N/A	N/A
	Date Sampled:	8/27/92	8/27/92
	Lab Id:	00445-01	00445-02
Parameter	Units		
PESTICIDE/PCBS			
ALPHA-BHC	UG/KG	51 U	19 U
BETA-BHC	UG/KG	51 U	19 U
DELTA-BHC	UG/KG	51 U	19 U
GAMMA-BHC(LINDANE)	UG/KG	51 U	19 U
HEPTACHLOR	UG/KG	51 U	19 U
ALDRIN	UG/KG	51 U	19 U
HEPTACHLOR EPOXIDE	UG/KG	51 U	19 U
ENDOSULFAN I	UG/KG	51 U	19 U
DIELDRIN	UG/KG	99 U	37 U
4,4'-DDE	UG/KG	99 U	37 U
ENDRIN	UG/KG	99 U	37 U
ENDOSULFAN II	UG/KG	99 U	37 U
4,4'-DDD	UG/KG	99 U	37 U
ENDOSULFAN SULFATE	UG/KG	99 U	37 U
4,4'-DDT	UG/KG	99 U	37 U
METHOXYCHLOR	UG/KG	510 U	190 U
ENDRIN KETONE	UG/KG	99 U	37 U
ENDRIN ALDEHYDE	UG/KG	99 U	37 U
ALPHA CHLORDANE	UG/KG	51 U	19 U
GAMMA CHLORDANE	UG/KG	51 U	19 U
TOXAPHENE	UG/KG	5100 U	1900 U
PCB-1016	UG/KG	990 U	370 U
PCB-1221	UG/KG	2000 U	740 U
PCB-1232	UG/KG	990 U	370 U
PCB-1242	UG/KG	990 U	370 U
PCB-1248	UG/KG	990 U	370 U
PCB-1254	UG/KG	990 U	370 U
PCB-1260	UG/KG	990 U	370 U
VOLATILES			
CHLOROMETHANE	UG/KG	83 U	71 U
BROMOMETHANE	UG/KG	83 U	71 U
VINYL CHLORIDE	UG/KG	83 U	71 U
CHLOROETHANE	UG/KG	83 U	71 U
METHYLENE CHLORIDE	UG/KG	83 U	71 U
ACETONE	UG/KG	110 UJ	180 UJ
CARBON DISULFIDE	UG/KG	83 U	71 U
1,1-DICHLOROETHENE	UG/KG	83 UJ	71 U
1,1-DICHLOROETHANE	UG/KG	83 U	71 UJ
1,2-DICHLOROETHENE	UG/KG	83 U	71 U
CHLOROFORM	UG/KG	83 U	71 U
1,2-DICHLOROETHANE	UG/KG	83 U	71 U
2-BUTANONE	UG/KG	83 U	71 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-BH07-SD-06B	6-BH07-SD-06M
	Depth:	N/A	N/A
	Date Sampled:	8/27/92	8/27/92
	Lab Id:	00445-01	00445-02
Parameter	Units		
VOLATILES Cont.			
1,1,1-TRICHLOROETHANE	UG/KG	83 U	71 U
CARBON TETRACHLORIDE	UG/KG	83 U	71 U
BROMODICHLOROMETHANE	UG/KG	83 U	71 U
1,2-DICHLOROPROPANE	UG/KG	83 U	71 U
CIS-1,3-DICHLOROPROPENE	UG/KG	83 UJ	71 U
TRICHLOROETHENE	UG/KG	83 U	150
DIBROMOCHLOROMETHANE	UG/KG	83 U	71 U
1,1,2-TRICHLOROETHANE	UG/KG	83 U	71 U
BENZENE	UG/KG	83 U	71 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	83 U	71 U
BROMOFORM	UG/KG	83 U	71 U
4-METHYL-2-PENTANONE	UG/KG	83 U	71 U
2-HEXANONE	UG/KG	83 U	71 U
TETRACHLOROETHENE	UG/KG	83 U	71 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	83 U	71 U
TOLUENE	UG/KG	83 U	71 U
CHLOROBENZENE	UG/KG	83 U	71 U
ETHYLBENZENE	UG/KG	83 U	57 J
STYRENE	UG/KG	83 U	71 U
TOTAL XYLENES	UG/KG	83 U	380
SEMIVOLATILES			
PHENOL	UG/KG	3300 U	3600 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	3300 U	3600 U
2-CHLOROPHENOL	UG/KG	3300 U	3600 U
1,3-DICHLOROBENZENE	UG/KG	3300 U	3600 U
1,4-DICHLOROBENZENE	UG/KG	340 J	370 J
1,2-DICHLOROBENZENE	UG/KG	3300 U	3600 U
2-METHYLPHENOL	UG/KG	3300 U	3600 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	3300 U	3600 U
4-METHYLPHENOL	UG/KG	3300 U	3600 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	3300 U	3600 U
HEXACHLOROETHANE	UG/KG	3300 U	3600 U
NITROBENZENE	UG/KG	3300 U	3600 U
ISOPHORONE	UG/KG	3300 U	3600 U
2-NITROPHENOL	UG/KG	3300 U	3600 U
2,4-DIMETHYLPHENOL	UG/KG	3300 U	3600 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	3300 U	3600 U
2,4-DICHLOROPHENOL	UG/KG	3300 U	3600 U
1,2,4-TRICHLOROBENZENE	UG/KG	3300 U	3600 U
NAPHTHALENE	UG/KG	3300 U	3600 U
4-CHLORANILINE	UG/KG	3300 U	3600 U
HEXACHLOROBUTADIENE	UG/KG	3300 U	3600 U

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-BH07-SD-06B	6-BH07-SD-06M
Sample No:		6-BH07-SD-06B	6-BH07-SD-06M
Depth:		N/A	N/A
Date Sampled:		8/27/92	8/27/92
Lab Id:		00445-01	00445-02
SEMIVOLATILES Cont.			
4-CHLORO-3-METHYLPHENOL	UG/KG	3300 U	3600 U
2-METHYLNAPHTHALENE	UG/KG	3300 U	3600 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	3300 U	3600 U
2,4,6-TRICHLOROPHENOL	UG/KG	3300 U	3600 U
2,4,5-TRICHLOROPHENOL	UG/KG	7900 U	8800 U
2-CHLORONAPHTHALENE	UG/KG	3300 U	3600 U
2-NITROANILINE	UG/KG	7900 U	8800 U
DIMETHYL PHTHALATE	UG/KG	3300 U	3600 U
ACENAPHTHYLENE	UG/KG	3300 U	3600 U
2,6-DINITROTOLUENE	UG/KG	3300 U	3600 U
3-NITROANILINE	UG/KG	7900 U	8800 U
ACENAPHTHENE	UG/KG	3300 U	3600 U
2,4-DINITROPHENOL	UG/KG	7900 U	8800 U
4-NITROPHENOL	UG/KG	7900 U	8800 U
DIBENZOFURAN	UG/KG	3300 U	3600 U
2,4-DINITROTOLUENE	UG/KG	3300 U	3600 U
DIETHYL PHTHALATE	UG/KG	3300 U	3600 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	3300 U	3600 U
FLUORENE	UG/KG	3300 U	3600 U
4-NITROANILINE	UG/KG	7900 U	8800 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	7900 U	8800 U
N-NITRISODIPHENYLAMINE	UG/KG	3300 U	3600 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	3300 U	3600 U
HEXACHLOROBENZENE	UG/KG	3300 U	3600 U
PENTACHLOROPHENOL	UG/KG	7900 U	8800 U
PHENANTHRENE	UG/KG	3300 U	3600 U
ANTHRACENE	UG/KG	3300 U	3600 U
DI-N-BUTYL PHTHALATE	UG/KG	3300 U	3600 U
FLUORANTHENE	UG/KG	3300 U	3600 U
CARBAZOLE	UG/KG	3300 U	3600 U
PYRENE	UG/KG	3300 U	3600 U
BUTYL BENZYL PHTHALATE	UG/KG	3300 U	3600 U
3,3-DICHLOROBENZIDINE	UG/KG	3300 U	3600 U
BENZO(A)ANTHRACENE	UG/KG	3300 U	3600 U
CHRYSENE	UG/KG	3300 U	3600 U
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	3300 U	3600 U
DI-N-OCTYL PHTHALATE	UG/KG	3300 U	3600 UJ
BENZO(B)FLUORANTHENE	UG/KG	3300 U	3600 UJ
BENZO(K)FLUORANTHENE	UG/KG	3300 U	3600 UJ
BENZO(A)PYRENE	UG/KG	3300 U	3600 UJ
INDENO(1,2,3-CD) PYRENE	UG/KG	3300 U	3600 UJ
DIBENZ(A,H)ANTHRACENE	UG/KG	3300 U	3600 UJ
BENZO(G,H,I)PERYLENE	UG/KG	3300 U	3600 UJ

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: Depth: Date Sampled: Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2 U	51 U	ND	ND		0/20
BETA-BHC	UG/KG	2 U	51 U	ND	ND		0/20
DELTA-BHC	UG/KG	2 U	51 U	ND	ND		0/20
GAMMA-BHC(LINDANE)	UG/KG	2 U	51 U	ND	ND		0/20
HEPTACHLOR	UG/KG	2 U	51 U	ND	ND		0/20
ALDRIN	UG/KG	2 U	51 U	ND	ND		0/20
HEPTACHLOR EPOXIDE	UG/KG	2 U	51 U	ND	ND		0/20
ENDOSULFAN I	UG/KG	2 U	51 U	ND	ND		0/20
DIELDRIN	UG/KG	3.9 U	99 U	ND	ND		0/20
4,4'-DDE	UG/KG	5.4 U	99 U	5.7	68	6-BH06-SD-06B	11/20
ENDRIN	UG/KG	3.9 U	99 U	ND	ND		0/20
ENDOSULFAN II	UG/KG	3.9 U	99 U	ND	ND		0/20
4,4'-DDD	UG/KG	5.2 U	99 U	8.4 J	220 J	6-BH04-SD-612M	10/20
ENDOSULFAN SULFATE	UG/KG	3.9 U	99 U	ND	ND		0/20
4,4'-DDT	UG/KG	4.5 UJ	99 U	6.6 J	38 J	6-BH04-SD-612M	8/20
METHOXYCHLOR	UG/KG	20 U	510 U	ND	ND		0/20
ENDRIN KETONE	UG/KG	3.9 U	99 U	ND	ND		0/20
ENDRIN ALDEHYDE	UG/KG	3.9 U	99 U	ND	ND		0/20
ALPHA CHLORDANE	UG/KG	2 U	51 U	14 J	14 J	6-BH06-SD-06B	1/20
GAMMA CHLORDANE	UG/KG	2 U	51 U	ND	ND		0/20
TOXAPHENE	UG/KG	200 U	5100 U	ND	ND		0/20
PCB-1016	UG/KG	39 U	990 U	ND	ND		0/20
PCB-1221	UG/KG	79 U	2000 U	ND	ND		0/20
PCB-1232	UG/KG	39 U	990 U	ND	ND		0/20
PCB-1242	UG/KG	39 U	990 U	ND	ND		0/20
PCB-1248	UG/KG	39 U	990 U	ND	ND		0/20
PCB-1254	UG/KG	39 U	990 U	ND	ND		0/20
PCB-1260	UG/KG	52 U	990 U	51	370 J	6-BH07-SD-06M	10/20
VOLATILES							
CHLOROMETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
BROMOMETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
VINYL CHLORIDE	UG/KG	12 U	1900 U	ND	ND		0/20
CHLOROETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
METHYLENE CHLORIDE	UG/KG	12 U	1990 U	2 J	7 J	6-BH03-SD-612M	4/20
ACETONE	UG/KG	18 U	180 UJ	34	9900 J	6-BH04-SD-06M	14/20
CARBON DISULFIDE	UG/KG	12 U	1900 U	ND	ND		0/20
1,1-DICHLOROETHENE	UG/KG	12 U	1900 U	ND	ND		0/20
1,1-DICHLOROETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
1,2-DICHLOROETHENE	UG/KG	12 U	1900 U	ND	ND		0/20
CHLOROFORM	UG/KG	12 U	1900 U	ND	ND		0/20
1,2-DICHLOROETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
2-BUTANONE	UG/KG	12 U	83 U	3 J	2600	6-BH05-SD-06B	10/20

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
CARBON TETRACHLORIDE	UG/KG	12 U	1900 U	ND	ND		0/20
BROMODICHLOROMETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
1,2-DICHLOROPROPANE	UG/KG	12 U	1900 U	ND	ND		0/20
CIS-1,3-DICHLOROPROPENE	UG/KG	12 U	1900 U	ND	ND		0/20
TRICHLOROETHENE	UG/KG	12 U	1900 U	5 J	150	6-BH07-SD-06M	2/20
DIBROMOCHLOROMETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
1,1,2-TRICHLOROETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
BENZENE	UG/KG	12 UJ	1900 U	5 J	5 J	6-BH01-SD-06B	1/20
TRANS-1,3-DICHLOROPROPENE	UG/KG	12 UJ	1900 U	ND	ND		0/20
BROMOFORM	UG/KG	12 U	1900 U	ND	ND		0/20
4-METHYL-2-PENTANONE	UG/KG	12 U	1900 U	ND	ND		0/20
2-HEXANONE	UG/KG	12 U	1900 U	ND	ND		0/20
TETRACHLOROETHENE	UG/KG	12 U	1900 U	3 J	3 J	6-BH03-SD-06B	1/20
1,1,2,2-TETRACHLOROETHANE	UG/KG	12 U	1900 U	ND	ND		0/20
TOLUENE	UG/KG	12 U	1900 U	ND	ND		0/20
CHLOROBENZENE	UG/KG	12 U	1900 U	ND	ND		0/20
ETHYLBENZENE	UG/KG	12 U	1900 U	57 J	57 J	6-BH07-SD-06M	1/20
STYRENE	UG/KG	12 U	1900 U	ND	ND		0/20
TOTAL XYLENES	UG/KG	12 U	1900 U	3 J	380	6-BH07-SD-06M	2/20
SEMIVOLATILES							
PHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
BIS(2-CHLOROETHYL) ETHER	UG/KG	390 U	3600 U	ND	ND		0/20
2-CHLOROPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
1,3-DICHLOROBENZENE	UG/KG	390 U	3600 U	ND	ND		0/20
1,4-DICHLOROBENZENE	UG/KG	390 U	1800 U	340 J	370 J	6-BH07-SD-06M	2/20
1,2-DICHLOROBENZENE	UG/KG	390 U	3600 U	ND	ND		0/20
2-METHYLPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	390 U	3600 U	ND	ND		0/20
4-METHYLPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
N-NITROSODI-N-PROPYLAMINE	UG/KG	390 U	3600 U	ND	ND		0/20
HEXACHLOROETHANE	UG/KG	390 U	3600 U	ND	ND		0/20
NITROBENZENE	UG/KG	390 U	3600 U	ND	ND		0/20
ISOPHORONE	UG/KG	390 U	3600 U	ND	ND		0/20
2-NITROPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
2,4-DIMETHYLPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
BIS(2-CHLOROETHOXY) METHANE	UG/KG	390 U	3600 U	ND	ND		0/20
2,4-DICHLOROPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
1,2,4-TRICHLOROBENZENE	UG/KG	390 U	3600 U	ND	ND		0/20
NAPHTHALENE	UG/KG	390 U	3600 U	ND	ND		0/20
4-CHLORANILINE	UG/KG	390 U	3600 U	ND	ND		0/20
HEXACHLOROBUTADIENE	UG/KG	390 U	3600 U	ND	ND		0/20

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: / Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
2-METHYLNAPHTHALENE	UG/KG	390 U	3600 U	ND	ND		0/20
HEXACHLOROCYCLOPENTADIENE	UG/KG	390 U	3600 U	ND	ND		0/20
2,4,6-TRICHLOROPHENOL	UG/KG	390 U	3600 U	ND	ND		0/20
2,4,5-TRICHLOROPHENOL	UG/KG	950 U	8800 U	ND	ND		0/20
2-CHLORONAPHTHALENE	UG/KG	390 U	3600 U	ND	ND		0/20
2-NITROANILINE	UG/KG	950 U	8800 U	ND	ND		0/20
DIMETHYL PHTHALATE	UG/KG	390 U	3600 U	ND	ND		0/20
ACENAPHTHYLENE	UG/KG	390 U	3600 U	ND	ND		0/20
2,6-DINITROTOLUENE	UG/KG	390 U	3600 U	ND	ND		0/20
3-NITROANILINE	UG/KG	950 U	8800 U	ND	ND		0/20
ACENAPHTHENE	UG/KG	390 U	3600 U	ND	ND		0/20
2,4-DINITROPHENOL	UG/KG	950 U	8800 U	ND	ND		0/20
4-NITROPHENOL	UG/KG	950 U	8800 U	ND	ND		0/20
DIBENZOFURAN	UG/KG	390 U	3600 U	ND	ND		0/20
2,4-DINITROTOLUENE	UG/KG	390 U	3600 U	ND	ND		0/20
DIETHYL PHTHALATE	UG/KG	390 U	3600 U	ND	ND		0/20
4-CHLOROPHENYL PHENYL ETHER	UG/KG	390 U	3600 U	ND	ND		0/20
FLUORENE	UG/KG	390 UJ	3600 U	ND	ND		0/20
4-NITROANILINE	UG/KG	950 U	8800 U	ND	ND		0/20
4,6-DINITRO-2-METHYLPHENOL	UG/KG	950 U	8800 U	ND	ND		0/20
N-NITRISODIPHENYLAMINE	UG/KG	390 U	3600 U	ND	ND		0/20
4-BROMOPHENYL PHENYL ETHER	UG/KG	390 U	3600 U	ND	ND		0/20
HEXACHLOROBENZENE	UG/KG	390 U	3600 U	ND	ND		0/20
PENTACHLOROPHENOL	UG/KG	950 U	8800 U	ND	ND		0/20
PHENANTHRENE	UG/KG	390 U	3600 U	ND	ND		0/20
ANTHRACENE	UG/KG	390 U	3600 U	ND	ND		0/20
DI-N-BUTYL PHTHALATE	UG/KG	390 U	3600 U	ND	ND		0/20
FLUORANTHENE	UG/KG	390 UJ	3600 U	ND	ND		0/20
CARBAZOLE	UG/KG	390 U	3600 U	ND	ND		0/20
PYRENE	UG/KG	390 U	3600 U	60 J	76 J	6-BH06-SD-06B	2/20
BUTYL BENZYL PHTHALATE	UG/KG	390 U	3600 U	ND	ND		0/20
3,3-DICHLOROBENZIDINE	UG/KG	390 U	3600 U	ND	ND		0/20
BENZO(A)ANTHRACENE	UG/KG	390 U	3600 U	ND	ND		0/20
CHRYSENE	UG/KG	390 U	3600 U	ND	ND		0/20
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	390 U	3600 U	ND	ND		0/20
DI-N-OCTYL PHTHALATE	UG/KG	390 UJ	3600 UJ	ND	ND		0/20
BENZO(B)FLUORANTHENE	UG/KG	390 U	3600 UJ	96 J	96 J	6-BH06-SD-06B	1/20
BENZO(K)FLUORANTHENE	UG/KG	390 U	3600 UJ	ND	ND		0/20
BENZO(A)PYRENE	UG/KG	390 U	3600 UJ	93 J	640	6-BH06-SD-06B	6/20
INDENO(1,2,3-CD) PYRENE	UG/KG	450 U	3600 UJ	40 J	40 J	6-BH04-SD-06B	1/20
DIBENZ(A,H)ANTHRACENE	UG/KG	390 U	3600 UJ	ND	ND		0/20
BENZO(G,H,I)PERYLENE	UG/KG	390 U	3600 UJ	ND	ND		0/20

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH01-SD-612B	6-BH01-SD-612M	6-BH01-SD-6B	6-BH01-SD-6M	6-BH02-SD-06M	6-BH02-SD-612M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	10/23/92	10/23/92	10/23/92	10/23/92	8/28/92	8/28/92
	Lab Id:	00591-03	00591-04	00591-01	00591-02	00458-02	00458-03
Parameter	Units						
ALUMINUM	MG/KG	6760	7790	5610	6360	3010	7780
ANTIMONY	MG/KG	4.7 UJ	5.9 U	4.9 UJ	4.8 U	3.8 U	4.6 U
ARSENIC	MG/KG	1 U	1.1 U	1.1 U	0.93 U	0.77 U	1.6 JB
BARIUM	MG/KG	9.7 JB	14.4 B	8.5 UJ	9.9 JB	12.5 B	30 B
BERYLLIUM	MG/KG	0.13 B	0.17 B	0.14 B	0.1 U	0.08 U	0.33 B
CADMIUM	MG/KG	0.51 UJ	0.8 UJ	0.86 UJ	0.65 UJ	0.54 JB	1.3 JB
CALCIUM	MG/KG	59.3 U	82.8 U	61.9 U	70.2 U	1410	3890
CHROMIUM	MG/KG	5.1	4.7	4.9	3.6	3.3 U	9.9
COBALT	MG/KG	0.53 U	0.84 U	0.55 U	0.69 U	1.1 UJ	2.6 UJ
COPPER	MG/KG	3.2 JB	10.1 JB	4.2 JB	6.2 JB	2.5 UJ	2.3 UJ
IRON	MG/KG	765	1590	638	956	1240	3150
LEAD	MG/KG	8.9	12.3	11.3	10.2	6.9	8.9
MAGNESIUM	MG/KG	128 B	160 B	103 B	130 B	77.9 B	187 B
MANGANESE	MG/KG	4.9	6 B	4.7	4.9 B	4.4 J	8.6 J
MERCURY	MG/KG	0.05 U	0.05 U	0.05 U	0.04 UJ	0.03 U	0.07 U
NICKEL	MG/KG	2.1 UJ	3.3 UJ	2.2 UJ	2.7 UJ	2.7 UJ	7.2 UJ
POTASSIUM	MG/KG	125 B	163 B	122 B	140 B	76.8 UJ	151 U
SELENIUM	MG/KG	1.7 UJ	1.9 U	1.8 UJ	1.6 UJ	1.3 U	2.9
SILVER	MG/KG	0.53 UJ	0.84 UJ	0.55 UJ	0.69 UJ	0.82 UJ	1.3 UJ
SODIUM	MG/KG	35.5 UJ	42.8 UJ	41.5 UJ	39.4 UJ	25.4 UJ	39.9 UJ
THALLIUM	MG/KG	0.69 U	0.76 U	0.73 U	0.62 U	0.51 U	0.65 UJ
VANADIUM	MG/KG	5.7 B	6.5 B	4.8 B	4.9 B	3.3 JB	14.1 B
ZINC	MG/KG	2.1 U	1.4 U	1.6 U	1.8 U	12	12.6

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH03-SD-06B	6-BH03-SD-06M	6-BH03-SD-612B	6-BH03-SD-612M	6-BH04-SD-06B	6-BH04-SD-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/28/92	8/28/92	8/28/92	8/28/92	8/26/92	8/26/92
	Lab Id:	00458-05	00458-07	00458-08	00458-09	00439-01	00439-02
Parameter	Units						
ALUMINUM	MG/KG	13600 J	9210	15000	10800	465	570
ANTIMONY	MG/KG	4.4 U	7.8 U	4.5 U	5.8 U	10.2 U	11.3 U
ARSENIC	MG/KG	0.79 U	1.5 UJ	0.79 U	1.2 UJ	0.47 U	0.62 B
BARIUM	MG/KG	31.7 B	33.2 B	32.8 B	40.4 B	4.4 U	4.8 U
BERYLLIUM	MG/KG	0.63 B	0.56 B	0.97 B	0.42 B	0.21 U	0.23 U
CADMIUM	MG/KG	1.3 JB	1.1 JB	1.3 JB	1.7 JB	0.7 JB	0.69 U
CALCIUM	MG/KG	3340	4850	3280	5880	45600	8560
CHROMIUM	MG/KG	11.9	8.4	13.6	10	2.4	1.2 U
COBALT	MG/KG	2.8 UJ	1.7 UJ	3.2 UJ	2.5 UJ	1.3 U	1.4 U
COPPER	MG/KG	2.8 UJ	6.7 JB	0.97 UJ	7.1 JB	0.83 U	0.92 U
IRON	MG/KG	3050	4450	3030	4660	516	442
LEAD	MG/KG	19.1 J	45.3	20.8	46.1	2.9	7.7
MAGNESIUM	MG/KG	317 B	219 B	291 B	210 B	653 B	138 B
MANGANESE	MG/KG	11 J	14 J	8.1 J	15 J	28.7	6.3 J
MERCURY	MG/KG	0.05 U	0.08 U	0.08 U	0.11 U	0.1 U	0.11 U
NICKEL	MG/KG	4.7 UJ	4.4 U	4.2 UJ	5.8 UJ	3.5 U	3.9 U
POTASSIUM	MG/KG	225 B	215 U	288 B	176 U	79.8 U	88.3 U
SELENIUM	MG/KG	1.3 UJ	2.5 UJ	1.3 UJ	2.1 UJ	1.2 U	1.1 U
SILVER	MG/KG	0.63 UJ	2.2 UJ	0.65 UJ	1.2 UJ	2.1 U	2.3 U
SODIUM	MG/KG	61.8 UJ	73.5 UJ	83 UJ	59.5 UJ	86.5 JB	39.6 UJ
THALLIUM	MG/KG	0.53 UJ	1 U	0.53 UJ	0.83 UJ	0.47 UJ	0.45 U
VANADIUM	MG/KG	13.8 B	12.9 B	17.8	12.5 B	1.7 JB	1.5 JB
ZINC	MG/KG	11	30.4	6.4 B	34.5	5 U	7.7

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH04-SD-612B	6-BH04-SD-612M	6-BH05-SD-06B	6-BH05-SD-06M	6-BH06-SD-06B	6-BH06-SD-06M
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92	8/26/92
	Lab Id:	00439-03	00439-04	00439-05	00439-06	00439-07	00439-09
Parameter	Units						
ALUMINUM	MG/KG	1000	1300	1850	6230	3840	5260 J
ANTIMONY	MG/KG	9.4 U	10.6 U	11.5 U	13.1 U	11.9 U	31.7 UJ
ARSENIC	MG/KG	0.4 U	0.54 B	0.46 U	1.1 B	1 B	2.2 JB
BARIUM	MG/KG	8.1 JB	4.5 U	7.7 JB	27 B	17.9 B	25.1 JB
BERYLLIUM	MG/KG	0.19 U	0.22 U	0.24 U	0.3 B	0.24 U	0.65 UJ
CADMIUM	MG/KG	0.57 U	0.73 JB	0.71 U	1.8 J	1.1 JB	1.9 UJ
CALCIUM	MG/KG	7490	18000	1210	4070	4630	12300 J
CHROMIUM	MG/KG	3.4	2.8	2.3 B	6.6	5.5	9.2 J
COBALT	MG/KG	1.1 U	1.3 U	1.4 U	1.7 JB	1.5 U	3.9 UJ
COPPER	MG/KG	0.76 U	1.2 JB	2.2 JB	6.2 JB	5.2 JB	8.8 JB
IRON	MG/KG	1320	995	998	6250	3060	5920 J
LEAD	MG/KG	2.5	17.8	17.6	29	42	27 J
MAGNESIUM	MG/KG	118 B	295 B	57.6 B	180 B	178 B	302 JB
MANGANESE	MG/KG	4.8 J	10.4 J	3.8 J	12.4 J	19 J	27.5 J
MERCURY	MG/KG	0.1 U	0.11 U	0.15 U	0.14 U	0.13 U	0.38 UJ
NICKEL	MG/KG	3.2 U	3.7 U	4 U	4.5 U	4.1 U	11 UJ
POTASSIUM	MG/KG	73.1 U	82.6 U	90 U	156 B	121 B	248 UJ
SELENIUM	MG/KG	1 U	1 U	1.2 U	1.2 U	1.5 U	3.3 UJ
SILVER	MG/KG	1.9 U	2.2 U	2.4 U	2.7 U	2.4 U	6.5 UJ
SODIUM	MG/KG	28.2 UJ	62.4 UJ	35 UJ	48.3 UJ	42.4 UJ	93.7 JB
THALLIUM	MG/KG	0.4 U	0.42 UJ	0.46 U	0.5 UJ	0.61 U	1.3 UJ
VANADIUM	MG/KG	1.5 JB	2.2 B	3.2 JB	10.4 B	6.5 B	9 JB
ZINC	MG/KG	6.7	11.4	13.8	36.6	24.9	50.7 J

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-BH07-SD-06B	6-BH07-SD-06M
	Depth:	N/A	N/A
	Date Sampled:	8/27/92	8/27/92
	Lab Id:	00445-01	00445-02
Parameter	Units		
ALUMINUM	MG/KG	12300 J	22100 J
ANTIMONY	MG/KG	21.3 U	23.7 U
ARSENIC	MG/KG	6.1 JB	4.7 B
BARIUM	MG/KG	10.5 JB	22.8 JB
BERYLLIUM	MG/KG	0.82 U	1.2 U
CADMIUM	MG/KG	4.5 UJ	4.7 JB
CALCIUM	MG/KG	9240 J	14400 J
CHROMIUM	MG/KG	10.8 B	16.4 B
COBALT	MG/KG	3.4 B	4 B
COPPER	MG/KG	28.1 B	23.8 B
IRON	MG/KG	15800 J	17100 J
LEAD	MG/KG	49.2 J	70.4 J
MAGNESIUM	MG/KG	9820 J	10500 J
MANGANESE	MG/KG	46.5	48.6
MERCURY	MG/KG	0.38 U	0.49 U
NICKEL	MG/KG	12 UJ	13.4 UJ
POTASSIUM	MG/KG	1930 B	1460 B
SELENIUM	MG/KG	7.6 U	7.5 U
SILVER	MG/KG	3 U	3.4 U
SODIUM	MG/KG	36200 J	15500 J
THALLIUM	MG/KG	3 UJ	3 UJ
VANADIUM	MG/KG	45.9 B	54.1 B
ZINC	MG/KG	77.1	82.4

SITE 6 BEAR HEAD CREEK SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
ALUMINUM	MG/KG	NA	NA	465	22100 J	6-BH07-SD-06M	20/20
ANTIMONY	MG/KG	3.8 U	31.7 UJ	ND	ND		0/20
ARSENIC	MG/KG	0.4 U	1.5 UJ	0.54 B	6.1 JB	6-BH07-SD-06B	8/20
BARIUM	MG/KG	4.4 U	8.5 UJ	7.7 JB	40.4 B	6-BH03-SD-612M	16/20
BERYLLIUM	MG/KG	0.08 U	1.2 U	0.13 B	0.97 B	6-BH03-SD-612B	9/20
CADMIUM	MG/KG	0.51 UJ	4.5 UJ	0.54 JB	4.7 JB	6-BH07-SD-06M	11/20
CALCIUM	MG/KG	59.3 U	82.8 U	1210	45600	6-BH04-SD-06B	16/20
CHROMIUM	MG/KG	1.2 U	3.3 U	2.3 B	16.4 B	6-BH07-SD-06M	18/20
COBALT	MG/KG	0.53 U	3.9 UJ	1.7 JB	4 B	6-BH07-SD-06M	3/20
COPPER	MG/KG	0.76 U	2.8 UJ	1.2 JB	28.1 B	6-BH07-SD-06B	13/20
IRON	MG/KG	NA	NA	442	17100 J	6-BH07-SD-06M	20/20
LEAD	MG/KG	NA	NA	2.5	70.4 J	6-BH07-SD-06M	20/20
MAGNESIUM	MG/KG	NA	NA	57.6 B	10500 J	6-BH07-SD-06M	20/20
MANGANESE	MG/KG	NA	NA	3.8 J	48.6	6-BH07-SD-06M	20/20
MERCURY	MG/KG	0.03 U	0.49 U	ND	ND		0/20
NICKEL	MG/KG	2.1 UJ	13.4 UJ	ND	ND		0/20
POTASSIUM	MG/KG	73.1 U	248 UJ	121 B	1930 B	6-BH07-SD-06B	10/20
SELENIUM	MG/KG	1 U	7.6 U	2.9	2.9	6-BH02-SD-612M	1/20
SILVER	MG/KG	0.53 UJ	6.5 UJ	ND	ND		0/20
SODIUM	MG/KG	25.4 UJ	83 UJ	86.5 JB	36200 J	6-BH07-SD-06B	4/20
THALLIUM	MG/KG	0.4 U	3 UJ	ND	ND		0/20
VANADIUM	MG/KG	NA	NA	1.5 JB	54.1 B	6-BH07-SD-06M	20/20
ZINC	MG/KG	1.4 U	5 U	6.4 B	82.4	6-BH07-SD-06M	15/20

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/25/92	8/24/92	8/24/92	8/24/92	8/24/92
	Lab Id:	00439-11	00439-13	00437-04	00437-05	00437-08	00437-09
Parameter	Units						
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
BETA-BHC	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
DELTA-BHC	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
GAMMA-BHC(LINDANE)	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
HEPTACHLOR	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
ALDRIN	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
HEPTACHLOR EPOXIDE	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
ENDOSULFAN I	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
DIELDRIN	UG/KG	43 J	4.1 UJ	24 U	8.1 J	4.1 UJ	4 UJ
4,4'-DDE	UG/KG	4.7 U	120 J	24 U	53 J	4.1 UJ	4 UJ
ENDRIN	UG/KG	5.1 J	4.1 UJ	24 U	8.1 U	4.1 UJ	4 UJ
ENDOSULFAN II	UG/KG	4.7 U	4.1 UJ	24 U	8.1 U	4.1 UJ	4 UJ
4,4'-DDD	UG/KG	4.7 U	45 J	24 U	8.1 U	9.4 J	4.1 J
ENDOSULFAN SULFATE	UG/KG	4.7 U	4.1 UJ	24 U	8.1 U	4.1 UJ	4 UJ
4,4'-DDT	UG/KG	4.7 U	130 J	210 J	51	14 J	4 UJ
METHOXYCHLOR	UG/KG	24 U	21 UJ	130 U	42 U	21 UJ	21 UJ
ENDRIN KETONE	UG/KG	4.7 U	4.1 UJ	24 U	8.1 U	4.1 UJ	4 UJ
ENDRIN ALDEHYDE	UG/KG	7.8	4.1 UJ	24 U	8.1 U	4.1 UJ	4 UJ
ALPHA CHLORDANE	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
GAMMA CHLORDANE	UG/KG	2.4 U	2.1 UJ	13 U	4.2 U	2.1 UJ	2.1 UJ
TOXAPHENE	UG/KG	240 U	210 UJ	1300 U	420 U	210 UJ	210 UJ
PCB-1016	UG/KG	47 U	41 UJ	240 U	81 U	41 UJ	40 UJ
PCB-1221	UG/KG	95 U	83 UJ	490 U	160 U	82 UJ	82 UJ
PCB-1232	UG/KG	47 U	41 UJ	240 U	81 U	41 UJ	40 UJ
PCB-1242	UG/KG	47 U	41 UJ	240 U	81 U	41 UJ	40 UJ
PCB-1248	UG/KG	47 U	41 UJ	240 U	81 U	41 UJ	40 UJ
PCB-1254	UG/KG	47 U	41 UJ	240 U	81 U	41 UJ	40 UJ
PCB-1260	UG/KG	360 J	92 J	190 J	81 U	41 UJ	40 UJ
VOLATILES							
CHLOROMETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
BROMOMETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
VINYL CHLORIDE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
CHLOROETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
METHYLENE CHLORIDE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
ACETONE	UG/KG	62	12 U	60 UJ	12 UJ	180 J	9100 J
CARBON DISULFIDE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,1-DICHLOROETHENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,1-DICHLOROETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,2-DICHLOROETHENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
CHLOROFORM	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,2-DICHLOROETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
2-BUTANONE	UG/KG	14 U	12 U	12 U	12 U	12 U	2400 J

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
Sample No:		6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/25/92	8/24/92	8/24/92	8/24/92	8/24/92
Lab Id:		00439-11	00439-13	00437-04	00437-05	00437-08	00437-09
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
CARBON TETRACHLORIDE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
BROMODICHLOROMETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,2-DICHLOROPROPANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
CIS-1,3-DICHLOROPROPENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
TRICHLOROETHENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
DIBROMOCHLOROMETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,1,2-TRICHLOROETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
BENZENE	UG/KG	14 UJ	12 UJ	12 U	12 U	12 U	750 UJ
TRANS-1,3-DICHLOROPROPENE	UG/KG	14 UJ	12 UJ	12 U	12 U	12 U	750 UJ
BROMOFORM	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
4-METHYL-2-PENTANONE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
2-HEXANONE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
TETRACHLOROETHENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
1,1,2,2-TETRACHLOROETHANE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
TOLUENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
CHLOROBENZENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
ETHYLBENZENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
STYRENE	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
TOTAL XYLENES	UG/KG	14 U	12 U	12 U	12 U	12 U	750 UJ
SEMIVOLATILES							
PHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2-CHLOROPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
1,3-DICHLOROBENZENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
1,4-DICHLOROBENZENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
1,2-DICHLOROBENZENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2-METHYLPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
4-METHYLPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
HEXACHLOROETHANE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
NITROBENZENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
ISOPHORONE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2-NITROPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2,4-DIMETHYLPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2,4-DICHLOROPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
1,2,4-TRICHLOROBENZENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
NAPHTHALENE	UG/KG	470 U	54 J	400 U	410 U	380 U	390 U
4-CHLORANILINE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
HEXACHLOROBUTADIENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
	Depth:	N/A	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/25/92	8/24/92	8/24/92	8/24/92	8/24/92
	Lab Id:	00439-11	00439-13	00437-04	00437-05	00437-08	00437-09
Parameter	Units						
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2-METHYLNAPHTHALENE	UG/KG	470 U	44 J	400 U	410 U	380 U	390 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2,4,6-TRICHLOROPHENOL	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2,4,5-TRICHLOROPHENOL	UG/KG	1100 U	1000 U	970 U	990 U	930 U	950 U
2-CHLORONAPHTHALENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2-NITROANILINE	UG/KG	1100 U	1000 U	970 U	990 U	930 U	950 U
DIMETHYL PHTHALATE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
ACENAPHTHYLENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
2,6-DINITROTOLUENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
3-NITROANILINE	UG/KG	1100 U	1000 U	970 U	990 U	930 U	950 U
ACENAPHTHENE	UG/KG	470 U	220 J	400 U	410 U	380 U	390 U
2,4-DINITROPHENOL	UG/KG	1100 U	1000 U	970 U	990 U	930 U	950 U
4-NITROPHENOL	UG/KG	1100 U	1000 U	970 U	990 U	930 U	950 U
DIBENZOFURAN	UG/KG	470 U	110 J	400 U	410 U	380 U	390 U
2,4-DINITROTOLUENE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
DIETHYL PHTHALATE	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	470 U	410 U	400 U	410 U	380 U	390 U
FLUORENE	UG/KG	470 UJ	250 J	400 U	410 U	380 U	390 U
4-NITROANILINE	UG/KG	1100 U	1000 U	970 U	990 U	930 U	950 U
4,6-DINITRO-2-METHYLPHENOL	UG/KG	1100 U	1000 U	970 U	990 U	930 UJ	950 UJ
N-NITRISODIPHENYLAMINE	UG/KG	470 U	410 U	400 U	410 U	380 UJ	390 UJ
4-BROMOPHENYL PHENYL ETHER	UG/KG	470 U	410 U	400 U	410 U	380 UJ	390 UJ
HEXACHLOROBENZENE	UG/KG	470 U	410 U	400 UJ	410 UJ	380 UJ	390 UJ
PENTACHLOROPHENOL	UG/KG	1100 U	1000 U	970 UJ	990 UJ	930 UJ	950 UJ
PHENANTHRENE	UG/KG	50 J	1600	400 U	90 J	380 UJ	390 UJ
ANTHRACENE	UG/KG	470 U	480	400 U	410 U	380 UJ	390 UJ
DI-N-BUTYL PHTHALATE	UG/KG	470 U	410 U	400 U	410 U	380 UJ	390 UJ
FLUORANTHENE	UG/KG	84 J	1500 J	400 U	130 J	380 UJ	390 UJ
CARBAZOLE	UG/KG	470 U	170 J	400 U	410 U	380 UJ	390 UJ
PYRENE	UG/KG	130 J	2100	400 U	96 J	380 UR	390 UR
BUTYL BENZYL PHTHALATE	UG/KG	470 U	410 U	400 U	410 U	380 UR	390 UR
3,3-DICHLOROBENZIDINE	UG/KG	470 U	410 U	400 U	410 U	380 UR	390 UR
BENZO(A)ANTHRACENE	UG/KG	61 J	1100	400 U	43 J	380 UR	390 UR
CHRYSENE	UG/KG	85 J	1100	400 U	59 J	380 UR	390 UR
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	470 U	410 U	200 J	480 U	380 UR	390 UR
DI-N-OCTYL PHTHALATE	UG/KG	470 UJ	410 UJ	400 U	410 U	380 UR	390 UR
BENZO(B)FLUORANTHENE	UG/KG	120 J	1200	400 U	54 J	380 UR	390 UR
BENZO(K)FLUORANTHENE	UG/KG	470 U	440	400 U	410 U	380 UR	390 UR
BENZO(A)PYRENE	UG/KG	70 J	1000	400 U	410 U	380 UR	390 UR
INDENO(1,2,3-CD) PYRENE	UG/KG	57 J	710	400 U	410 U	380 UR	390 UR
DIBENZ(A,H)ANTHRACENE	UG/KG	470 U	83 J	400 U	410 U	380 UR	390 UR
BENZO(G,H,I)PERYLENE	UG/KG	57 J	680	400 U	410 U	380 UR	390 UR

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-RV5-SD-06	6-RV6-SD-06	6-RV7-SD-06	6-RV7-SD-612	6-RV8-SD-06
	Depth:	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/25/92	8/25/92	8/25/92	8/25/92
	Lab Id:	00439-15	00437-11	00437-12	00437-14	00437-17
Parameter	Units					
PESTICIDE/PCBS						
ALPHA-BHC	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
BETA-BHC	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
DELTA-BHC	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
GAMMA-BHC(LINDANE)	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
HEPTACHLOR	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
ALDRIN	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
HEPTACHLOR EPOXIDE	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
ENDOSULFAN I	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
DIELDRIN	UG/KG	4.1 UJ	37 U	8.9 U	4.3 UJ	4.3 U
4,4'-DDE	UG/KG	44 J	58 J	37 J	23 J	4.3 U
ENDRIN	UG/KG	4.1 UJ	37 U	8.9 U	4.3 UJ	4.3 U
ENDOSULFAN II	UG/KG	4.1 UJ	37 U	8.9 U	4.3 UJ	4.3 U
4,4'-DDD	UG/KG	9 J	37 U	36 J	34 J	4.3 U
ENDOSULFAN SULFATE	UG/KG	4.1 UJ	37 U	8.9 U	4.3 UJ	4.3 U
4,4'-DDT	UG/KG	19 J	170 J	60 J	19 J	4.3 U
METHOXYCHLOR	UG/KG	21 UJ	190 U	46 U	22 UJ	22 U
ENDRIN KETONE	UG/KG	4.1 UJ	37 U	8.9 U	4.3 UJ	4.3 U
ENDRIN ALDEHYDE	UG/KG	4.1 UJ	37 U	8.9 U	4.3 UJ	4.3 U
ALPHA CHLORDANE	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
GAMMA CHLORDANE	UG/KG	2.1 UJ	19 U	4.6 U	2.2 UJ	2.2 U
TOXAPHENE	UG/KG	210 UJ	1900 U	460 U	220 UJ	220 U
PCB-1016	UG/KG	41 UJ	370 U	89 U	43 UJ	43 U
PCB-1221	UG/KG	83 UJ	740 U	180 U	87 UJ	86 U
PCB-1232	UG/KG	41 UJ	370 U	89 U	43 UJ	43 U
PCB-1242	UG/KG	41 UJ	370 U	89 U	43 UJ	43 U
PCB-1248	UG/KG	41 UJ	370 U	89 U	43 UJ	43 U
PCB-1254	UG/KG	41 UJ	370 U	89 U	43 UJ	43 U
PCB-1260	UG/KG	79 J	370 U	29 J	41 J	43 U
VOLATILES						
CHLOROMETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
BROMOMETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
VINYL CHLORIDE	UG/KG	12 U	810 U	13 U	13 U	24 U
CHLOROETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
METHYLENE CHLORIDE	UG/KG	12 U	810 U	13 U	13 U	24 U
ACETONE	UG/KG	12 U	3400 J	15 UJ	67 UJ	340 J
CARBON DISULFIDE	UG/KG	12 U	810 U	13 U	13 U	24 U
1,1-DICHLOROETHENE	UG/KG	12 U	810 U	13 U	13 U	24 U
1,1-DICHLOROETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
1,2-DICHLOROETHENE	UG/KG	12 U	810 U	13 U	13 U	24 U
CHLOROFORM	UG/KG	12 U	810 U	13 U	13 U	24 U
1,2-DICHLOROETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
2-BUTANONE	UG/KG	12 U	2300	13 U	13 U	24 U

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

	Sample No:	6-RV5-SD-06	6-RV6-SD-06	6-RV7-SD-06	6-RV7-SD-612	6-RV8-SD-06
	Depth:	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/25/92	8/25/92	8/25/92	8/25/92
	Lab Id:	00439-15	00437-11	00437-12	00437-14	00437-17
Parameter	Units					
VOLATILES Cont.						
1,1,1-TRICHLOROETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
CARBON TETRACHLORIDE	UG/KG	12 U	810 U	13 U	13 U	24 U
BROMODICHLOROMETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
1,2-DICHLOROPROPANE	UG/KG	12 U	810 U	13 U	13 U	24 U
CIS-1,3-DICHLOROPROPENE	UG/KG	12 U	810 U	13 U	13 U	24 U
TRICHLOROETHENE	UG/KG	12 U	810 U	13 U	13 U	24 U
DIBROMOCHLOROMETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
1,1,2-TRICHLOROETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
BENZENE	UG/KG	12 UJ	810 U	13 U	13 U	24 U
TRANS-1,3-DICHLOROPROPENE	UG/KG	12 UJ	810 U	13 U	13 U	24 U
BROMOFORM	UG/KG	12 U	810 U	13 U	13 U	24 U
4-METHYL-2-PENTANONE	UG/KG	12 U	810 U	13 U	13 U	24 U
2-HEXANONE	UG/KG	12 U	810 U	13 U	13 U	24 U
TETRACHLOROETHENE	UG/KG	12 U	810 U	13 U	13 U	24 U
1,1,2,2-TETRACHLOROETHANE	UG/KG	12 U	810 U	13 U	13 U	24 U
TOLUENE	UG/KG	12 U	810 U	13 U	13 U	24 U
CHLOROBENZENE	UG/KG	12 U	810 U	13 U	13 U	24 U
ETHYLBENZENE	UG/KG	12 U	810 U	13 U	13 U	24 U
STYRENE	UG/KG	12 U	810 U	13 U	13 U	24 U
TOTAL XYLENES	UG/KG	12 U	810 U	13 U	13 U	24 U
SEMIVOLATILES						
PHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
BIS(2-CHLOROETHYL) ETHER	UG/KG	410 U	400 U	440 U	460 U	680 U
2-CHLOROPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
1,3-DICHLOROBENZENE	UG/KG	410 U	400 U	440 U	460 U	680 U
1,4-DICHLOROBENZENE	UG/KG	410 U	400 U	440 U	460 U	680 U
1,2-DICHLOROBENZENE	UG/KG	410 U	400 U	440 U	460 U	680 U
2-METHYLPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	410 U	400 U	440 U	460 U	680 U
4-METHYLPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
N-NITROSODI-N-PROPYLAMINE	UG/KG	410 U	400 U	440 U	460 U	680 U
HEXACHLOROETHANE	UG/KG	410 U	400 U	440 U	460 U	680 U
NITROBENZENE	UG/KG	410 U	400 U	440 U	460 U	680 U
ISOPHORONE	UG/KG	410 U	400 U	440 U	460 U	680 U
2-NITROPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
2,4-DIMETHYLPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
BIS(2-CHLOROETHOXY) METHANE	UG/KG	410 U	400 U	440 U	460 U	680 U
2,4-DICHLOROPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
1,2,4-TRICHLOROBENZENE	UG/KG	410 U	400 U	440 U	460 U	680 U
NAPHTHALENE	UG/KG	410 U	400 U	440 U	460 U	680 U
4-CHLORANILINE	UG/KG	410 U	400 U	440 U	460 U	680 U
HEXACHLOROBUTADIENE	UG/KG	410 U	400 U	440 U	460 U	680 U

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Units	6-RV5-SD-06	6-RV6-SD-06	6-RV7-SD-06	6-RV7-SD-612	6-RV8-SD-06
Depth:		N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/25/92	8/25/92	8/25/92	8/25/92
Lab Id:		00439-15	00437-11	00437-12	00437-14	00437-17
SEMIVOLATILES Cont.						
4-CHLORO-3-METHYLPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
2-METHYLNAPHTHALENE	UG/KG	410 U	400 U	440 U	460 U	680 U
HEXACHLOROCYCLOPENTADIENE	UG/KG	410 U	400 U	440 U	460 U	680 U
2,4,6-TRICHLOROPHENOL	UG/KG	410 U	400 U	440 U	460 U	680 U
2,4,5-TRICHLOROPHENOL	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
2-CHLORONAPHTHALENE	UG/KG	410 U	400 U	440 U	460 U	680 U
2-NITROANILINE	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
DIMETHYL PHTHALATE	UG/KG	410 U	400 U	440 U	460 U	680 U
ACENAPHTHYLENE	UG/KG	410 U	400 U	440 U	460 U	680 U
2,6-DINITROTOLUENE	UG/KG	410 U	400 U	440 U	460 U	680 U
3-NITROANILINE	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
ACENAPHTHENE	UG/KG	410 U	400 U	440 U	460 U	680 U
2,4-DINITROPHENOL	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
4-NITROPHENOL	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
DIBENZOFURAN	UG/KG	410 U	400 U	440 U	460 U	680 U
2,4-DINITROTOLUENE	UG/KG	410 U	400 U	440 U	460 U	680 U
DIETHYL PHTHALATE	UG/KG	410 U	400 U	440 U	460 U	680 U
4-CHLOROPHENYL PHENYL ETHER	UG/KG	410 U	400 U	440 U	460 U	680 U
FLUORENE	UG/KG	410 UJ	400 U	440 U	460 U	680 U
4-NITROANILINE	UG/KG	980 U	970 U	1100 U	1100 U	1600 UJ
4,6-DINITRO-2-METHYLPHENOL	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
N-NITRISODIPHENYLAMINE	UG/KG	410 U	400 U	440 U	460 U	680 U
4-BROMOPHENYL PHENYL ETHER	UG/KG	410 U	400 U	440 U	460 U	680 U
HEXACHLOROBENZENE	UG/KG	410 U	400 U	440 U	460 U	680 U
PENTACHLOROPHENOL	UG/KG	980 U	970 U	1100 U	1100 U	1600 U
PHENANTHRENE	UG/KG	410 U	400 U	440 U	460 U	680 U
ANTHRACENE	UG/KG	410 U	400 U	440 U	460 U	680 U
DI-N-BUTYL PHTHALATE	UG/KG	410 U	400 U	440 UJ	52 J	680 U
FLUORANTHENE	UG/KG	410 UJ	400 U	440 U	460 U	680 U
CARBAZOLE	UG/KG	410 U	400 U	440 U	460 U	680 U
PYRENE	UG/KG	410 U	400 U	440 U	460 U	120 J
BUTYL BENZYL PHTHALATE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
3,3-DICHLOROBENZIDINE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
BENZO(A)ANTHRACENE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
CHRYSENE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	410 U	400 U	440 U	500 U	680 UJ
DI-N-OCTYL PHTHALATE	UG/KG	410 UJ	400 U	440 U	460 U	680 UJ
BENZO(B)FLUORANTHENE	UG/KG	410 U	400 U	440 U	460 U	110 J
BENZO(K)FLUORANTHENE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
BENZO(A)PYRENE	UG/KG	410 U	400 U	440 U	460 U	89 J
INDENO(1,2,3-CD) PYRENE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
DIBENZ(A,H)ANTHRACENE	UG/KG	410 U	400 U	440 U	460 U	680 UJ
BENZO(G,H,I)PERYLENE	UG/KG	410 U	400 U	440 U	460 U	680 UJ

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter	Sample No: / Depth: / Date Sampled: / Lab Id: Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
PESTICIDE/PCBS							
ALPHA-BHC	UG/KG	2.1 UJ	19 U	ND	ND		0/11
BETA-BHC	UG/KG	2.1 UJ	19 U	ND	ND		0/11
DELTA-BHC	UG/KG	2.1 UJ	19 U	ND	ND		0/11
GAMMA-BHC(LINDANE)	UG/KG	2.1 UJ	19 U	ND	ND		0/11
HEPTACHLOR	UG/KG	2.1 UJ	19 U	ND	ND		0/11
ALDRIN	UG/KG	2.1 UJ	19 U	ND	ND		0/11
HEPTACHLOR EPOXIDE	UG/KG	2.1 UJ	19 U	ND	ND		0/11
ENDOSULFAN I	UG/KG	2.1 UJ	19 U	ND	ND		0/11
DIELDRIN	UG/KG	4 UJ	37 U	8.1 J	43 J	6-RV1-SD-06	2/11
4,4'-DDE	UG/KG	4 UJ	24 U	23 J	120 J	6-RV2-SD-06	6/11
ENDRIN	UG/KG	4 UJ	37 U	5.1 J	5.1 J	6-RV1-SD-06	1/11
ENDOSULFAN II	UG/KG	4 UJ	37 U	ND	ND		0/11
4,4'-DDD	UG/KG	4.3 U	37 U	4.1 J	45 J	6-RV2-SD-06	6/11
ENDOSULFAN SULFATE	UG/KG	4 UJ	37 U	ND	ND		0/11
4,4'-DDT	UG/KG	4 UJ	4.7 U	14 J	210 J	6-RV3-SD-06	8/11
METHOXYCHLOR	UG/KG	21 UJ	190 U	ND	ND		0/11
ENDRIN KETONE	UG/KG	4 UJ	37 U	ND	ND		0/11
ENDRIN ALDEHYDE	UG/KG	4 UJ	37 U	7.8	7.8	6-RV1-SD-06	1/11
ALPHA CHLORDANE	UG/KG	2.1 UJ	19 U	ND	ND		0/11
GAMMA CHLORDANE	UG/KG	2.1 UJ	19 U	ND	ND		0/11
TOXAPHENE	UG/KG	210 UJ	1900 U	ND	ND		0/11
PCB-1016	UG/KG	40 UJ	370 U	ND	ND		0/11
PCB-1221	UG/KG	82 UJ	740 U	ND	ND		0/11
PCB-1232	UG/KG	40 UJ	370 U	ND	ND		0/11
PCB-1242	UG/KG	40 UJ	370 U	ND	ND		0/11
PCB-1248	UG/KG	40 UJ	370 U	ND	ND		0/11
PCB-1254	UG/KG	40 UJ	370 U	ND	ND		0/11
PCB-1260	UG/KG	40 UJ	370 U	29 J	360 J	6-RV1-SD-06	6/11
VOLATILES							
CHLOROMETHANE	UG/KG	12 U	810 U	ND	ND		0/11
BROMOMETHANE	UG/KG	12 U	810 U	ND	ND		0/11
VINYL CHLORIDE	UG/KG	12 U	810 U	ND	ND		0/11
CHLOROETHANE	UG/KG	12 U	810 U	ND	ND		0/11
METHYLENE CHLORIDE	UG/KG	12 U	810 U	ND	ND		0/11
ACETONE	UG/KG	12 U	67 UJ	62	9100 J	6-RV4-SD-612	5/11
CARBON DISULFIDE	UG/KG	12 U	810 U	ND	ND		0/11
1,1-DICHLOROETHENE	UG/KG	12 U	810 U	ND	ND		0/11
1,1-DICHLOROETHANE	UG/KG	12 U	810 U	ND	ND		0/11
1,2-DICHLOROETHENE	UG/KG	12 U	810 U	ND	ND		0/11
CHLOROFORM	UG/KG	12 U	810 U	ND	ND		0/11
1,2-DICHLOROETHANE	UG/KG	12 U	810 U	ND	ND		0/11
2-BUTANONE	UG/KG	12 U	24 U	2300	2400 J	6-RV4-SD-612	2/11

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter (Sample No: / Depth: / Date Sampled: / Lab Id:)	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
VOLATILES Cont.							
1,1,1-TRICHLOROETHANE	UG/KG	12 U	810 U	ND	ND		0/11
CARBON TETRACHLORIDE	UG/KG	12 U	810 U	ND	ND		0/11
BROMODICHLOROMETHANE	UG/KG	12 U	810 U	ND	ND		0/11
1,2-DICHLOROPROPANE	UG/KG	12 U	810 U	ND	ND		0/11
CIS-1,3-DICHLOROPROPENE	UG/KG	12 U	810 U	ND	ND		0/11
TRICHLOROETHENE	UG/KG	12 U	810 U	ND	ND		0/11
DIBROMOCHLOROMETHANE	UG/KG	12 U	810 U	ND	ND		0/11
1,1,2-TRICHLOROETHANE	UG/KG	12 U	810 U	ND	ND		0/11
BENZENE	UG/KG	12 UJ	810 U	ND	ND		0/11
TRANS-1,3-DICHLOROPROPENE	UG/KG	12 UJ	810 U	ND	ND		0/11
BROMOFORM	UG/KG	12 U	810 U	ND	ND		0/11
4-METHYL-2-PENTANONE	UG/KG	12 U	810 U	ND	ND		0/11
2-HEXANONE	UG/KG	12 U	810 U	ND	ND		0/11
TETRACHLOROETHENE	UG/KG	12 U	810 U	ND	ND		0/11
1,1,2,2-TETRACHLOROETHANE	UG/KG	12 U	810 U	ND	ND		0/11
TOLUENE	UG/KG	12 U	810 U	ND	ND		0/11
CHLOROBENZENE	UG/KG	12 U	810 U	ND	ND		0/11
ETHYLBENZENE	UG/KG	12 U	810 U	ND	ND		0/11
STYRENE	UG/KG	12 U	810 U	ND	ND		0/11
TOTAL XYLENES	UG/KG	12 U	810 U	ND	ND		0/11
SEMIVOLATILES							
PHENOL	UG/KG	380 U	680 U	ND	ND		0/11
BIS(2-CHLOROETHYL) ETHER	UG/KG	380 U	680 U	ND	ND		0/11
2-CHLOROPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
1,3-DICHLOROBENZENE	UG/KG	380 U	680 U	ND	ND		0/11
1,4-DICHLOROBENZENE	UG/KG	380 U	680 U	ND	ND		0/11
1,2-DICHLOROBENZENE	UG/KG	380 U	680 U	ND	ND		0/11
2-METHYLPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
2,2'-OXYBIS (1-CHLOROPROPANE)	UG/KG	380 U	680 U	ND	ND		0/11
4-METHYLPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
N-NITROSODI-N-PROPYLAMINE	UG/KG	380 U	680 U	ND	ND		0/11
HEXACHLOROETHANE	UG/KG	380 U	680 U	ND	ND		0/11
NITROBENZENE	UG/KG	380 U	680 U	ND	ND		0/11
ISOPHORONE	UG/KG	380 U	680 U	ND	ND		0/11
2-NITROPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
2,4-DIMETHYLPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
BIS(2-CHLOROETHOXY) METHANE	UG/KG	380 U	680 U	ND	ND		0/11
2,4-DICHLOROPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
1,2,4-TRICHLOROBENZENE	UG/KG	380 U	680 U	ND	ND		0/11
NAPHTHALENE	UG/KG	380 U	680 U	54 J	54 J	6-RV2-SD-06	1/11
4-CHLORANILINE	UG/KG	380 U	680 U	ND	ND		0/11
HEXACHLOROBUTADIENE	UG/KG	380 U	680 U	ND	ND		0/11

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
ORGANICS

Parameter (Sample No: / Depth: / Date Sampled: / Lab Id:)	Units	MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
SEMIVOLATILES Cont.							
4-CHLORO-3-METHYLPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
2-METHYLNAPHTHALENE	UG/KG	380 U	680 U	44 J	44 J	6-RV2-SD-06	1/11
HEXACHLOROCYCLOPENTADIENE	UG/KG	380 U	680 U	ND	ND		0/11
2,4,6-TRICHLOROPHENOL	UG/KG	380 U	680 U	ND	ND		0/11
2,4,5-TRICHLOROPHENOL	UG/KG	930 U	1600 U	ND	ND		0/11
2-CHLORONAPHTHALENE	UG/KG	380 U	680 U	ND	ND		0/11
2-NITROANILINE	UG/KG	930 U	1600 U	ND	ND		0/11
DIMETHYL PHTHALATE	UG/KG	380 U	680 U	ND	ND		0/11
ACENAPHTHYLENE	UG/KG	380 U	680 U	ND	ND		0/11
2,6-DINITROTOLUENE	UG/KG	380 U	680 U	ND	ND		0/11
3-NITROANILINE	UG/KG	930 U	1600 U	ND	ND		0/11
ACENAPHTHENE	UG/KG	380 U	680 U	220 J	220 J	6-RV2-SD-06	1/11
2,4-DINITROPHENOL	UG/KG	930 U	1600 U	ND	ND		0/11
4-NITROPHENOL	UG/KG	930 U	1600 U	ND	ND		0/11
DIBENZOFURAN	UG/KG	380 U	680 U	110 J	110 J	6-RV2-SD-06	1/11
2,4-DINITROTOLUENE	UG/KG	380 U	680 U	ND	ND		0/11
DIETHYL PHTHALATE	UG/KG	380 U	680 U	ND	ND		0/11
4-CHLOROPHENYL PHENYL ETHER	UG/KG	380 U	680 U	ND	ND		0/11
FLUORENE	UG/KG	380 U	680 U	250 J	250 J	6-RV2-SD-06	1/11
4-NITROANILINE	UG/KG	930 U	1600 UJ	ND	ND		0/11
4,6-DINITRO-2-METHYLPHENOL	UG/KG	930 UJ	1600 U	ND	ND		0/11
N-NITRISODIPHENYLAMINE	UG/KG	380 UJ	680 U	ND	ND		0/11
4-BROMOPHENYL PHENYL ETHER	UG/KG	380 UJ	680 U	ND	ND		0/11
HEXACHLOROBENZENE	UG/KG	380 UJ	680 U	ND	ND		0/11
PENTACHLOROPHENOL	UG/KG	930 UJ	1600 U	ND	ND		0/11
PHENANTHRENE	UG/KG	380 UJ	680 U	50 J	1600	6-RV2-SD-06	3/11
ANTHRACENE	UG/KG	380 UJ	680 U	480	480	6-RV2-SD-06	1/11
DI-N-BUTYL PHTHALATE	UG/KG	380 UJ	680 U	52 J	52 J	6-RV7-SD-612	1/11
FLUORANTHENE	UG/KG	380 UJ	680 U	84 J	1500 J	6-RV2-SD-06	3/11
CARBAZOLE	UG/KG	380 UJ	680 U	170 J	170 J	6-RV2-SD-06	1/11
PYRENE	UG/KG	380 UR	460 U	96 J	2100	6-RV2-SD-06	4/11
BUTYL BENZYL PHTHALATE	UG/KG	380 UR	680 UJ	ND	ND		0/11
3,3-DICHLOROBENZIDINE	UG/KG	380 UR	680 UJ	ND	ND		0/11
BENZO(A)ANTHRACENE	UG/KG	380 UR	680 UJ	43 J	1100	6-RV2-SD-06	3/11
CHRYSENE	UG/KG	380 UR	680 UJ	59 J	1100	6-RV2-SD-06	3/11
BIS(2-ETHYLHEXYL)PHTHALATE	UG/KG	380 UR	680 UJ	200 J	200 J	6-RV3-SD-06	1/11
DI-N-OCTYL PHTHALATE	UG/KG	380 UR	680 UJ	ND	ND		0/11
BENZO(B)FLUORANTHENE	UG/KG	380 UR	460 U	54 J	1200	6-RV2-SD-06	4/11
BENZO(K)FLUORANTHENE	UG/KG	380 UR	680 UJ	440	440	6-RV7-SD-06	1/11
BENZO(A)PYRENE	UG/KG	380 UR	460 U	70 J	1000	6-RV2-SD-06	3/11
INDENO(1,2,3-CD) PYRENE	UG/KG	380 UR	680 UJ	57 J	710	6-RV2-SD-06	2/11
DIBENZ(A,H)ANTHRACENE	UG/KG	380 UR	680 UJ	83 J	83 J	6-RV2-SD-06	1/11
BENZO(G,H,I)PERYLENE	UG/KG	380 UR	680 UJ	57 J	680	6-RV8-SD-06	2/11

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Parameter	Units	6-RV1-SD-06	6-RV2-SD-06	6-RV3-SD-06	6-RV3-SD-612	6-RV4-SD-06	6-RV4-SD-612
Depth:		N/A	N/A	N/A	N/A	N/A	N/A
Date Sampled:		8/25/92	8/25/92	8/24/92	8/24/92	8/24/92	8/24/92
Lab Id:		00439-11	00439-13	00437-04	00437-05	00437-08	00437-09
ALUMINUM	MG/KG	10300	2540	3820	1090	947	739
ANTIMONY	MG/KG	12.5 U	9.8 U	2.6 U	2.9 U	2.6 U	2.6 U
ARSENIC	MG/KG	4.3	0.61 B	2.1 JB	0.5 U	0.53 U	0.7 UJ
BARIUM	MG/KG	61.5	22.9 B	18.2 JB	5.6 JB	4.2 JB	2.9 JB
BERYLLIUM	MG/KG	0.26 U	0.2 U	0.13 B	0.06 U	0.06 U	0.06 U
CADMIUM	MG/KG	5.9 J	1.8 J	1.9 J	0.61 J	0.53 JB	0.36 U
CALCIUM	MG/KG	3450	1490	735 B	315 B	148 B	110 U
CHROMIUM	MG/KG	17.7	3.6	6	2.3 U	1.7 U	1.3 U
COBALT	MG/KG	2.1 JB	1.2 U	0.72 B	0.41 U	0.37 U	0.38 U
COPPER	MG/KG	67.5	12.3	18.7 J	6 J	4.2 JB	2.6 JB
IRON	MG/KG	7590	2290	2690	828	1010	420
LEAD	MG/KG	2.1 B	21.2	62.3 J	12.4 J	6.6 J	5.4 J
MAGNESIUM	MG/KG	402 B	139 B	137 B	40 B	34.7 B	24.5 B
MANGANESE	MG/KG	288	24	58.3	5.1 J	6.5 J	3.4 J
MERCURY	MG/KG	0.75	0.25	0.1	0.04 B	0.03 B	0.02 U
NICKEL	MG/KG	7.7 JB	3.4 U	2.1 B	1.6 U	1.5 U	1.5 U
POTASSIUM	MG/KG	361 B	108 B	153 B	47.5 B	35.1 B	29.5 B
SELENIUM	MG/KG	1.1 U	1.1 U	1.1 UJ	0.83 U	0.89 U	1.2 U
SILVER	MG/KG	2.6 U	2 U	0.85 B	0.41 U	0.56 B	0.6 B
SODIUM	MG/KG	48.8 UJ	30.2 UJ	27.8 UJ	16.2 UJ	16.8 UJ	14.6 UJ
THALLIUM	MG/KG	0.44 UJ	0.43 UJ	0.43 UJ	0.33 UJ	0.36 U	0.46 U
VANADIUM	MG/KG	19	6 B	7 B	2.1 B	2.5 B	1.2 B
ZINC	MG/KG	408	64.8	113	24.8	31.6	20.3

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SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

	Sample No:	6-RV5-SD-06	6-RV6-SD-06	6-RV7-SD-06	6-RV7-SD-612	6-RV8-SD-06
	Depth:	N/A	N/A	N/A	N/A	N/A
	Date Sampled:	8/25/92	8/25/92	8/25/92	8/25/92	8/25/92
	Lab Id:	00439-15	00437-11	00437-12	00437-14	00437-17
Parameter	Units					
ALUMINUM	MG/KG	913	2100	1260	1710	7130
ANTIMONY	MG/KG	11.9 U	2.7 U	3.5 U	3.2 U	4.2 U
ARSENIC	MG/KG	0.44 U	0.67 UJ	0.87 UJ	0.78 UJ	2.3 B
BARIUM	MG/KG	5.1 U	8.5 JB	6.8 JB	12.2 JB	37.7 JB
BERYLLIUM	MG/KG	0.24 U	0.06 B	0.08 U	0.07 B	0.25 B
CADMIUM	MG/KG	0.73 U	1.7 J	0.64 JB	1.6 J	2.3 J
CALCIUM	MG/KG	301 U	10100	284 B	577 B	1390 B
CHROMIUM	MG/KG	2 B	3.1 J	1.9 U	3.8 U	10.5
COBALT	MG/KG	1.5 U	0.39 U	0.5 U	0.45 U	1.1 B
COPPER	MG/KG	6.5 J	8.1 J	6.9 J	45 J	35 J
IRON	MG/KG	875	2950	851	1000	3420
LEAD	MG/KG	25.6	11.2 J	13.3 J	18.5 J	105 J
MAGNESIUM	MG/KG	36.3 B	217 B	53.2 B	91.1 B	289 B
MANGANESE	MG/KG	28.9	104	25.5 J	21.6 J	24.2 J
MERCURY	MG/KG	0.12 U	0.15	0.09 B	0.15	0.27
NICKEL	MG/KG	4.1 U	1.5 U	2 U	2.8 B	4 B
POTASSIUM	MG/KG	93 U	83.2 B	48.2 B	60.9 B	253 B
SELENIUM	MG/KG	1.1 U	1.1 U	1.5 U	1.3 U	1.6 U
SILVER	MG/KG	2.4 U	0.39 U	0.82 B	0.85 B	1.2 B
SODIUM	MG/KG	26.9 UJ	41.4 UJ	25.5 UJ	24.3 UJ	60 UJ
THALLIUM	MG/KG	0.44 UJ	0.45 UJ	0.58 UJ	0.52 U	0.64 U
VANADIUM	MG/KG	1.8 JB	4 B	2.4 JB	3.7 JB	11.4 JB
ZINC	MG/KG	80.8	204	94.2	193	142

SITE 6 RAVINE SEDIMENT
DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA
TOTAL METALS

Sample No: / Depth: / Date Sampled: / Lab Id:		MINIMUM NONDETECTED	MAXIMUM NONDETECTED	MINIMUM DETECTED	MAXIMUM DETECTED	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
Parameter	Units						
ALUMINUM	MG/KG	NA	NA	739	10300	6-RV1-SD-06	11/11
ANTIMONY	MG/KG	2.6 U	12.5 U	ND	ND		0/11
ARSENIC	MG/KG	0.44 U	0.87 UJ	0.61 B	4.3	6-RV1-SD-06	4/11
BARIUM	MG/KG	5.1 U	5.1 U	2.9 JB	61.5	6-RV1-SD-06	10/11
BERYLLIUM	MG/KG	0.06 U	0.26 U	0.06 B	0.25 B	6-RV8-SD-06	4/11
CADMIUM	MG/KG	0.36 U	0.73 U	0.53 JB	5.9 J	6-RV1-SD-06	9/11
CALCIUM	MG/KG	110 U	301 U	148 B	10100	6-RV6-SD-06	9/11
CHROMIUM	MG/KG	1.3 U	3.8 U	2 B	17.7	6-RV1-SD-06	6/11
COBALT	MG/KG	0.37 U	1.5 U	0.72 B	2.1 JB	6-RV1-SD-06	3/11
COPPER	MG/KG	NA	NA	2.6 JB	67.5	6-RV1-SD-06	11/11
IRON	MG/KG	NA	NA	420	7590	6-RV1-SD-06	11/11
LEAD	MG/KG	NA	NA	2.1 B	105 J	6-RV8-SD-06	11/11
MAGNESIUM	MG/KG	NA	NA	24.5 B	402 B	6-RV1-SD-06	11/11
MANGANESE	MG/KG	NA	NA	3.4 J	288	6-RV1-SD-06	11/11
MERCURY	MG/KG	0.02 U	0.12 U	0.03 B	0.75	6-RV1-SD-06	9/11
NICKEL	MG/KG	1.5 U	4.1 U	2.1 B	7.7 JB	6-RV1-SD-06	4/11
POTASSIUM	MG/KG	93 U	93 U	29.5 B	361 B	6-RV1-SD-06	10/11
SELENIUM	MG/KG	0.83 U	1.6 U	ND	ND		0/11
SILVER	MG/KG	0.39 U	2.6 U	0.56 B	1.2 B	6-RV8-SD-06	6/11
SODIUM	MG/KG	14.6 UJ	60 UJ	ND	ND		0/11
THALLIUM	MG/KG	0.33 UJ	0.64 U	ND	ND		0/11
VANADIUM	MG/KG	NA	NA	1.2 B	19	6-RV1-SD-06	11/11
ZINC	MG/KG	NA	NA	20.3	408	6-RV1-SD-06	11/11

APPENDIX F
FIELD DATA SHEETS
BENTHIC MACROINVERTEBRATES
AND FISH SAMPLES

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH2A-Fish Date: 8/29/92 Time: 12:45

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Electroshocker

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ___ Replicate #2: ___ Replicate #3: ___

Sediment Description: Silty, stirs up quickly

Water:

Temp.: 22.5° C Dissolved Oxygen: 5.0 mg/L pH: NE S.U.

Conductivity: 115 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: ______

Weather Conditions: ______ Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH04-Fish Date: 8/27/92 Time: 15:18

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Electroshocker

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other:

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other:

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: 24.0° C Dissolved Oxygen: 5.7 mg/L pH: 6.4 S.U.

Conductivity: 112 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other:

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color:

Weather Conditions: NE Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH06A-Fish Date: 9/9/92 Time: 10:00

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Electroshocker

8/29/92

SEE 6-BH06A-BN

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NE

Weather Conditions: Warm, Sunny Slight Breeze Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC03 Fish   Date: 9/12/92   Time: 07:45

Sample Type: Fish   Benthic Macroinvertebrate   Sediment   Surface Water

SAMPLING EQUIPMENT: Seine   Gill Net   Ponar   Kemmerer   Sediment Corer   Spoon   Other: Electroshocker

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest   Industrial   Other: ______

Vegetation Type: NE

Estimated Stream Width: NE m   Est. Stream Depth: NE m   Riffle: NE m   Run: NE m   Pool: NE m

Stream Type: Cold Water   Warm Water   Velocity: NE   Channelized: Yes __   No __

Canopy Cover: Open   Partly Open   Partly Shaded   Shaded

Sediment/Substrate:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other: ______

Sediment Oils: Absent   Slight   Moderate   Profuse

Ponar Grab: Number of Jars Filled with Sediments   Replicate: #1: ___   Replicate #2: ___   Replicate #3: ___

Sediment Description: NE

Water:

Temp.: 28.0° C   Dissolved Oxygen: NE mg/L   pH: NE S.U.

Conductivity: 20 Micromhos/cm   Salinity: 0.0 ppt

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other: ______

Water Surface Oils: Slick   Sheen   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color: Tannic

Weather Conditions: NE   Tide: In   Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC06-Fish Date: 8/29/92 Time: -

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: ____

Weather Conditions: NE Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC06A-Fish Date: 9/9/92 Time: 13:00

Sample Type: **Fish** Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine **Gill Net** 8/29/92 Ponar Kemmerer Sediment Corer Spoon **Other: Electroshocker**

SEE 6-WC06A-BN

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ____

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water **Warm Water** Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ____

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ____

Water Surface Oils: Slick Sheen **None**

Turbidity: Clear Slightly Turbid **Turbid** Opaque Water Color: NE

Weather Conditions: Warm, Sunny, Slight breeze Tide: In **Out**

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC09-Fish Date: 8/27/92 8/29/92 9/9/92 Time: NA

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

SEE 6-WC09-SW/SD

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest **Industrial** **Other:** ______

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: ______ Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: ______

Weather Conditions: ______ Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC11A Fish Date: 9/9/92 Time: 08:30

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

See 6-WC11A-BN

______

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: NE

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ____ Replicate #2: ____ Replicate #3: ____

Sediment Description: NE

Water:

Temp.: NE C Dissolved Oxygen: NE mg/L pH: NE S.U.

Conductivity: NE Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: ______

Weather Conditions: NE Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: PC1-Fish Date: 9/15/92 Time: 13:41

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: Electroshocker

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: National forest area, Conifers, shrubs, hard woods, Spanish moss

Estimated Stream Width: NE m Est. Stream Depth: NE m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: ___ Replicate #2: ___ Replicate #3: ___

Sediment Description: NE

Water:

Temp.: 22° C Dissolved Oxygen: 3.1 mg/L pH: NE S.U.

Conductivity: 270 Micromhos/cm Salinity: NE ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NE

Weather Conditions: Sunny Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH2A-BN. Date: 8/22/92 Time: 16:26

Sample Type: Fish **Benthic Macroinvertebrate** Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net **Ponar** Kemmerer Sediment Corer Spoon Other: ______

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ______

Vegetation Type: Hardwood, both banks thick with trees

Estimated Stream Width: 1.5 m Est. Stream Depth: appx 0.9 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water **Warm Water** Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded **Shaded** 90%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic **None** Other: ______

Sediment Oils: **Absent** Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 6 Replicate #2: 4 Replicate #3: 2

Sediment Description: Sandy, leaf litter, twigs

Water:

Temp.: 24.0° C Dissolved Oxygen: 6.45 mg/L pH: 5.5 S.U.

Conductivity: 60 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ______

Water Surface Oils: Slick Sheen **None**

Turbidity: **Clear** Slightly Turbid Turbid Opaque Water Color: yellow/Brown tint

Weather Conditions: Sunny, appx. 27°C Tide: **In** Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BH 4A-BN Date: 8/24/92 Time: 1500

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

Downstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Deciduous Trees

Estimated Stream Width: 3.7 m Est. Stream Depth: ~1 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded 85%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: Silt / Sand, mixed with organics

Water:

Temp.: 23° C Dissolved Oxygen: 6.35 mg/L pH: NA S.U.

Conductivity: 82 Micromhos/cm Salinity: 0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Brown Tint

Weather Conditions: Sunny, appx. 32°C Tide: In Out

Comments: NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-BHbA-BW Date: 8/21/92 Time: 11:35

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ____

UPSTREAM

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ____

Vegetation Type: NE

Estimated Stream Width: 9.1 m Est. Stream Depth: 1.5 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

10%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: Slight

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 11 Replicate #2: 6 Replicate #3: 11

Sediment Description: leaves twigs silt (40%); silt (60%); DARK Brown

Water:

Temp.: S=22.9; B=22.8°C Dissolved Oxygen: S=5.0; B=4.95 mg/L pH: S=6.3; B=NE S.U.

Conductivity: S=135; B=140 Micromhos/cm Salinity: S=0.0; B=0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ____

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Cloudy Tide: In Out

Comments: S= Surface; B= Bottom; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC03-BN   Date: 8/26/92   Time: NE

Sample Type: Fish   Benthic Macroinvertebrate   Sediment   Surface Water

SAMPLING EQUIPMENT: Seine   Gill Net   Ponar   Kemmerer   Sediment Corer   Spoon   Other: ____

NOT AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest   Industrial   Other: ____

Vegetation Type: Bank lined w/deciduous shrubs; Moderate number of shrubs in the water

Estimated Stream Width: NE m   Est. Stream Depth: NE m   Riffle: NE m   Run: NE m   Pool: NE m

Stream Type: Cold Water   Warm Water   Velocity: NE   Channelized: Yes X   No __

Canopy Cover: Open   Partly Open 30%   Partly Shaded   Shaded

Sediment/Substrate:

Sediment Odors: Normal   Sewage   Petroleum   Chemical   Anaerobic   None   Other: ____

Sediment Oils: Absent   Slight   Moderate   Profuse

Ponar Grab: Number of Jars Filled with Sediments   Replicate: #1: 4   Replicate #2: 8   Replicate #3: 9

Sediment Description: NE

Water:

Temp.: NE C   Dissolved Oxygen: NE mg/L   pH: NE S.U.

Conductivity: NE Micromhos/cm   Salinity: NE ppt

Water Odors: Normal   Sewage   Petroleum   Chemical   None   Other: ____

Water Surface Oils: Slick   Sheen   None

Turbidity: Clear   Slightly Turbid   Turbid   Opaque   Water Color: Tannic

Weather Conditions: Sunny, appx. 32°C   Tide: In   Out

Comments: NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC6A-BN Date: 8/24/92 Time: 12:45

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

Downstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: Deciduous trees and evergreens, large amount of deadfall,

Estimated Stream Width: 15.2 m Est. Stream Depth: 0.76 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes X No __

Canopy Cover: Open Partly Open Partly Shaded Shaded 25%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: Silty Sand, 5% wood debris

Water:

Temp.: S= 23.5°; B= 23.5°C Dissolved Oxygen: S=5.85; B=5.8 mg/L pH: S=6.3; B=6.3 S.U.

Conductivity: S=125; B=145 Micromhos/cm Salinity: S=0.0; B=0.0 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: Tannic

Weather Conditions: Sunny, appx. 32°C Tide: In Out

Comments: S= Surface; B= Bottom; NE= Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC09A-BN Date: 8/21/92 Time: 09:10

Sample Type: Fish **Benthic Macroinvertebrate** Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net **Ponar** Kemmerer Sediment Corer Spoon Other: ______

Downstream

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ______

Vegetation Type: NE

Estimated Stream Width: 229 m Est. Stream Depth: 3.7 m Riffle: NA m Run: NA m Pool: NA m

Stream Type: Cold Water **Warm Water** Velocity: NE Channelized: Yes __ No __

Canopy Cover: **Open** Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical **Anaerobic** None Other: Strong

Sediment Oils: **Absent** Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: 5% detritus; 95% silt; Dark Brown

Water:

Temp.: S=22.8; B=25.5° C Dissolved Oxygen: S=5.1; B=0.13 mg/L pH: S=6.3; B: NE S.U.

Conductivity: S=900; B=11,500 Micromhos/cm Salinity: S=0.5; B=7 ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ______

Water Surface Oils: Slick Sheen **None**

Turbidity: **Clear** Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Overcast Tide: In **Out**

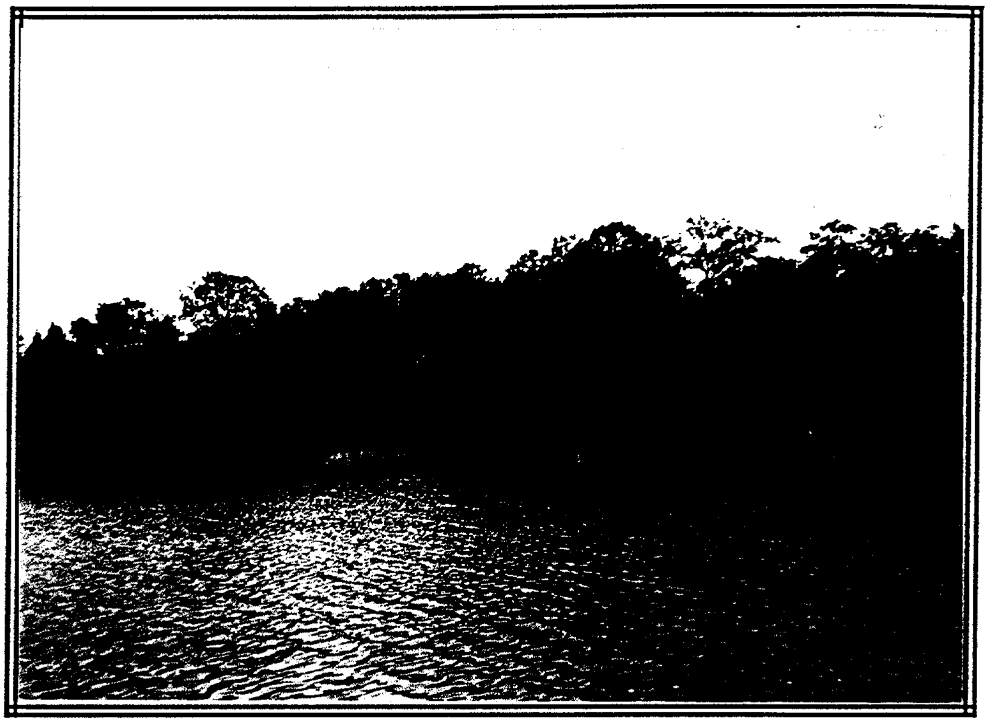
Comments: S= Surface; B= Bottom; NA= Not Applicable; NE= Not Available)

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: 6-WC-11A-BN Date: 8/21/92 Time: 10:23

Sample Type: Fish **Benthic Macroinvertebrate** Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net **Ponar** Kemmerer Sediment Corer Spoon Other: ____



Mouth of Bearhead Creek

Riparian Zone/Instream Features

Predominant Surrounding Land Use: **Forest** Industrial Other: ____

Vegetation Type: NE

Estimated Stream Width: 76.2 m Est. Stream Depth: 1.8 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water **Warm Water** Velocity: NE Channelized: Yes __ No __

Canopy Cover: **Open** Partly Open Partly Shaded Shaded 3-5%

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical **Anaerobic** None Other: ____

Sediment Oils: **Absent** Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 2 Replicate #2: 1 Replicate #3: 2

Sediment Description: Dark Brown Organic Muck, Silty

Water:

Temp.: S = 23.3° B = 26°C Dissolved Oxygen: S = 4.45, B = 0.15 mg/L pH: S = 6.3, B = NE S.U.

Conductivity: S = 1500, B = 10,900 Micromhos/cm Salinity: S = 0.5, B = 7.5 ppt

Water Odors: Normal Sewage Petroleum Chemical **None** Other: ____

Water Surface Oils: Slick Sheen **None**

Turbidity: **Clear** Slightly Turbid Turbid Opaque Water Color: Amber Brown

Weather Conditions: Overcast, appx. 24°C Tide: In **Out**

Comments: S = Surface; B = Bottom; NE = Not Evaluated

SAMPLING STATION CHARACTERIZATION DATA SHEET

Station Number: PC1 - BN Date: 9/15/92 Time: 15:19

Sample Type: Fish Benthic Macroinvertebrate Sediment Surface Water

SAMPLING EQUIPMENT: Seine Gill Net Ponar Kemmerer Sediment Corer Spoon Other: ______

Not AVAILABLE

Riparian Zone/Instream Features

Predominant Surrounding Land Use: Forest Industrial Other: ______

Vegetation Type: National forest area, Conifers, shrubs, hard wood spanish moss

Estimated Stream Width: 5.0 m Est. Stream Depth: 1.5 m Riffle: NE m Run: NE m Pool: NE m

Stream Type: Cold Water Warm Water Velocity: NE Channelized: Yes __ No __

Canopy Cover: Open Partly Open Partly Shaded Shaded

Sediment/Substrate:

Sediment Odors: Normal Sewage Petroleum Chemical Anaerobic None Other: ______

Sediment Oils: Absent Slight Moderate Profuse

Ponar Grab: Number of Jars Filled with Sediments Replicate: #1: 1 Replicate #2: 1 Replicate #3: 1

Sediment Description: Hard; 50% Silty-Sand; 50% organics

Water:

Temp.: 22.0° C Dissolved Oxygen: 7.95 mg/L pH: NE S.U.

Conductivity: 270 Micromhos/cm Salinity: 1.5 ppt

Water Odors: Normal Sewage Petroleum Chemical None Other: ______

Water Surface Oils: Slick Sheen None

Turbidity: Clear Slightly Turbid Turbid Opaque Water Color: NE

Weather Conditions: Sunny Tide: In Out

Comments: NE = Not Evaluated

APPENDIX H
BENTHIC MACROINVERTEBRATES RAW DATA TABLES

APPENDIX H

OPERABLE UNIT NO. 2
WALLACE CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-WC3A-BN1	6-WC3A-BN2	6-WC3A-BN3	6-WC3A	6-WC6A-BN1	6-WC6A-BN2	6-WC6A-BN3	6-WC6A	6-WC9A-BN1	6-WC9A-BN2	6-WC9A-BN3	6-WC9A	6-WC11A-BN1	6-WC11A-BN2	6-WC11A-BN3	6-WC11A	Total
ARTHROPODA																	
Insecta																	
Pterygota																	
Diptera																	
Chironomidae																	
Chironomus decorus	12			12		3		3									15
Krenopelopia sp.			4	4													4
Paramerina sp.	4			4													4
Pentaneura sp.		4		4													4
Polypedilum scalaenum							1	1									1
Stenochironomus sp.	4			4													4
Tanytarsus sp.							1	1									1
Tribelos jucundum	36	68	44	148	17	10	7	34									182
Trichoptera																	
Polycentropodidae																	
Phylocentropus sp.	4			4													4

APPENDIX [illegible] (continued)

OPERABLE UNIT NO. 2
WALLACE CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-WC3A-BN1	6-WC3A-BN2	6-WC3A-BN3	6-WC3A	6-WC6A-BN1	6-WC6A-BN2	6-WC6A-BN3	6-WC6A	6-WC9A-BN1	6-WC9A-BN2	6-WC9A-BN3	6-WC9A	6-WC11A-BN1	6-WC11A-BN2	6-WC11A-BN3	6-WC11A	Total
Odonata																	
Anisoptera																	
Corduliidae	4			4													4
Zygoptera	4			4													4
Coleoptera																	
Elmidae																	
Dubiraphia sp.		4		4													4
Crustacea																	
Malacostraca																	
Amphipoda																	
Gammaridae																	
Gammarus fasciatus					51	24	38	113									113
Isopoda																	
Idoteidae																	
Caecidotea sp.		4		4													4
ANNELIDA																	
Polychaeta																	
Phyllodocida																	
Nereidae																	

APPENDIX [illegible] (continued)

OPERABLE UNIT NO. 2
WALLACE CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-WC3A-BN1	6-WC3A-BN2	6-WC3A-BN3	6-WC3A	6-WC6A-BN1	6-WC6A-BN2	6-WC6A-BN3	6-WC6A	6-WC9A-BN1	6-WC9A-BN2	6-WC9A-BN3	6-WC9A	6-WC11A-BN1	6-WC11A-BN2	6-WC11A-BN3	6-WC11A	Total
Nereis succinea													3	1		4	4
Capitellida																	
Capitellidae																	
Capitella capitata															1	1	1
Terebellida																	
Ampharetidae																	
Hypaniola grayi							1	1									1
Oligochaeta																	
Tubificida																	
Tubificidae																	
Limnodrilus hoffmeisteri					8	12	4	24						2	1	3	27
NEMATODA		4		4													4
TOTAL SPECIES	7	5	2	12	3	4	6	7	0	0	0	0	1	2	2	3	19
TOTAL INDIVIDUALS	68	84	48	200	76	49	52	177	0	0	0	0	3	3	2	8	385
SPECIES DENSITY (#/M^2)	433	535	306	1275	484	312	331	1128	0	0	0	0	19	19	13	51	2454
SPECIES DIVERSITY	0.641	0.326	0.125	0.510	0.365	0.517	0.401	0.448	0	0	0	0	0	0.276	0.301	0.423	NA

APPENDIX H (continued)

OPERABLE UNIT NO. 2
BEARHEAD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-BH2A-BN1	6-BH2A-BN2	6-BH2A-BN3	6-BH2A	6-BH4A-BN1	6-BH4A-BN2	6-BH4A-BN3	6-BH4A	6-BH6A-BN1	6-BH6A-BN2	6-BH6A-BN3	6-BH6A	Total
ARTHROPODA													
Insecta													
Pterygota													
Diptera													
Ceratopogonidae							2	2					2
Ceratopogon sp.	1	1	1	3									3
Chironomidae													
Clinotanypus pinguis	3	3	1	7									7
Crytochironomous sp.			1	1									1
Krenopelopia sp.	4	1		5									5
Pentaneura sp.	1			1									1
Polypedilum falax	2			2			6	6					8
Polypedilum scalaenum			1	1		1	1	2					3
Procladius sp.		1		1									1
Tribelos jucundum	4		9	13									13
Tipulidae													
Hexatoma sp.	2	1		3		1	6	7					10
Ormosia sp.	7	1		8									8

APPENDIX H (continued)

OPERABLE UNIT NO. 2
BEARHEAD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-BH2A-BN1	6-BH2A-BN2	6-BH2A-BN3	6-BH2A	6-BH4A-BN1	6-BH4A-BN2	6-BH4A-BN3	6-BH4A	6-BH6A-BN1	6-BH6A-BN2	6-BH6A-BN3	6-BH6A	Total
Dolichopodidae													
Paraphrosylus sp.	7	1		8									8
Syrphidae													
Eristalis sp.	1			1									1
Tabanidae													
Chrysops sp.	10	9	2	21	1	2	1	4					25
Trichoptera													
Polycentropodidae													
Phylocentropus sp.			3	3			4	4					7
Leptoceridae													
Oecetis sp.					1			1					1
Hemiptera													
Nepomorpha													
Corixidae													
Sigara sp.	16			16									16
Odonata													
Anisoptera													
Corduliidae	1			1									1
Zygoptera													

APPENDIX (continued)

OPERABLE UNIT NO. 2
BEARHEAD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-BH2A-BN1	6-BH2A-BN2	6-BH2A-BN3	6-BH2A	6-BH4A-BN1	6-BH4A-BN2	6-BH4A-BN3	6-BH4A	6-BH6A-BN1	6-BH6A-BN2	6-BH6A-BN3	6-BH6A	Total
Coenagrionidae													
Enallagma sp.		1		1									1
Gomphidae													
Stylurus sp.			1	1									1
Megaloptera													
Sialidae													
Sialis sp.		1		1									1
Coleoptera													
Elmidae													
Dubiraphia sp.	5	12	8	25			1	1					26
Stenelmis sp.							1	1					1
Crustacea													
Malacostraca													
Amphipoda													
Gammaridae													
Gammarus fasciatus		1	1	2	2	5	41	48					50
Isopoda													
Idoteidae													
Caecidotea sp.		1		1									1

APPENDIX [illegible] (continued)

OPERABLE UNIT NO. 2
BEARHEAD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-BH2A-BN1	6-BH2A-BN2	6-BH2A-BN3	6-BH2A	6-BH4A-BN1	6-BH4A-BN2	6-BH4A-BN3	6-BH4A	6-BH6A-BN1	6-BH6A-BN2	6-BH6A-BN3	6-BH6A	Total
Decapoda													
Palaemonidae													
Palaemonetes paludosus	1			1									1
ANNELIDA													
Polychaeta													
Phyllodocida													
Nereidae													
Nereis succinea										4		4	4
Capitellida													
Capitellidae													
Capitella capitata	1			1									1
Oligochaeta													
Tubificida													
Tubificidae			2	2									2
Isochaetides curvisetosus	121	126	14	261									261
Limnodrilus hoffmeisteri	31	12	5	48	13	12	13	38					86
Limnodrilus udekemianus	6	8	12	26	2	3	1	6					32
Quistadrilus multisetosus	1			1									1
Sparganophilidae													

APPENDIX .. (continued)

OPERABLE UNIT NO. 2
BEARHEAD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-BH2A-BN1	6-BH2A-BN2	6-BH2A-BN3	6-BH2A	6-BH4A-BN1	6-BH4A-BN2	6-BH4A-BN3	6-BH4A	6-BH6A-BN1	6-BH6A-BN2	6-BH6A-BN3	6-BH6A	Total
Sparganophilus sp.	48	7	5	60									60
Haplotaxida													
Lumbriculidae													
Eclipidrilus sp.							1	1					1
PLATYHELMINTHES													
Turbellaria													
Tricladida													
Planariidae													
Dugesia tigrina							4	4					4
MOLLUSCA													
Gastropoda													
Mesogastropoda													
Viviparidae													
Campeloma decisum	5	4	3	12		1	4	5					17
Bivalvia													
Veneroida													
Sphaeriidae													
Pisidium casertanum	8	32	4	44	11	158	132	301					345
TOTAL SPECIES	23	19	17	33	6	8	15	16	0	1	0	1	39

APPENDIX ... (continued)

OPERABLE UNIT NO. 2
BEARHEAD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	6-BH2A-BN1	6-BH2A-BN2	6-BH2A-BN3	6-BH2A	6-BH4A-BN1	6-BH4A-BN2	6-BH4A-BN3	6-BH4A	6-BH6A-BN1	6-BH6A-BN2	6-BH6A-BN3	6-BH6A	Total
TOTAL INDIVIDUALS	286	223	73	582	30	183	218	431	0	4	0	4	1017
SPECIES DENSITY (#/M^2)	1823	1421	465	3709	191	1166	1389	2747	0	25	0	25	6482
SPECIES DIVERSITY	0.896	0.715	1.065	0.932	0.572	0.263	0.606	0.514	0	0	0	0	NA

APPENDIX H (continued)

OPERABLE UNIT NO. 2
PETTIFORD CREEK
RAW DATA TABLE: BENTHIC MACROINVERTEBRATE SPECIES
BASELINE ECOLOGICAL RISK ASSESSMENT
REMEDIAL INVESTIGATION CTO-0133
MCB CAMP LEJEUNE, NORTH CAROLINA

Species	PC-BN1	PC-BN2	PC-BN3	PC
ARTHROPODA				
Insecta				
Pterygota				
Diptera				
Chironomidae				
Microtendipes pedellus			1	1
Tribelos jucundum	4	2	1	7
Crustacea				
Malacostraca				
Amphipoda				
Gammaridae				
Gammarus fasciatus	1		1	2
ANNELIDA				
Oligochaeta				
Tubificida				
Tubificidae				
Limnodrilus hoffmeisteri	5	9	9	23
TOTAL SPECIES	3	2	4	4
TOTAL INDIVIDUALS	10	11	12	33
SPECIES DENSITY (#/M^2)	64	70	76	210
SPECIES DIVERSITY	0.410	0.206	0.363	0.372