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FINAL EXPANDED SITE INVESTIGATION REPORT SITE 15 MCB CAMP LEJEUNE NC

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CH2M HILL

Final

Expanded Site Investigation Report
Site 15
Marine Corps Base Camp Lejeune
Jacksonville, North Carolina

Prepared for

Department of the Navy
Naval Facilities Engineering Command
Mid-Atlantic

Contract No.
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April 2012

Prepared by

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Expanded Site Investigation Report
Site 15

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Under the

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Executive Summary

This document presents the findings and conclusions of the Expanded Site Investigation (ESI) conducted at Site 15, Former Montford Point Burn Dump, located on Marine Corps Base Camp Lejeune (MCB CamLej) in Jacksonville, North Carolina. This ESI Report was prepared by CH2M HILL under the Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic Division, Comprehensive Long-term Environmental Action—Navy (CLEAN) 1000 Contract N62470-08-D-1000, Contract Task Order (CTO) 136. The field investigation was conducted in accordance with the *Field Sampling and Analysis Plan, Expanded Site Investigation Site 15, Former Montford Point Burn Dump* (CH2M HILL, 2011a), which was prepared in accordance with the Uniform Federal Policy (UFP) for Sampling and Analysis Plans (SAPs) and is therefore referred to as the UFP-SAP. The UFP-SAP was approved by NAVFAC, MCB CamLej, the United States (U.S.) Environmental Protection Agency (USEPA), and the North Carolina Department of Environment and Natural Resources (NCDENR).

Background

In 2009, a Preliminary Assessment/Site Investigation (PA/SI) was conducted for the Camp Johnson military construction (MILCON) area, which included Site 15, to characterize potential environmental impacts associated with the past use of the site. Preliminary results of a conservative ecological risk screening identified potentially unacceptable risks for terrestrial receptors (for example, plants, soil invertebrates, mammals, reptiles, and birds) from exposure to metals, pesticides, and polychlorinated biphenyls (PCBs) in soil. A preliminary human health risk screening (HHRS) identified potentially unacceptable human health risks from exposure to chromium in groundwater. Further investigation of the site was recommended based on the results of the ecological and human health risk screenings.

Investigation Activities

The environmental investigation included:

- Collecting five surface soil samples
- Collecting 11 subsurface soil samples
- Installing six monitoring wells and collecting groundwater samples
- Aquifer testing

Soil concentrations were compared to North Carolina Soil Screening Levels (NCSSLs) (NCDENR, 2010a), USEPA Industrial and Residential Soil Adjusted Regional Screening Levels (RSLs) (USEPA, 2010a), twice the mean Base background concentrations (Base background) for inorganic constituents (Baker, 2001a), and risk-based ecological screening values (ESVs).

Groundwater samples were compared to North Carolina Groundwater Quality Standards (NCGWQS) (NCDENR, 2010a), USEPA Tap Water RSLs (USEPA, 2010a), USEPA's Maximum Contaminant Levels (MCLs) (USEPA, 2009a), twice the mean Base background for inorganic constituents (Baker, 2001a), and risk-based ESVs. A summary of the results from the ESI is provided below.

Surface Soil

Volatile organic compounds (VOCs) and pesticides were not detected in the surface soil samples collected during ESI activities at concentrations exceeding NCSSLs and USEPA Adjusted RSLs. One PCB, Aroclor-1254, was detected in three surface soil samples at concentrations exceeding the USEPA Adjusted Residential RSL. Samples in which PCBs were detected were further analyzed for dioxin/furan congeners, which could potentially be formed if PCBs were heated during waste burning at the site. Dioxins and furans were not detected above regulatory criteria. Four semivolatile organic compounds (SVOCs), (benzo(a)pyrene, benzo(b)flouranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), were detected in one surface soil sample (IR15-SS20) at concentrations exceeding their respective USEPA Adjusted Residential RSL, with the concentration of benzo(a)pyrene also exceeding the

NCSSL. Four metals, arsenic, chromium, manganese, and mercury, were detected in the surface soil samples at concentrations that exceeded two times their respective Base background concentration and at least one regulatory screening criterion.

Subsurface Soil

VOCs and PCBs were not detected in the subsurface soil samples collected during ESI activities at concentrations exceeding screening criteria. One SVOC, benzo(a)pyrene, was detected in one subsurface soil sample at a concentration exceeding the Adjusted Residential RSL. One metal, iron, was detected at a concentration that exceeded Base background and regulatory screening criteria. 4,4'-dichlorodiphenyltrichloroethane (DDT) was detected in two subsurface soil samples (IR15-SB17 and IR15-SB19) at concentrations above the NCSSL, with the concentration detected in IR15-SB19 also exceeding the USEPA Adjusted Residential and Industrial Soil RSLs. Additionally, 4,4'-dichlorodiphenyldichloroethene (DDE) was detected in one subsurface soil sample (IR15-SB19) above the Adjusted Residential RSL, 4,4'-dichlorodiphenyldichloroethane (DDD) was detected in one subsurface soil sample (IR15-SB19) above the NCSSL, and dieldrin was detected in one subsurface soil sample (IR15-SB21) above the NCSSL.

Groundwater

VOCs, pesticides, and PCBs were not detected in the groundwater samples collected from Site 15 for the ESI at concentrations exceeding regulatory screening criteria. Three SVOCs were detected in one groundwater sample (IR15-MW04) at concentrations exceeding the NCGWQS. Additionally, hexavalent chromium, for which no Base background concentration has been established, was detected in one groundwater sample above the tap water RSL.

Human Health Risk Assessment

The human health risk evaluation for surface soil, combined surface and subsurface soil, and groundwater at Site 15 was performed in two phases. The first phase entailed a human health risk screening (HHRS), in which the site data were compared to appropriate human health risk-based screening values and a risk ratio evaluation was performed. If the HHRS indicated the potential for unacceptable human health risks for any of the media, that medium was carried forward to the second phase of evaluation, a complete human health risk assessment (HHRA).

The HHRS did not identify any contaminants of potential concern (COPCs) in surface soil; therefore, exposure to surface soil would not result in unacceptable risks to human health. As a result, no further assessment of surface soil based on human health risks was necessary, and a baseline HHRA was not performed. Exposure to combined surface and subsurface soil could potentially result in an unacceptable risk to human receptors as a result of lead exposure; however, a baseline HHRA was not performed for combined surface and subsurface soil because lead was the only COPC and is not evaluated in the same manner as the other COPCs. Lead is evaluated using the Integrated Exposure Uptake Biokinetic (IEUBK) model, which uses the average lead concentration, not the maximum detected lead concentration, as the input value. A baseline HHRA would not change lead risk results. The potential adverse effects associated with lead were associated with the concentration detected in one subsurface soil sample. When considering exposure to the average lead concentration (the concentration that is used in the IEUBK evaluation), there would be no adverse effects associated with exposure to lead.

The HHRS indicated the potential for unacceptable risks associated with exposure to shallow groundwater; therefore, a more complete risk assessment was performed for groundwater. The complete HHRA evaluated exposure to groundwater for future adult and child residents and construction workers.

Potential future contact with shallow groundwater by construction workers would not result in risks and hazards above USEPA's acceptable risk range and hazard level.

Potential contact with groundwater by future adult residents (noncarcinogenic hazard) would not result in hazards above USEPA acceptable levels.

Potential contact with groundwater by future child residents may result in a reasonable maximum exposure (RME) noncarcinogenic hazard above USEPA's target hazard index (HI). This hazard is associated with ingesting iron; however, the iron concentration is within Base-wide background concentration ranges and it is below the upper limit that is likely to pose a risk of adverse effects to a child. In addition, the central tendency exposure (CTE) noncarcinogenic hazard is below USEPA's target HI of 1.

Potential contact with groundwater by future lifetime residents (carcinogenic risks) would result in potential risks above USEPA's acceptable level. The concentration of benzo(a)pyrene is the primary contributor to estimated risks, with a lesser contribution from other SVOCs, as well as chromium. The carcinogenic polycyclic aromatic hydrocarbons (PAHs), including benzo[a]pyrene, were detected at estimated concentrations in only one of the eight groundwater samples analyzed for PAHs (in monitoring well IR15-MW04), and three of the four PAHs (including benzo[a]pyrene) were not detected in the duplicate sample collected from this location. The maximum detected concentrations of the PAHs were used as the exposure point concentration (EPC).

Ecological Risk Assessment

The ecological risk assessment (ERA) evaluated risk to terrestrial receptors from contaminants in surface soil, subsurface soil, and groundwater. Soil data used for this assessment were collected in 1997, 2002, 2004, 2005, 2006, 2009, and 2010 from across the site. Groundwater data were collected in 2002, 2004, 2009, 2010, and 2011.

Potentially complete and significant exposure pathways to terrestrial ecological receptors include the following:

- Direct exposure to terrestrial plants (root uptake) and soil invertebrates (dermal and direct ingestion)
- Incidental ingestion and dermal exposure for wildlife
- Food chain (prey consumption) exposures for wildlife

The potential for effects from exposure to each medium was initially evaluated in the Step 2 direct exposure screening by comparing ESVs to maximum concentrations of constituents detected at the site. Those analytes that were identified as Step 2 COPCs were retained for further evaluation in Step 3a.

Step 3a involved re-evaluation of the conservative assumptions used in Steps 1 and 2, resulting in a refinement of the COPC list. Step 3a included a re-assessment of the risks to lower trophic level receptors (direct exposure) and an evaluation, for the subset of contaminants that are bioaccumulative, of the potential for risks to upper trophic level receptors (food chain transfer). The risk to lower trophic level receptors from exposure to contaminants in soils and groundwater was recalculated using a conservative estimate of the mean chemical concentration as the EPC. If a conservative estimate of the mean EPC could not be calculated, the arithmetic mean concentration was used as the EPC.

Based on the refined screening, Aroclor-1254 in surface soil was identified as potentially posing risk to lower trophic level receptors. However, overall risk to ecological receptors from Aroclor-1254 is considered low because it was the only Aroclor detected, it was only detected in 4 of 20 samples, and food chain risks were not predicted. In addition, the ESV for soil (20 micrograms per kilogram [µg/kg]) is a target value (Swartjes, 1999). Target values for soil are related to negligible risk for ecosystems. The negligible risk level is assumed to be 1 percent of the maximum permissible risk level for ecosystems. Because the average Aroclor-1254 level was less than 10 times the screening value, population level risks are unlikely.

Lead and the DDT family of pesticides in subsurface soil were identified as posing risks to lower and upper trophic level receptors. A field investigation was subsequently conducted to determine whether the exposure pathway to subsurface soil is complete. The results indicated that the site is not inhabited by deep-dwelling earthworms and there is little, if any, burrowing activity by small mammals. The only exposure to subsurface soils identified was for tree roots and the pits that are formed as a result of fallen trees. With regard to the former, there was no evidence that trees and other vegetation are being negatively affected by subsurface soil contamination. For the latter, the investigation suggested that pine, which have relatively shallow root systems, are the tree species most likely to fall. It is unlikely that enough trees would tip during one event to expose an area of subsurface soil that

would result in significant impacts to receptor populations. In addition, the pits created by the tree falls will naturally fill in, eliminating exposure over time.

No significant risks were identified for ecological receptors exposed to surface soil or groundwater. For subsurface soil, potentially significant risks to lower and upper trophic level receptors could occur if the lead and pesticides in subsurface soil is exposed. However, given the lack of deep-dwelling earthworms, limited burrowing activity, the unlikelihood for excavation in the waste disposal area, and the relatively small area exposed by occasional tree falls, exposure to subsurface soils is limited.

Conclusions and Recommendations

Multiple phases of investigation and data evaluation at Site 15 concluded that inert waste remains in place; however, the impacts to soil and groundwater are minimal and occur in sporadic and isolated locations.

Exposure to surface and subsurface soil would not result in unacceptable risks to human health. Based on the HHRA calculations, hypothetical contact with groundwater by future lifetime residents (carcinogenic risks) would result in potential risks above USEPA's acceptable level, with benzo(a)pyrene acting as the primary contributor to estimated risks. However, benzo[a]pyrene was detected at an estimated concentration in only one of the eight groundwater samples (in monitoring well IR15-MW04), and was not detected in the duplicate sample collected from this location. The estimated concentration of benzo(a)pyrene detected in the sample collected from IR15-MW04 was below the maximum contaminant level (MCL).

No significant ecological risks were identified from exposure to surface soil. For subsurface soil, potential risks to lower and upper trophic level receptors could occur if the lead and pesticides in subsurface soil is exposed. However, given the lack of deep-dwelling earthworms, limited burrowing activity, unlikelihood for excavation in the waste disposal area, and the relatively small area exposed by occasional tree falls, exposure to subsurface soils is unlikely.

Based on these conclusions, no further action is recommended for Site 15.

Contents

Appendixes

Tables

Figures

Acronyms and Abbreviations

°F	degree Fahrenheit
µg/kg	microgram per kilogram
µg/L	microgram per liter
ADAF	age-dependent adjustment factor
amsl	above mean sea level
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	area use factor
BAF	bioaccumulation factor
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLEAN	Comprehensive Long-term Environmental Action—Navy
cm	centimeter
COC	chemical of concern
COPC	contaminant of potential concern
CSF	cancer slope factor
CSI	Confirmatory Site Investigation
CSM	Conceptual Site Model
CTE	central tendency exposure
CTO	Contract Task Order
DDD	4,4'-dichlorodiphenyldichloroethane
DDE	4,4'-dichlorodiphenyldichloroethene
DDT	4,4'-dichlorodiphenyltrichloroethane
DoN	Department of the Navy
DOT	Department of Transportation
DPT	direct-push technology
EcoSSL	ecological soil screening level
EDS	Environmental Data Services
ELCR	excess lifetime carcinogenic risk
EPC	exposure point concentration
ERA	ecological risk assessment
ESI	Expanded Site Investigation
ESV	ecological screening value
FFA	Federal Facilities Agreement
ft/day	foot per day
GI	gastrointestinal
HEAST	Human Health Effects Assessment Summary Tables
HHRA	human health risk assessment
HHRS	human health risk screening
HI	hazard index
HMW	high molecular weight
HQ	hazard quotient
ID	inside diameter
IDW	investigation-derived waste
IEUBK	Integrated Exposure Uptake Biokinetic [model]

IR	Installation Restoration
IRP	Installation Restoration Program
IRM	interim remedial measures
K	hydraulic conductivity
kg	kilogram
L/day	liter per day
LOAEL	lowest observed adverse effects level
MCB CamLej	Marine Corps Base Camp Lejeune
MCL	Maximum Contaminant Level
MILCON	military construction
MF	modifying factor
mg/day	milligram per day
mg/kg	milligram per kilogram
mg/kg/d	milligram per kilogram per day
mg/L	milligram per liter
NAVFAC	Naval Facilities Engineering Command
NCDENR	North Carolina Department of Environment and Natural Resources
NCEA	National Center for Environmental Assessment
NCGWQS	North Carolina Groundwater Quality Standards
NCSSL	North Carolina Soil Screening Level
NIH	National Institute of Health
NOAEL	no observed adverse effect level
NPL	National Priorities List
NRWQC	National Recommended Water Quality Criteria
NTU	nephelometric turbidity unit
PAH	polycyclic aromatic hydrocarbon
PA/SI	Preliminary Assessment/Site Investigation
PCB	polychlorinated biphenyl
PPE	personal protective equipment
PPRTV	provisional peer reviewed toxicity value
PRG	preliminary remediation goal
PVC	polyvinyl chloride
QA/QC	quality assurance/quality control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RDA	recommended daily allowance
RFA	RCRA Facility Assessment
RfD	reference dose
RFI	RCRA Facility Investigation
RME	reasonable maximum exposure
RSL	Regional Screening Level
SAP	Sampling and Analysis Plan
SLERA	screening level ecological risk assessment
SOP	standard operating procedure
SQL	sample quantitation limit

SSL	soil screening level
STSC	Superfund Health Risk Technical Support Center
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TCDD	2,3,7,8- tetrachlorodibenzo-p-dioxin
TEF	toxicity equivalency factor
TEQ	toxic equivalent
TRV	toxicity reference value
U.S.	United States
UCL	upper confidence limit
UF	uncertainty factor
UFP	Uniform Federal Policy
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WHO	World Health Organization
WOE	weight-of-evidence

SECTION 1

Introduction

This document presents the findings and conclusions of the Expanded Site Investigation (ESI) conducted at Installation Restoration (IR) Site 15, former Montford Point Burn Dump on Marine Corps Base Camp Lejeune (MCB CamLej) in Jacksonville, North Carolina. A regional location map of MCB CamLej and its surrounding area is provided as **Figure 1-1**.

The ESI was conducted under the Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic Division, Comprehensive Long-term Environmental Action—Navy (CLEAN) 1000 Contract N62470-08-D-1000, Contract Task Order (CTO) 136. Field investigations were conducted in accordance with the *Field Sampling and Analysis Plan, Expanded Site Investigation Site 15, Former Montford Point Burn Dump* (CH2M HILL, 2011a) and was prepared in accordance with the Uniform Federal Policy (UFP) for Sampling and Analysis Plans (SAPs). The UFP-SAP was approved by NAVFAC, MCB CamLej, the U. S. Environmental Protection Agency (USEPA), and the North Carolina Department of Environment and Natural Resources (NCDENR).

1.1 Objectives and Approach

The objectives of the ESI were to:

- Assess the nature and extent of site contaminants
- Evaluate potential risks to human health
- Evaluate potential risks to ecological receptors
- Provide recommendations for site management

The following activities were performed in accordance with methods and procedures detailed in the MCB CamLej Master Project Plans (CH2M HILL, 2008) (referred to herein as the Master Project Plans) and the Site 15 UFP-SAP (CH2M HILL, 2011a):

- Collect five surface soil samples
- Collect 11 subsurface soil samples
- Install six permanent groundwater monitoring wells within the surficial aquifer, and collect groundwater samples
- Perform human health and ecological risk assessments (ERAs)

1.2 Report Organization

This ESI report comprises the following sections:

- Section 1—Introduction
- Section 2—Site Characteristics
- Section 3—Field Investigation Activities
- Section 4—Nature and Extent of Contamination
- Section 5—Human Health Risk Assessment
- Section 6— Ecological Risk Assessment
- Section 7— Conclusions and Recommendations
- Section 8— References

Figures and tables are provided at the end of each section and appendixes are located after Section 8.

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Legend

- IR Site 15 Boundary
- Installation Boundary

N

0 600 1,200 2,400 Feet

1 inch = 1,200 feet

Figure 1-1
Site Location Map
Site 15 ESI Report
MCB CamLej
North Carolina

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SECTION 2

Site Characteristics

2.1 MCB CamLej Setting and History

MCB CamLej encompasses 236 square miles in Onslow County, North Carolina, adjacent to the southern side of the City of Jacksonville. Jacksonville is the largest city near MCB CamLej and contains approximately half of the county's total population. Since 1990, much of MCB CamLej has been part of Jacksonville.

The Base is bisected by the New River, which flows into the Atlantic Ocean in a southeasterly direction. The Base is bordered by the Atlantic Ocean to the east, United States (U.S.) Route 17 to the west, and State Route 24 to the north. The MCB CamLej complex consists of six geographical locations under the jurisdiction of the Base command. These areas include Camp Geiger, Camp Johnson, Courthouse Bay, Mainside, the Greater Sandy Run Area, and the Rifle Range Area.

MCB CamLej was placed on the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) National Priorities List (NPL) effective November 4, 1989. Subsequent to this listing, the USEPA, NCDENR, the U. S. Department of the Navy (DoN), and the Marine Corps entered into a Federal Facilities Agreement (FFA) for CamLej. The primary purpose of the FFA was to be sure that environmental impacts associated with past and present activities at the Base are thoroughly investigated and that appropriate CERCLA response and Resource Conservation and Recovery Act (RCRA) corrective action alternatives are developed and implemented, as necessary, to protect public health and welfare and the environment.

2.2 Site Setting and History

Site 15 is an undeveloped tract of land encompassing approximately 24 acres that consists of an open field surrounded by vegetation **(Figure 2-1)**. Historical investigations indicate that the former disposal area covered approximately 2 acres in the eastern portion of the site. Surface topography is flat with a ground surface elevation of approximately 15 feet above mean sea level (amsl).

Site 15 (previously referred to as Solid Waste Management Unit [SWMU] 46) is the former Montford Point Burn Dump. Between 1946 and 1958, various wastes such as sewage treatment sludge, litter, asphalt and sand were reportedly disposed and buried at the site (Baker/CH2M HILL, 2005). The extent of the disposal area at the former burn dump has been characterized through geophysical and intrusive investigations. Buried waste, including pipes, strapping, grates, ceramic, glass, and automotive parts (radiator, hood, muffler), have been encountered between 3 and 7 feet below ground surface (bgs). The buried waste covers approximately 2 acres of the site and is still in place.

Table 2-1 summarizes the previous phases of environmental investigation and actions conducted at Site 15.

TABLE 2-1
Chronology of Events— Site 15

Investigation/Action	Date	Reference	Summary
RCRA Facility Assessment (RFA)	1989	EnSafe, 1989	Initial RFAs of 76 SWMUs at MCB CamLej identified SWMU 46 as a site that required confirmatory sampling.
SWMU 46 Phase I Confirmatory Site Investigation (CSI)	1997	Baker, 1997	Surface and subsurface soil samples were collected and analyzed for semivolatile organic compounds (SVOCs) and RCRA metals. Arsenic, cadmium, and lead were detected in subsurface soil samples at concentrations exceeding the NCDENR soil screening level (SSLs), USEPA Region IX preliminary remediation goals (PRGs) for residential land use, and Base background criteria (see **Figure 2-2**). Based on these results, additional assessment was recommended.
SWMU 46 Phase II CSI	2002	Baker, 2002	Several metals were detected in surface soil, subsurface soil, and groundwater samples at concentrations exceeding regulatory screening criteria. A geophysical survey was conducted to assess the approximate extent of buried debris (**Figure 2-2**).

TABLE 2-1
Chronology of Events— Site 15

Investigation/Action	Date	Reference	Summary
SWMU 46 RCRA Facility Investigation (RFI)	2005	Baker/CH2M HILL, 2005	Additional investigation included a supplemental geophysical survey, test trench excavation and confirmatory soil sampling, surface and subsurface soil sampling, and the installation of one permanent monitoring well. Waste material such as glass, metal debris, ceramic, ash, and other burned debris were encountered in the test trenches (**Figure 2-2**). Metals were detected in several surface soil samples, and metals, SVOCs, and pesticides were detected in subsurface soil samples collected from the test trenches. Cross-sections and photographs of the test trenches and results are provided in **Appendix A**. Several pesticide concentrations detected in the trench samples exceeded North Carolina soil to groundwater screening levels and USEPA industrial PRGs, including 4,4-dichlorodiphenyldichloroethane (DDD), and 4,4-dichlorodiphenyltrichloroethane (DDT), alpha-chlordane, and gamma-chlordane. A human health risk assessment (HHRA) identified potential human health risks from exposure to metals in soil and groundwater. An ERA concluded that terrestrial receptors may be at risk from exposure to metals in surface soils. The RFI recommended additional assessment of surface soil contamination, and further investigation of the extent of buried waste.
Additional assessment	2006	CH2M HILL, 2006	Soil samples were collected to further delineate the extent of contamination in the surface soil and assess soil mounds at the site, in order to provide guidance for the interim remedial measures (IRM) removal actions. Pesticides and metals were detected in surface soil and soil mounds and were recommended for removal.
SWMU 46 IRM	2007	Shaw, 2007	A total of 1,039 tons of surface soil was removed from the identified locations and disposed at the MCB CamLej landfill. Confirmatory soil samples were collected from the removal areas and submitted for laboratory analysis of pesticides and RCRA metals. The laboratory data indicated that one composite soil sample (SWMU46-0005) contained a concentration of mercury greater than the North Carolina Soil Screening Level (NCSSL); however, the concentration was only slightly greater than the Base background concentration. No additional excavation was conducted. On December 28, 2007, following completion of the surface soil removal action, SWMU 46 was transferred to the Installation Restoration Program (IRP) as Site 15 to address contamination in subsurface soils and buried waste at the site.
Camp Johnson Preliminary Assessment/Site Investigation (PA/SI)	2009	CH2M HILL, 2011b	The PA/SI was conducted within a proposed military construction (MILCON) area to identify and characterize potential environmental impacts, evaluate the potential risks to human health and the environment, and evaluate whether additional investigation and/or remediation activities are necessary. The investigation included collecting surface and subsurface soil from 10 soil borings and installing 5 temporary monitoring wells, as well as excavating 8 test pits. Several metals, pesticides, and polychlorinated biphenyls (PCBs) were detected in soil samples at concentrations exceeding regulatory screening criteria (**Figure 2-3**). Several metals were detected in groundwater at concentrations exceeding regulatory screening criteria. A human health risk screening (HHRS) identified potentially unacceptable risks as a result of the concentration of total chromium in a groundwater sample collected from temporary monitoring well TW05 that exceeded the risk-based hexavalent chromium screening level. Potentially unacceptable ecological risks were identified for one surface soil and three subsurface soil areas. Thus, additional groundwater and surface soil assessment was recommended. Buried waste was not encountered in the test pits, with the exception of small pieces polyvinyl chloride (PVC) pipe, metal, and ceramics in two test pits. The test pit logs are provided in **Appendix A**.

2.3 Regional and Facility-wide Physiography, Climate, and Surface Water Hydrology

MCB CamLej lies within the Tidewater region of the Atlantic Coastal Plain Physiographic Province in North Carolina. This physiographic province stretches from Georgia to Long Island, New York. The Tidewater region is generally swampy and of low relief, with elevations averaging roughly 20 feet amsl. The physiography of the area is typical of the Atlantic Coastal Plain with stepped terraces consisting of wide, gently eastward-sloping plains separated by linear, steeper, northward- and eastward-facing scarps. The topography is characterized by low

elevations and relatively low relief across MCB CamLej. The surface elevations range from sea level to approximately 70 feet amsl, with the majority of MCB CamLej ranging from 20 to 40 feet amsl. The relief between stream and interstream areas typically ranges from 20 to 30 feet. The New River and its tributaries bisect the Base in a northwest to southeast alignment.

Climatic conditions in southeastern North Carolina and at MCB CamLej are generally characterized by mild winters and hot, humid summers. Average annual precipitation in the area is approximately 50 inches. The average ambient air temperature is 63 degrees Fahrenheit (°F) (Water and Air Research, 1983).

2.4 Geology and Hydrogeology

2.4.1 General Regional Geologic and Hydrogeologic Framework

MCB CamLej is underlain by an eastward-thickening sediment wedge of marine and non-marine origins ranging in age from early Cretaceous to Holocene. The wedge of sediment begins at the western boundary of the Atlantic Coastal Plain Physiographic Province, known as the Fall Line, and dips southeastward toward the coast. Along the coastline, several thousands of feet of interlayered, unconsolidated sediments are present, consisting of gravel, sand, silt, clay deposits, calcareous clays, shell beds, sandstone, and limestone that were deposited over pre-Cretaceous crystalline basement rock. Within the MCB CamLej area, approximately 1,500 feet of a sedimentary sequence overlie the crystalline basement rock. This sedimentary sequence includes seven aquifers and their associated confining units (less-permeable beds of clay and silt) including the surficial, Castle Hayne, Beaufort, Peedee, Black Creek, and Upper and Lower Cape Fear Aquifers, shown in **Table 2-2** (Cardinell, Berg, and Lloyd, 1993). Three of the upper Tertiary Formations (Yorktown, Eastover, and Pungo River) shown in **Table 2-2** are not present in the vicinity of MCB CamLej.

Interstream areas generally provide the recharge for aquifers within the Coastal Plain region (Heath, 1989). In general, natural discharge of groundwater from the Coastal Plain aquifer system is into streams, swamps, and lakes. Evapotranspiration from the vadose zone and upward leakage through confining units into streams, estuaries, swamps, and even the ocean also contribute to groundwater discharge. Within the vicinity of MCB CamLej, the New River estuary serves as the principal discharge area for groundwater from the Castle Hayne Aquifer (Harned et al., 1989).

2.4.2 Site-specific Geologic and Hydrogeologic Framework

2.4.2.1. Site Geology

Shallow sediments at Site 15 consist of fine-grained silts and silty sands to approximately 6 feet bgs with trace amounts of clay. The silty sand is underlain by fine-grained sand to at least 16 feet bgs, the greatest depth investigated at the site. These sediments are considered to belong to the undifferentiated Formation, a heterogeneous deposit that mantles much of MCB CamLej.

2.4.2.2. Site Hydrogeology

Site-specific hydrogeologic information was derived from six permanent groundwater monitoring wells installed within the surficial aquifer. Depths to groundwater range from roughly 6.7 feet bgs to 8 feet bgs, as shown on **Table 2-3**. Groundwater elevation data indicate that groundwater in the surficial aquifer generally flows toward the southwest as shown on **Figure 2-4**. The horizontal hydraulic gradient in the surficial aquifer is roughly 0.0023-feet per foot. The hydraulic conductivity has been calculated using data collected during slug testing. The values range from 0.47 foot per day (ft/day) to 16.36 ft/day with a geometric mean of 6.73 ft/day. The lowest value was calculated for a well screened within a zone of sandy-clay and clay. For the wells screened in sand the hydraulic conductivity ranged from 8.94 ft/day to 16.36 ft/day with a geometric mean of 11.36 ft/day. The calculated hydraulic conductivity values are summarized in **Table 2-4** and the results of the slug test analyses are provided in **Appendix C**.

There are no active public water supply wells located within a 1-mile radius of Site 15 and the site is not located within a delineated wellhead protection area.

TABLE 2-2
Hydrostratigraphic Units of the North Carolina Coastal Plain
Site 15 ESI Report
MCB CamLej
North Carolina

Geologic Units			Hydrogeologic Units
System	**Series**	**Formation**	**Aquifer and Confining Unit**
Quaternary	Holocene/Pleistocene	Undifferentiated	Surficial Aquifer
Tertiary	Miocene	Yorktown[1]	Yorktown confining unit
		Eastover[1]	Yorktown Aquifer
		Pungo River[1]	Pungo River confining unit
			Pungo River Aquifer
	Oligocene	Belgrade[2]	Castle Hayne confining unit
		River Bend	Castle Hayne Aquifer
			Beaufort confining unit[3]
			Beaufort Aquifer
	Eocene	Castle Hayne	
	Paleocene	Beaufort	Peedee Confining Unit
Cretaceous	Upper Cretaceous	Peedee	
		Black Creek and Middendorf	Black Creek confining unit
			Black Creek Aquifer
		Cape Fear	Upper Cape Fear confining unit
			Upper cape Fear Aquifer
			Lower Cape Fear confining unit
			Lower Cape Fear Aquifer
	Lower Cretaceous	Unnamed deposits[1]	Lower Cretaceous confining unit
			Lower Cretaceous
Pre-Cretaceous basement rocks			

Notes:
[1]Geologic and hydrologic units probably not present beneath MCB Camp Lejeune.
[2]Constitutes part of the surficial aquifer and Castle Hayne confining unit in the study area.
[3]Estimated to be confined to deposits of Paleocene age in the study area.
Source: Harned et al., 1989.

TABLE 2-3

Monitoring Well Construction Information

Site 15 ESI Report

MCB CamLej

North Carolina

Monitoring Well ID	Date Installed	Date Water Level Measured	Casing Diameter (inches)	Screened Interval (ft bgs)	Well Depth (ft bgs)	TOC Elevation (ft amsl)	Ground Surface Elevation (ft amsl)	Depth to Water (ft btoc)	Depth to Water (ft bgs)	Water Elevation (ft amsl)
IR15-MW01	11/08/10	04/08/11	2	3 to 13	13	12.51	12.84	6.36	6.69	6.15
IR15-MW02	11/09/10	04/08/11	2	6 to 16	16	12.83	13.44	6.10	6.71	6.73
IR15-MW03	11/09/10	04/08/11	2	5 to 15	15	14.35	14.95	7.42	8.02	6.93
IR15-MW04	04/05/11	04/08/11	2	5 to 15	15	16.74	14.34	10.24	7.84	6.50
IR15-MW05	04/05/11	04/08/11	2	5 to 15	15	15.20	12.76	8.92	6.48	6.28
IR15-MW06	04/06/11	04/08/11	2	5 to 15	15	15.76	13.07	9.70	7.01	6.06

Notes:
ft amsl - feet above mean sea level
ft bgs - feet below ground surface
ft btoc - feet below top of casing

TABLE 2-4

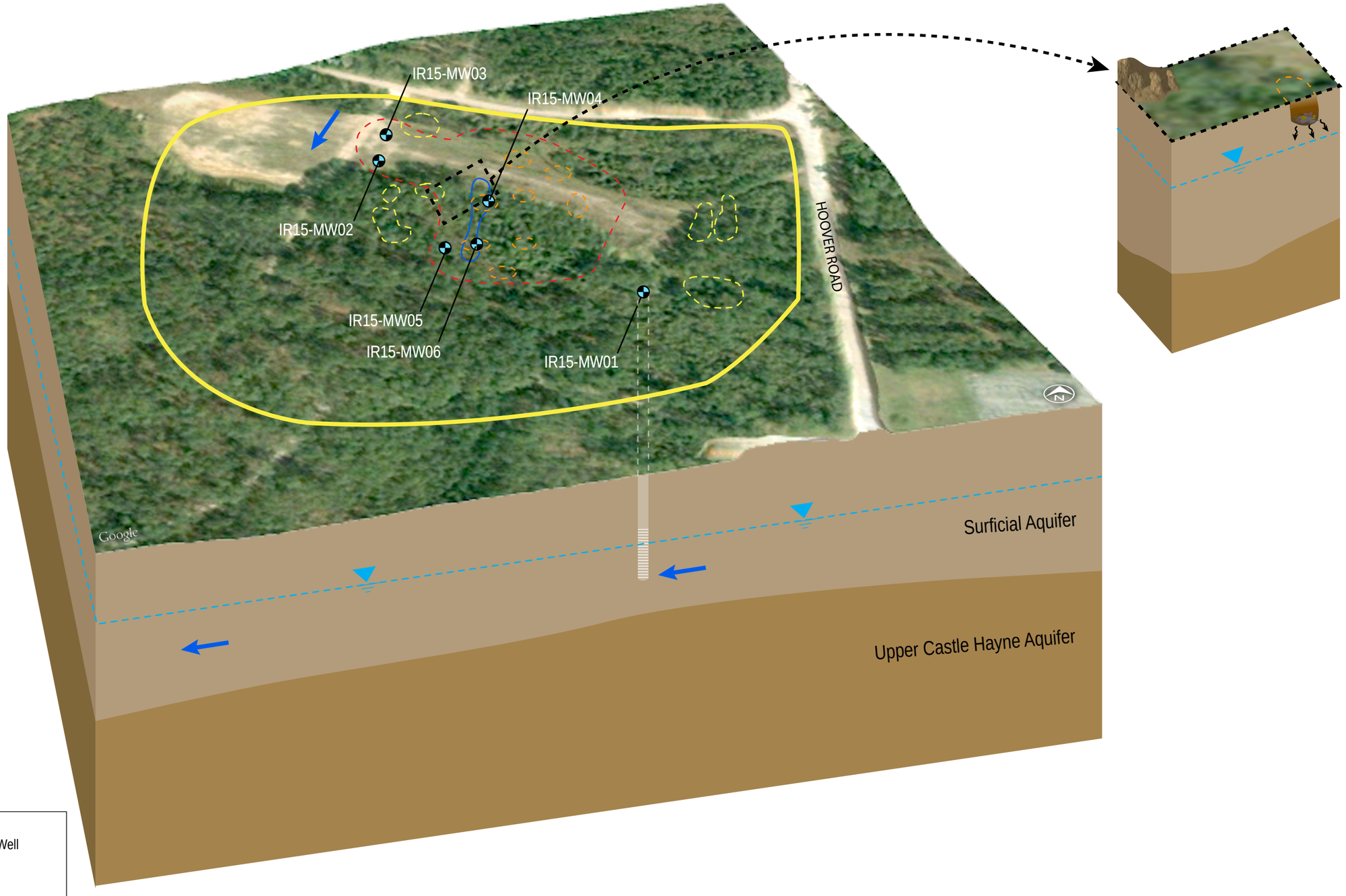
Hydraulic Conductivity

Site 15 ESI Report

MCB CamLej

North Carolina

Monitoring Well ID	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (ft/day)	Average Hydraulic Conductivity (ft/day)
IR15-MW01	11.58	11.05	11.58	11.40
IR15-MW02	8.44	8.04	10.36	8.95
IR15-MW03	0.49	0.47	0.53	0.50
IR15-MW04	10.94	9.49	12.53	10.99
IR15-MW05	11.59	9.39	10.00	10.33
IR15-MW06	17.44	15.71	15.94	16.36

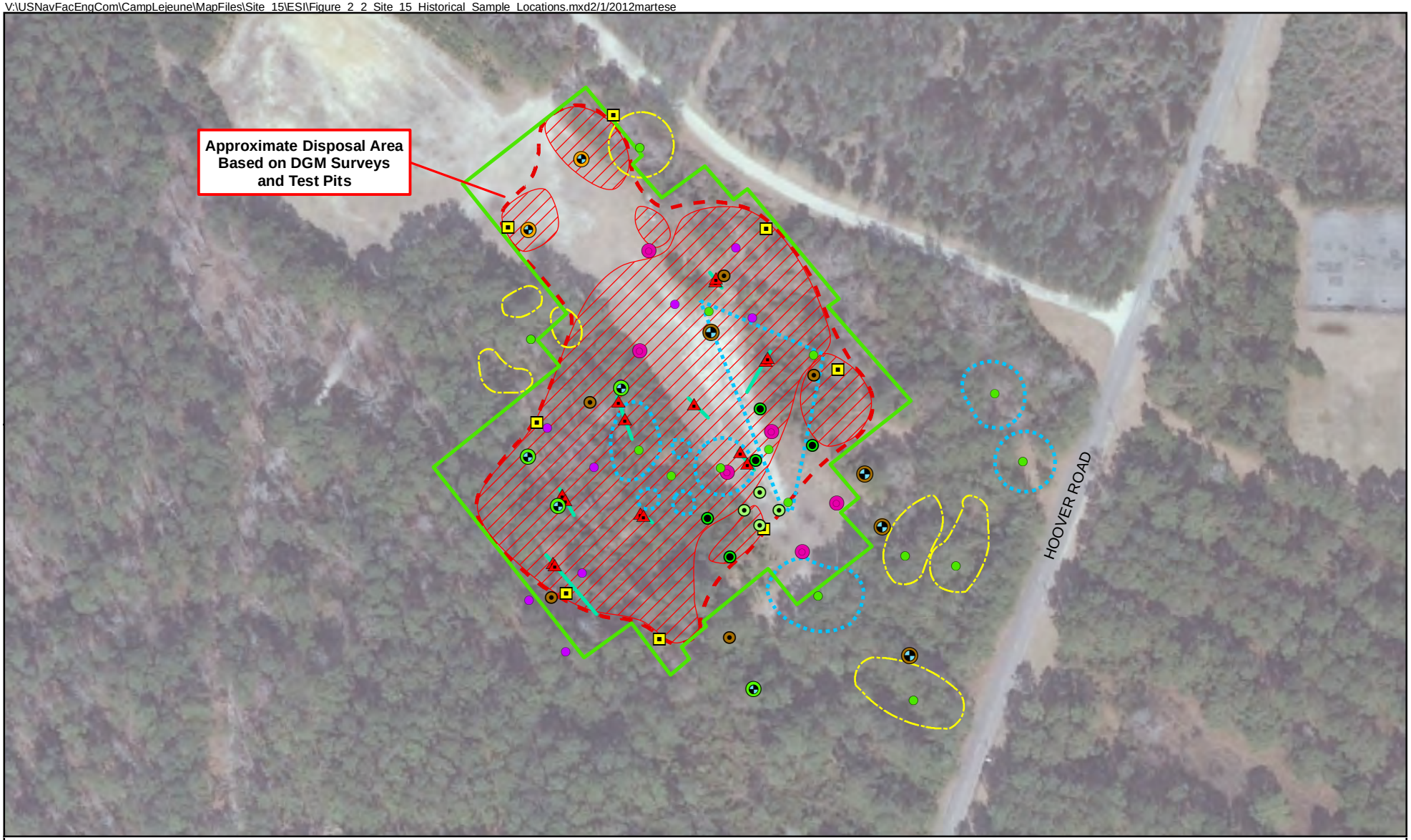


LEGEND

- Surficial Aquifer Monitoring Well
- IR Site 15 Boundary
- Approximate Disposal Area
- Former Soil Mounds
- Area of Elevated Subsurface Pesticides
- Approximate Test Trench Location
- Groundwater
- Groundwater Flow Direction
- Infiltration

FIGURE 2-1
Site Setting
Site 15 ESI Report
MCB CamLej
North Carolina

V:\USNavFacEngCom\CampLejeune\MapFiles\Site_15\ESI\Figure_2_2_Site_15_Historical_Sample_Locations.mxd2/1/2012martese



Legend

- PA/SI Surface/Subsurface Soil Sample Locations (CH2M HILL, 2010)
- PA/SI Surface/Subsurface Soil Sample Locations/Temporary Wells (CH2M HILL, 2010)
- Phase I CSI Soil Boring (Baker 1997)
- RFI Soil Boring (Baker/CH2M HILL 2005)
- Phase II CSI Temporary Well (Baker 2002)
- PA/SI Test pit
- Test trench sample (CH2M Hill, 2004)
- IRM Soil Mound Sample
- ESI Soil Sample
- ESI Soil and Groundwater Sample
- ESI Groundwater Sample
- Test Trench (Baker/CH2M HILL, 2005)
- IRM Surface Soil and Soil Mound Removal Areas
- Area of geophysical investigation
- Soil Mounds
- Approximate Electromagnetic Geophysical Anomaly

N

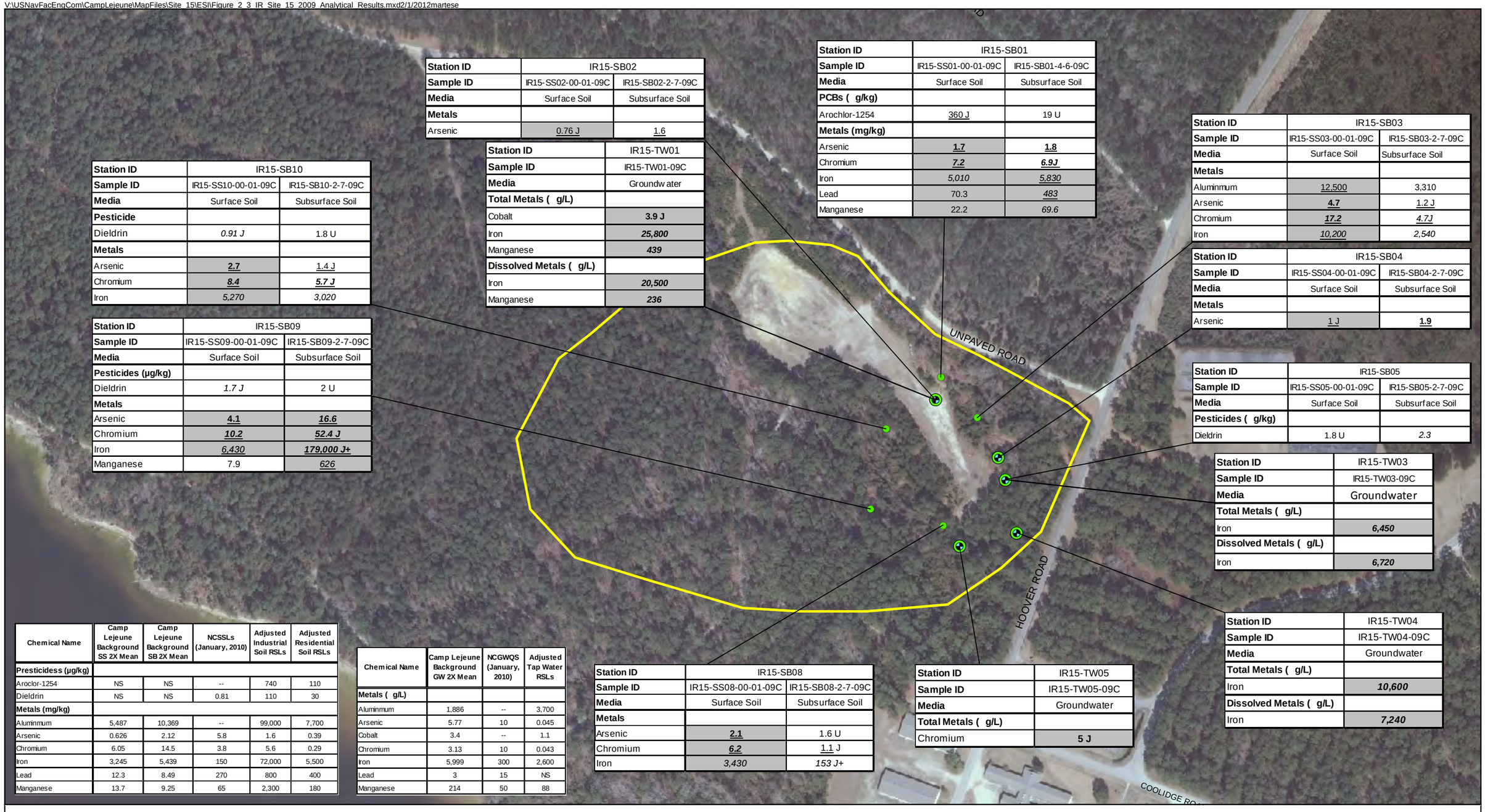
0 75 150 Feet

1 inch = 150 feet

Figure 2-2
Historical Sampling Locations
Site 15 ESI Report
MCB CamLej
North Carolina

CH2MHILL

V:\USNavFacEngCom\CampLejeune\MapFiles\Site_15\ESI\Figure_2_3_IR_Site_15_2009_Analytical_Results.mxd2/1/2012martese



Station ID	IR15-SB10	
Sample ID	IR15-SS10-00-01-09C	IR15-SB10-2-7-09C
Media	Surface Soil	Subsurface Soil
Pesticide		
Dieldrin	*0.91 J*	1.8 U
Metals		
Arsenic	**2.7**	1.4 J
Chromium	***8.4***	***5.7 J***
Iron	*5,270*	*3,020*

Station ID	IR15-SB09	
Sample ID	IR15-SS09-00-01-09C	IR15-SB09-2-7-09C
Media	Surface Soil	Subsurface Soil
Pesticides (µg/kg)		
Dieldrin	*1.7 J*	2 U
Metals		
Arsenic	**4.1**	***16.6***
Chromium	***10.2***	***52.4 J***
Iron	*6,430*	***179,000 J+***
Manganese	7.9	*626*

Station ID	IR15-SB02	
Sample ID	IR15-SS02-00-01-09C	IR15-SB02-2-7-09C
Media	Surface Soil	Subsurface Soil
Metals		
Arsenic	0.76 J	1.6

Station ID	IR15-TW01
Sample ID	IR15-TW01-09C
Media	Groundwater
Total Metals (g/L)	
Cobalt	**3.9 J**
Iron	***25,800***
Manganese	***439***
Dissolved Metals (g/L)	
Iron	***20,500***
Manganese	***236***

Station ID	IR15-SB01	
Sample ID	IR15-SS01-00-01-09C	IR15-SB01-4-6-09C
Media	Surface Soil	Subsurface Soil
PCBs (g/kg)		
Arochlor-1254	360 J	19 U
Metals (mg/kg)		
Arsenic	**1.7**	**1.8**
Chromium	***7.2***	***6.9J***
Iron	*5,010*	*5,830*
Lead	70.3	*483*
Manganese	22.2	*69.6*

Station ID	IR15-SB03	
Sample ID	IR15-SS03-00-01-09C	IR15-SB03-2-7-09C
Media	Surface Soil	Subsurface Soil
Metals		
Aluminmum	12,500	3,310
Arsenic	**4.7**	1.2 J
Chromium	***17.2***	*4.7J*
Iron	*10,200*	*2,540*

Station ID	IR15-SB04	
Sample ID	IR15-SS04-00-01-09C	IR15-SB04-2-7-09C
Media	Surface Soil	Subsurface Soil
Metals		
Arsenic	1 J	**1.9**

Station ID	IR15-SB05	
Sample ID	IR15-SS05-00-01-09C	IR15-SB05-2-7-09C
Media	Surface Soil	Subsurface Soil
Pesticides (g/kg)		
Dieldrin	1.8 U	*2.3*

Station ID	IR15-TW03
Sample ID	IR15-TW03-09C
Media	Groundwater
Total Metals (g/L)	
Iron	***6,450***
Dissolved Metals (g/L)	
Iron	***6,720***

Station ID	IR15-TW04
Sample ID	IR15-TW04-09C
Media	Groundwater
Total Metals (g/L)	
Iron	***10,600***
Dissolved Metals (g/L)	
Iron	***7,240***

Station ID	IR15-SB08	
Sample ID	IR15-SS08-00-01-09C	IR15-SB08-2-7-09C
Media	Surface Soil	Subsurface Soil
Metals		
Arsenic	**2.1**	1.6 U
Chromium	***6.2***	1.1 J
Iron	*3,430*	*153 J+*

Station ID	IR15-TW05
Sample ID	IR15-TW05-09C
Media	Groundwater
Total Metals (g/L)	
Chromium	**5 J**

Chemical Name	Camp Lejeune Background SS 2X Mean	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs	Adjusted Residential Soil RSLs
Presticidess (µg/kg)					
Aroclor-1254	NS	NS	--	740	110
Dieldrin	NS	NS	0.81	110	30
Metals (mg/kg)					
Aluminmum	5,487	10,369	--	99,000	7,700
Arsenic	0.626	2.12	5.8	1.6	0.39
Chromium	6.05	14.5	3.8	5.6	0.29
Iron	3,245	5,439	150	72,000	5,500
Lead	12.3	8.49	270	800	400
Manganese	13.7	9.25	65	2,300	180

Chemical Name	Camp Lejeune Background GW 2X Mean	NCGWQS (January, 2010)	Adjusted Tap Water RSLs
Metals (g/L)			
Aluminmum	1,886	--	3,700
Arsenic	5.77	10	0.045
Cobalt	3.4	--	1.1
Chromium	3.13	10	0.043
Iron	5,999	300	2,600
Lead	3	15	NS
Manganese	214	50	88

Legend

- Surface/Subsurface Soil Sample
- Surface/Subsurface Soil/Groundwater Sample
- IR Site 15 Boundary

Notes:
Shading indicates exceedance of two times the mean base background concentration
Italics indicates exceedance of NCSSLs or NCGWQS
Bold text indicates exceedance of Adjusted Industrial Soil RSLs or Adjusted Tapwater RSL
Underline indicates exceedance of Adjusted Residential Soil RSLs
U - The material was analyzed for, but not detected
J - Analyte present, value may or may not be accurate or precise
J+ - Analyte present, value may be biased high, actual value may be lower
NS - Not Specified

N

0 125 250 500 Feet

1 inch = 250 feet

Figure 2-3
2009 PA/SI Analytical Results
Site 15 ESI Report
MCB CamLej
North Carolina

CH2MHILL

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Legend

- Monitoring Well Location
- Potentiometric Contour Lines
- Groundwater Flow
- IR Site 15 Boundary

Notes:
Potentiometric surface contours have been interpolated between monitoring well locations. Actual conditions may differ from those shown here.
6.93 - Groundwater elevation in feet above mean sea level
Water level measurements collected on April 8, 2011

N

0 62.5 125 Feet

1 inch = 125 feet

Figure 2-4
Potentiometric Surface Map
Site 15 ESI Report
MCB CamLej
North Carolina

CH2MHILL

SECTION 3

Field Investigation Activities

Field activities were conducted in November 2010 and April 2011 in accordance with the standard operating procedures (SOPs) outlined in the UFP-SAP (CH2M HILL, 2011a) and detailed in the Master Project Plans (CH2M HILL, 2008).

3.1 Field Investigation Activities

This section presents a summary of field activities, which included:

- Collecting five surface soil samples
- Collecting 11 subsurface soil samples
- Installing six groundwater monitoring wells
- Collecting six groundwater samples
- Aquifer testing
- Site surveying
- Investigation-derived waste (IDW) Management

3.2 Surface Soil Sampling

The purpose of the surface soil sampling was to provide additional data to refine risk assessments, and to investigate two areas of geophysical anomalies potentially relating to historical waste disposal activities. The Camp Johnson PA/SI ecological risk screening identified potentially unacceptable risks to ecological receptors from exposure to PCBs, pesticides, and mercury in surface soil at IR15-SS01. To better characterize this area, three surface soil samples were collected from within a 50-foot radius of IR15-SS01. In addition, two geophysical anomalies in the northern portion of the site had not been previously investigated; therefore, one surface soil sample was collected from the center of each anomaly to fully assess these areas. Surface soil sample locations are shown on **Figure 3-1**.

A stainless steel trowel, which was decontaminated between sampling locations, was used to collect the surface soil samples from 0 to 0.5 foot bgs. The soil was placed in laboratory-supplied containers and packed in an iced cooler, which was shipped under chain-of-custody control by overnight courier to TriMatrix Laboratories. **Table 3-1** summarizes the laboratory analytical methods used for each surface soil sample. Individual samples were analyzed for different parameters based on potential ecological risks that were identified in the PA/SI or to further assess the northern anomaly areas that were not previously assessed. The surface soil samples collected near IR15-SS01 were analyzed for Aroclor-1254, 4-4'-DDD, 4-4'-DDT, 4-4'-dichlorodiphenyldichloroethene (DDE), and mercury, while the surface soil samples collected from the northern anomalies were analyzed for volatile organic compounds (VOCs), SVOCs, pesticides, PCBs, and metals.

At surface soil locations where samples were collected for PCB analysis, additional sample material was also collected for potential dioxin and furan analysis. Dioxins and furans could potentially form if PCBs were heated during waste burning at the site. Dioxin and furan analysis was conducted only if PCBs were detected in the parent sample. Three surface soil samples (IR15-SS11, IR15-SS12, and IR15-SS21) were reported to contain PCBs and were therefore analyzed for 2,3,7,8 p-dioxin, and furans.

3.3 Subsurface Soil Sampling

The purpose of the subsurface soil sampling was to provide additional data to refine risk assessments, and to investigate two areas of geophysical anomalies potentially relating to historical waste disposal activities. Potential ecological risks from exposure to pesticides and metals in subsurface soil were identified in three areas during the Camp Johnson PA/SI. To further evaluate these potential risks, three subsurface soil samples were collected from within a 50-foot radius of subsurface soil samples IR15-SB01, IR15-SB09, and IR15-SB10. In addition, subsurface

soil samples (IR15-SB20 and IR15-SB21) were collected from the center of the geophysical anomalies in the northern portion of the site. Subsurface soil sample locations are shown on **Figure 3-1**.

A hand auger, which was decontaminated between sample locations, was used to collect the subsurface soil samples from 1 to 5 feet bgs. This interval was selected because it is unlikely that ecological receptors would be present at depths greater than 5 feet bgs.

The subsurface soil samples were placed in the appropriate sample container, packed in an ice-filled cooler, and shipped under chain-of-custody control by overnight courier to TriMatrix Laboratories. **Table 3-1** summarizes the laboratory analytical methods used for each subsurface soil sample. Individual samples were analyzed for different parameters based on potential ecological risks that were identified in the PA/SI or to complete a full assessment of areas that were not previously assessed. The subsurface soil samples collected near IR15-SB01 were analyzed for lead, zinc, and antimony, while the subsurface soil samples collected near IR15-SB09 were analyzed for lead, iron, and zinc. The subsurface soil samples collected near IR15-SB10 were analyzed for 4-4'-DDD, 4-4'-DDT, 4-4'-DDE. The subsurface soil samples collected from the northern anomalies were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals.

3.4 Groundwater Sampling

The HHRS conducted during the Camp Johnson PA/SI identified potentially unacceptable risks to human health posed by the chromium concentration detected in the shallow groundwater sample collected from temporary monitoring well IR15-TW05. As a result, monitoring well IR15-MW01 was installed at the former location of temporary monitoring well IR15-TW05. In addition, to investigate the northern anomalies, which were not previously assessed, one monitoring well was installed in the center of each anomaly (IR15-MW02 and IR15-MW03).

During the course of the initial ESI data evaluation, it was determined that pesticides were detected in subsurface soil samples collected from the western portion of the site at concentrations exceeding regulatory criteria. However, groundwater had not been assessed in this area during any previous investigations. Therefore, three monitoring wells were installed (IR15-MW04 through IR15-MW06) in that region of the site. Monitoring well locations are shown on **Figure 3-1**.

Prior to advancing each borehole, subsurface utilities were identified, and the boring location was cleared to 5 feet bgs using a hand auger. A track-mounted direct-push technology (DPT) rig was used to advance each well boring to a depth of approximately 15 feet bgs. Continuous soil cores were collected from each boring for lithologic characterization, and described using the Unified Soil Classification System; boring logs are provided in **Appendix B**.

The DPT soil borings were subsequently reamed using 4.25-inch inside diameter (ID) hollow stem augers to allow installation of groundwater monitoring wells. Each well was constructed with 2-inch ID, Schedule 40, PVC casing and a 10-foot length of 0.010-inch machine slotted Schedule 40 PVC well screen. Silica filter sand was placed around the annular space of the well screen from the bottom of the boring extending to 2 feet above the top of the screen. A layer of bentonite pellets was placed above the top of the sand pack extending to 1 foot bgs. Monitoring wells IR15-MW01 through IR15-MW03 were completed as flush-mounted wells with an 8-inch diameter steel manhole cover, and wells IR15-MW04 through IR15-MW06 were completed with locking steel above grade protective casings. **Table 2-3** summarizes the well construction information, and well completion diagrams are provided in **Appendix B.**

After completion, each monitoring well was developed using a surge block and submersible pump to remove solids and establish a graded filter pack to reduce turbidity. Development continued until the turbidity was less than 10 nephelometric turbidity units (NTUs) or until readings had stabilized.

Following well development, the wells were allowed to equilibrate for at least 24 hours before purging. A bladder pump was used to collect the groundwater samples following low-flow sampling methods in accordance with the UFP-SAP (CH2M HILL, 2011a) and the CH2M HILL and Navy CLEAN SOPs as described in the *Master Project Plans* (CH2M HILL, 2008). **Table 3-2** summarizes the groundwater quality parameters.

Laboratory analytical methods used for groundwater samples are summarized in **Table 3-1**. The groundwater samples were placed in laboratory-supplied bottleware, packed in an iced cooler, and shipped under chain-of-custody control by overnight courier to TriMatrix Laboratories. **Table 3-1** summarizes the laboratory analytical methods used for each groundwater sample. Individual samples were analyzed for different parameters based on the HHRA, to assess for the presence of pesticides near subsurface soil sample locations that contained elevated pesticides, or to further assess the northern anomaly areas. The groundwater sample collected from IR15-MW01 was analyzed for total and hexavalent chromium, while all other groundwater samples were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals.

3.5 Aquifer Testing

In order to assess the hydrogeologic properties of the surficial aquifer, rising head slug tests were performed on all site monitoring wells. Prior to initiating the slug testing activities, the static water level was measured in each well using an electronic water level meter. An In-Situ TROLL® 700 pressure transducer was placed in each well to allow monitoring of the rapid changes in water level that occur during slug testing. The slug consisted of a 1.5-inch outer diameter 3-foot-long polyethylene bailer. New, clean slugs were used for each monitoring well. Water levels within the well were allowed to return to static conditions after the slug was lowered into each well.

Once water levels returned to static conditions, rising head slug tests were performed by rapidly removing the slug from the well. The near instantaneous loss of volume as the slug was removed from the well casing caused the water level to drop, and the water level recovery was recorded by the transducer until static conditions were reached.

The slug testing procedure was repeated in each well in triplicate to evaluate the data quality and repeatability. Water level and time data obtained from the slug test, as well as aquifer parameters and monitoring well construction data, were entered into the analytical software package AQTESOLV PRO 4.0 for analysis. The methods used to analyze the data included the Bouwer and Rice (1976) solution for monitoring wells screened in unconfined conditions. Results of the slug testing, including water level response and hydraulic conductivity values, are presented in **Appendix C**.

3.6 Site Survey

All newly installed wells and soil sample locations were surveyed by Lanier Surveying, a North Carolina-licensed land surveyor. The locations were referenced horizontally and vertically (monitoring wells) to permanent land monuments. The survey controls were tied to a benchmark and North American Datum 83 for the horizontal and North American Vertical Datum 88 for the vertical. Ground surface and monitoring well top of casing vertical control were surveyed to the nearest 0.01-foot, and the horizontal control was to the nearest 0.1- foot.

3.7 Investigation-derived Waste Management

IDW generated during the investigation was managed in accordance with the Master Project Plans. IDW included soil, liquid waste (such as purged groundwater or decontamination fluids), and personal protective equipment (PPE). Soil and liquids were placed in Department of Transportation (DOT)-approved 55-gallon drums, labeled, and staged for disposal. Samples were collected from the drummed IDW for characterization purposes. Soil and liquid IDW were disposed offsite as nonhazardous waste. Used PPE and trash were placed into opaque garbage bags and placed in an onsite dumpster.

3.8 Data Tracking and Validation

Field samples and their corresponding analytical tests were recorded on COC forms, which were submitted with the samples to the laboratory. Chain-of-custody entries were checked against the UFP-SAP (CH2M HILL, 2011a) to verify all designated samples were collected and submitted for the appropriate analyses. Upon receipt of the samples by TriMatrix and APPL, a comparison to the field information was made to verify that each sample was analyzed for the correct parameters. A check was made to ensure that the proper number and types of quality assurance/quality control (QA/QC) samples were collected. Analytical data reports, in hard copy and electronic

format, were submitted to Environmental Data Services (EDS) for third-party validation using the National Functional Guidelines for Superfund for Organic Methods Data Review (USEPA, 2008a), and National Functional Guidelines for Inorganic Data Review (USEPA, 2004a). The electronic data were downloaded to a CH2M HILL database. These steps (third-party validation and electronic data handling) reduce inherent uncertainties associated with data authenticity and usability.

TABLE 3-1

Summary of Laboratory Methods

Site 15 ESI Report

MCB CamLej

North Carolina

Sample ID	Matrix	Aroclor-1254 (Method 8082)	DDD, DDT, DDE (Method 8081A)	Select Metals (Methods 6010B/6062/7470/7471)	VOCs (Method 8260B)	SVOCs (Method 8270C)	Pesticides (Method 8081A)	PCBs (Method 8082)	Dioxins & Furans (Method 8290)	Total Metals (Methods 6010B/6062/7470)	Dissolved Metals (Method 6010B)	Hexavalent Chromium (7196A)
IR15-SS11	Surface Soil	X	X	X (mercury)					X			
IR15-SS12	Surface Soil	X	X	X (mercury)					X			
IR15-SS13	Surface Soil	X	X	X (mercury)								
IR15-SS20	Surface Soil				X	X	X	X		X		X
IR14-SS21	Surface Soil				X	X	X	X	X	X		X
IR15-SB11	Subsurface Soil			X (lead, antimony, zinc)								
IR15-SB12	Subsurface Soil			X (lead, antimony, zinc)								
IR15-SB13	Subsurface Soil			X (lead, antimony, zinc)								
IR15-SB14	Subsurface Soil			X (lead, iron, zinc)								
IR15-SB15	Subsurface Soil			X (lead, iron, zinc)								
IR15-SB16	Subsurface Soil			X (lead, iron, zinc)								
IR15-SB17	Subsurface Soil		X									
IR15-SB18	Subsurface Soil		X									
IR15-SB19	Subsurface Soil		X									
IR15-SB20	Subsurface Soil				X	X	X	X		X		X
IR15-SB21	Subsurface Soil				X	X	X	X	X	X		X
IR15-GW01	Groundwater											X (and total chromium)
IR15-GW02	Groundwater				X	X	X	X		X	X	X
IR15-GW03	Groundwater				X	X	X	X		X	X	X
IR15-GW04	Groundwater				X	X	X	X		X	X	X
IR15-GW05	Groundwater				X	X	X	X		X	X	X
IR15-GW06	Groundwater				X	X	X	X		X	X	X

Notes:
DDD - 4,4'-dichlorodiphenyldichloroethane
DDT - 4,4'-dichlorodiphenyltrichloroethane
DDE - 4,4'-dichlorodiphenyldichloroethene
VOCs - volatile organic compounds
SVOCs - semivolatile organic compounds
PCBs - polychlorinated biphenyls

TABLE 3-2

Water Quality Measurements

Site 15 ESI Report

MCB CamLej

North Carolina

Monitoring Well ID	Date Sampled	pH (SU)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Temperature (°Celsius)	Turbidity (NTU)	ORP (mV)
IR15-MW01	11/10/2010	6.38	0.261	7.19	18.43	7.3	36.7
IR15-MW02	11/11/2010	4.30	0.171	2.08	20.40	9.8	113.2
IR15-MW03	11/11/2010	5.42	0.379	1.74	21.80	7.8	25.4
IR15-MW04	4/6/2011	5.63	0.158	4.65	15.64	9.03	110.8
IR15-MW05	4/7/2011	4.93	0.061	2.50	16.66	63.12	136.4
IR15-MW06	4/7/2011	5.50	0.122	3.37	14.54	15.39	95.0

Notes:
SU - standard units
mS/cm - miliSiemens per centimeter
mg/L - milligram per liter
NTU - nephelometric turbidity units
mV - millivolts

VBO \\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\SITE_15\ESI\FIGURE_3_1_IR_SITE_15_ENVIRO_SAMPLE_LOCS_MAP.MXD BHATHAWA 12/2/2011 5:06:35 PM

Legend

- Surface/Subsurface Soil Sample Location
- Subsurface Soil Sample Location
- Monitoring Well Location
- Surface/Subsurface Soil Sample/Monitoring Well Location
- Soil Sample Locations for Camp Johnson MILCON PASI
- Approximate Electromagnetic Geophysical Anomaly Boundary
- IR Site 15 Boundary

N

0 60 120 Feet

1 inch = 120 feet

Figure 3-1
Environmental Sample Locations
Site 15 ESI Report
MCB CamLej
North Carolina

CH2MHILL

SECTION 4

Nature and Extent of Contamination

This section presents the results from the ESI field investigation and a summary of the nature and extent of contamination based on all data collected from the site. The raw analytical data tables are provided in **Appendix D**.

4.1 Surface Soil

Five surface soil samples were collected from Site 15 as part of the ESI field activities. Analytical data are presented in **Table 4-1**. **Figure 4-1** illustrates the distribution of the sample locations and shows target analytes that exceeded the NCSSLs, USEPA Adjusted Regional Screening Levels (RSLs), and/or USEPA Adjusted Industrial RSLs and Base background (metals only).

- VOCs were not detected in the surface soil samples at concentrations exceeding NCSSLs or USEPA Adjusted RSLs.
- Four SVOCs (benzo(a)pyrene, benzo(b)flouranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) were detected in surface soil sample IR15-SS20 at concentrations exceeding their respective USEPA Adjusted Residential RSLs. Additionally, the concentration of benzo(a)pyene exceeded the NCSSL.
- Pesticides were not detected in the surface soil samples at concentrations exceeding NCSSLs or USEPA Adjusted RSLs.
- One PCB, Aroclor-1254, was detected in surface soil samples IR15-SS11, IR15-SS12, and IR15-SS21, at concentrations exceeding the USEPA Adjusted Residential RSL. These soil samples were further analyzed for dioxin/furan congeners, which were not detected at concentrations exceeding the Adjusted RSLs.
- Four metals were detected at concentrations exceeding screening criteria as follows:
  - Arsenic was detected in the soil samples collected from IR15-SS20 and IR15-SS21 at concentrations exceeding the USEPA Adjusted Residential RSL and Base background.
  - The concentration of chromium detected in surface soil sample IR15-SS20 exceeded the NCSSL, USEPA Adjusted Residential and Industrial RSLs, and the Base background concentration.
  - Manganese was detected in surface soil sample IR15-SS20 at a concentration exceeding the NCSSL and Base background.
  - The concentration of mercury detected in surface soil sample IR15-SS11 exceeded the NCSSL and Base background.

4.2 Subsurface Soil

A total of 11 subsurface soil samples were collected from Site 15 as part of the field investigation. The laboratory analytical data are summarized in **Table 4-2** and sample locations exceeding the NCSSL, USEPA Adjusted Residential RSL, and/or USEPA Adjusted Industrial RSL and Base background are shown on **Figure 4-2**.

- VOCs were not detected in the surface soil samples at concentrations exceeding NCSSLs or USEPA Adjusted RSLs.
- One SVOC, benzo(a)pyrene, was detected in the subsurface soil sample collected from IR15-SB21 at a concentration exceeding the USEPA Adjusted Residential Soil RSL.
- Four pesticides were detected in the subsurface soil samples, with the highest concentrations detected in the sample collected from IR15-SB19.

  - 4,4,-DDD and 4,4-DDE were detected in IR15-SB19 at concentrations that exceeded the NCSSL and the USEPA Adjusted Residential RSL, respectively.
  - 4,4-DDT was detected in subsurface soil samples IR15-SB17 and IR15-SB19 at concentrations exceeding the NCSSL. Additionally, the concentration of 4,4-DDT detected in IR15-SB19 exceeded the USEPA Adjusted Residential and Industrial RSLs.
  - Dieldrin was detected in the subsurface soil sample collected from IR15-SB21 at a concentration exceeding the NCSSL.
- PCBs were not detected in the subsurface soil samples.
- Iron was detected in subsurface soil samples IR15-SB14, IR15-SB15, and IR15-SB16 exceeded the NCSSL, USEPA Adjusted Residential RSL, and Base background concentration.
- Lead was detected in the subsurface soil sample collected from IR15-SB16 at a concentration exceeding the NCSSL and Base background concentrations.

4.3 Groundwater

A total of six groundwater samples were collected from Site 15 during the ESI field events. The laboratory analytical data are summarized in **Table 4-3**. For evaluation, analytical results for groundwater were compared to the North Carolina Groundwater Quality Standards (NCGWQS) or Maximum Contaminant Levels (MCLs), whichever was more conservative, the adjusted USEPA tap water RSL, and Base background (metals only).

- VOCs were not detected in the groundwater samples at concentrations exceeding NCGWQS, MCLs, or USEPA tap water RSLs.
- Three SVOCs (benzo(a)anthracene, benzo(a)pyrene, and benzo(b)flouranthene) were detected in the groundwater sample collected from IR15-MW04 at concentrations exceeding the NCGWQS and USEPA tap water RSL.
- Pesticides and PCBs were not detected in the groundwater samples at concentrations exceeding NCGWQS, MCLs, or USEPA tap water RSLs.
- Hexavalent chromium, for which a Base background concentration has not been established, was detected in the groundwater sample collected from IR15-MW01 at a concentration exceeding the USEPA tap water RSL.

4.4 Summary of Investigations

The previous investigations at Site 15 have included geophysical evaluations, test trench excavations, and environmental sampling (**Table 4-4**) to estimate the boundary of the former waste disposal area and assess if past site use affected soil and groundwater. A summary of the findings, including results from previous investigations, is provided below. The analytical data collected prior to the ESI can be found in previous reports (CH2M HILL, 2011b; Baker/CH2M HILL, 2005).

4.4.1 Waste

Surface waste mounds have been identified across the site. Three surface mounds were removed from the site during the IRM removal action, during which 1,039 tons of surface soil and soil mounds were excavated (Shaw, 2007).

The extent of the buried waste disposal area has been identified through geophysical investigations and intrusive soil excavations. Buried debris, including, glass, metal debris, ceramic, ash, and car parts were encountered in test trench excavations within the boundary of geophysical anomalies (Baker/CH2M HILL, 2005). The test pits excavated along the inferred boundary of the buried waste provide further evidence of the disposal area boundary (**Figure 2-2**). Buried inert material, such as metal and glass, is present at the site.

4.4.2 Surface Soil

A total of 42 surface soil samples were collected from across the site during the various field investigations at SWMU 46/Site 15 (**Figure 2-2**). The majority of the samples were collected from within the area of buried waste and 14 samples were collected from outside the boundary of the waste disposal area. Metals were the most frequently detected target analytes with concentrations exceeding regulatory criteria, with arsenic, mercury, and lead the most frequently detected. The metals detections were generally in samples collected within the waste disposal area; however, arsenic was detected above regulatory criteria in three samples collected from outside the disposal boundary. One PCB, one pesticide, and four SVOCs have been detected in surface soil samples above screening criteria. The magnitude of the exceedances is generally low and is primarily limited to the surface soils in the northern portion of the site within the waste disposal area. VOCs have not been detected in the surface soil samples that have been collected from across Site 15.

4.4.3 Subsurface Soil

Fifty-three subsurface soil samples were collected from soil borings and test trenches located across the site during the various field investigations at SWMU 46/Site 15 (**Figure 2-2**). Several target analytes were detected at concentrations exceeding screening criteria, with metals being the most frequently detected analytes. Arsenic, mercury, and lead were the most frequently detected metals in the subsurface soil samples. The distribution of metals detections was widespread across the site; however, the detections above regulatory criteria were primarily located in the central portion of the site within the waste disposal area. Pesticides were detected at concentrations exceeding regulatory screening criteria in subsurface soil samples, primarily in a narrow area covering approximately 0.1-acre in the western portion of the site within the waste disposal area. One SVOC was detected in one subsurface soil sample at a concentration exceeding the USEPA Adjusted Residential Soil RSL. VOCs and PCBs have not been detected in subsurface soil samples above regulatory criteria.

4.4.4 Groundwater

Seventeen groundwater samples have been collected from Site 15 (**Figure 2-2**). Ten samples were collected from temporary monitoring wells and seven samples were collected from permanent monitoring wells. Metals and SVOCs have been detected in groundwater samples at concentrations exceeding NCGWQS. Three SVOCs were detected in one groundwater sample collected from the western portion of the site, at concentrations above their respective NCGQWS. SVOCs were not detected in groundwater samples collected from the perimeter of the disposal area. Several metals, including chromium, cobalt, iron, lead and manganese have been detected in groundwater samples at concentrations exceeding regulatory criteria. Cobalt, iron, lead, and manganese were also detected above their respective Base background concentrations; however, these samples collected from temporary monitoring wells, contained elevated turbidity readings. The elevated concentrations of metals may be due to metals sorbed to sediments in the groundwater sample rather than reflecting conditions in the groundwater. Of the groundwater samples collected from the permanent monitoring wells, no metals were detected at concentrations exceeding regulatory criteria and Base background concentrations. Hexavalent chromium, for which a Base background concentration is not established, was detected in the groundwater sample collected from IR15-MW01, above the adjusted tap water RSL. Hexavalent chromium was not detected in any other groundwater samples.

TABLE 4-1

Surface Soil Analytical Results

Site 15 ESI Report

MCB CamLej

North Carolina

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May, 2011)	Adjusted Residential Soil RSLs (May, 2011)	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID					IR15-SS11-0-0.5-10D	IR15-SS12-0-0.5-10D	IR15-SS13-0-0.5-10D	IR15-SS20-0-0.5-10D	IR15-SS20D-0-0.5-10D	IR15-SS21-0-0.5-10D
Sample Date					11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name										
Volatile Organic Compounds (µg/kg)										
1,4-Dichlorobenzene	--	70	12,000	2,400	NA	NA	NA	0.6 U	28 U	0.34 J
2-Butanone	--	16,000	20,000,000	2,800,000	NA	NA	NA	2.2 J	63 U	4.2 J
Acetone	--	24,000	63,000,000	6,100,000	NA	NA	NA	25 J	280 U	61 J
Benzene	--	7.3	5,400	1,100	NA	NA	NA	0.59 J	28 U	0.74 J
Carbon disulfide	--	3,800	370,000	82,000	NA	NA	NA	0.48 J	28 U	0.58 J
Methylcyclohexane	--	--	--	--	NA	NA	NA	0.31 J	28 U	0.22 U
Toluene	--	5,500	820,000	500,000	NA	NA	NA	0.6 U	28 U	0.94 J
Semivolatile Organic Compounds (µg/kg)										
Acenaphthylene	--	11,000	3,300,000	340,000	NA	NA	NA	3.7 J	3.4 J	3.7 U
Acetophenone	--	--	2,500,000	780,000	NA	NA	NA	1.1 J	18 U	1.9 J
Anthracene	--	660,000	17,000,000	1,700,000	NA	NA	NA	6.6 J	6.7 J	3.7 U
Benzaldehyde	--	--	1,200,000	780,000	NA	NA	NA	3.7 J	3.4 J	3.8 J
Benzo(a)anthracene	--	180	2,100	150	NA	NA	NA	32	20	19 U
Benzo(a)pyrene	--	59	210	15	NA	NA	NA	160	140	9.9 U
Benzo(b)fluoranthene	--	600	2,100	150	NA	NA	NA	290	240	17 J
Benzo(g,h,i)perylene	--	360,000	1,700,000	170,000	NA	NA	NA	330	270	9.5 U
Benzo(k)fluoranthene	--	5,900	21,000	1,500	NA	NA	NA	100	90	5.7 U
Chrysene	--	18,000	210,000	15,000	NA	NA	NA	80	70	19 U
Dibenz(a,h)anthracene	--	190	210	15	NA	NA	NA	59	50	3.4 J
Di-n-octylphthalate	--	38,000	120,000	35,000	NA	NA	NA	15 J	16 J	16 J
Indeno(1,2,3-cd)pyrene	--	2,000	2,100	150	NA	NA	NA	240	210	7.6 U
Pyrene	--	220,000	1,700,000	170,000	NA	NA	NA	27	16 J	19 U
Pesticide/Polychlorinated Biphenyls (µg/kg)										
4,4'-DDD	--	240	7,200	2,000	0.18 U	0.15 U	0.15 U	0.41 J	0.53 J	0.15 U
4,4'-DDE	--	--	5,100	1,400	0.18 U	2.7 J	2.8 J	5 J	6.9 J	6.8 J
4,4'-DDT	--	340	7,000	1,700	39	1.5 J	1.4 J	4.4 J	8.1 J	4.8 J
Aroclor-1254	--	--	740	110	360	260	15 U	14 U	14 U	120
Endrin	--	810	18,000	1,800	NA	NA	NA	0.15 U	0.15 U	0.83 J
Dioxin/Furans (pg/g)										
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	--	--	1,800	450	140	110 U	NA	NA	NA	38 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	--	--	1,800	450	3.7	2.2 J	NA	NA	NA	0.83 U
1,2,3,4,7,8-Hexachlorodibenzofuran	--	--	180	45	6.9 U	10	NA	NA	NA	1.2 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	--	--	180	45	4.8 U	3 U	NA	NA	NA	1.2 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	--	--	180	45	6.8	4.9 U	NA	NA	NA	1.8 J
2,3,4,6,7,8-Hexachlorodibenzofuran	--	--	180	45	2.1 J	1.9 J	NA	NA	NA	0.61 U
2,3,7,8-Tetrachlorodibenzofuran	--	--	180	45	3	2 U	NA	NA	NA	1.1
Octachlorodibenzofuran	--	--	60,000	15,000	96	74	NA	NA	NA	20
Octachlorodibenzo-p-dioxin	--	--	60,000	15,000	1,400	2,300	NA	NA	NA	950
Total heptachlorodibenzofuran	--	--	--	--	99	130	NA	NA	NA	29
Total heptachlorodibenzo-p-dioxin	--	--	--	--	260	230	NA	NA	NA	85
Total hexachlorodibenzofuran	--	--	--	--	120	69	NA	NA	NA	7.2
Total hexachlorodibenzo-p-dioxin	--	--	--	--	58	39	NA	NA	NA	4.7
Total pentachlorodibenzofuran	--	--	--	--	23	99	NA	NA	NA	5.3
Total pentachlorodibenzo-p-dioxin	--	--	--	--	8.9 U	1.4	NA	NA	NA	4.4 U
Total tetrachlorodibenzofuran	--	--	--	--	15	4.3	NA	NA	NA	1.1
Total tetrachlorodibenzo-p-dioxin	--	--	--	--	1.8	3.8	NA	NA	NA	5 U
Toxic Equivalents (Total TEQ)	--	--	--	--	3.5	3	NA	NA	NA	NA

TABLE 4-1

Surface Soil Analytical Results

Site 15 ESI Report

MCB CamLej

North Carolina

Station ID	Camp Lejeune Background SS 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May, 2011)	Adjusted Residential Soil RSLs (May, 2011)	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID					IR15-SS11-0-0.5-10D	IR15-SS12-0-0.5-10D	IR15-SS13-0-0.5-10D	IR15-SS20-0-0.5-10D	IR15-SS20D-0-0.5-10D	IR15-SS21-0-0.5-10D
Sample Date					11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name										
Total Metals (mg/kg)										
Aluminum	5,487	--	99,000	7,700	NA	NA	NA	4,100	4,300	3,000
Antimony	0.447	--	41	3.1	NA	NA	NA	0.32	0.33	0.52
Arsenic	0.626	5.8	1.6	0.39	NA	NA	NA	0.83	1.1	0.8
Barium	14.5	580	19,000	1,500	NA	NA	NA	14	15	13
Beryllium	0.103	--	200	16	NA	NA	NA	0.063 J	0.066 J	0.062 J
Cadmium	0.033	3	80	7	NA	NA	NA	0.12	0.12	0.2
Calcium	6,360	--	--	--	NA	NA	NA	4,100	5,100	7,600
Chromium	6.05	3.8	5.6	0.29	NA	NA	NA	6.6	4.7	4.1
Chromium (hexavalent)	--	3.8	5.6	0.29	NA	NA	NA	0.58 J	0.39 J	0.46 J
Cobalt	0.294	--	30	2.3	NA	NA	NA	0.22	0.28	0.29
Copper	4.83	700	4,100	310	NA	NA	NA	6.8	7	16
Iron	3,245	150	72,000	5,500	NA	NA	NA	2,700	2,700	2,500
Lead	12.3	270	800	400	NA	NA	NA	39 J	49 J	30 J
Magnesium	238	--	--	--	NA	NA	NA	200	220	170
Manganese	13.7	65	2,300	180	NA	NA	NA	15 J	160 J	15
Mercury	0.081	1	31	2.3	1.2	0.51	0.017 U	0.035 J	0.033 J	0.12
Nickel	1.21	130	2,000	150	NA	NA	NA	1.2	1.3	1.6
Potassium	116	--	--	--	NA	NA	NA	130	140	120
Selenium	0.563	2.1	510	39	NA	NA	NA	0.2 J	0.19 J	0.18 J
Silver	0.14	3.4	510	39	NA	NA	NA	0.057 J	0.045 J	0.13
Sodium	80.9	--	--	--	NA	NA	NA	21 J	22 J	10 J
Thallium	0.36	--	1	0.078	NA	NA	NA	0.036 J	0.036 J	0.027 J
Vanadium	8.9	--	520	39	NA	NA	NA	6.1	6.9	5.1
Zinc	10.8	1,200	31,000	2,300	NA	NA	NA	32 J	150 J	46 J

Notes:

Shading indicates concentrations is greater than twice the mean base background concentration for surface soil

Bold box indicates exceedance of NC SSL

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

NC SSL - North Carolina Soil Screening Level

RSL - Regional Screening Level

NA - Not analyzed

J - Analyte present, value may or may not be accurate or precise

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pg/g - Picograms per gram

µg/kg - Micrograms per kilogram

TABLE 4-2

Subsurface Soil Analytical Results

Site 15 ESI Report

MCB CamLej

North Carolina

Station ID	Camp Lejeune Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (May, 2011)	Adjusted Residential Soil RSLs (May, 2011)	IR15-IS11	IR15-IS12	IR15-IS13	IR15-IS14	IR15-IS15	IR15-IS16	IR15-IS17	IR15-IS18	IR15-IS19	IR15-MW02		IR15-MW03
Sample ID					IR15-SB11-1-5-10D	IR15-SB12-1-5-10D	IR15-SB13-1-5-10D	IR15-SB14-1-3-10D	IR15-SB15-1-3-10D	IR15-SB16-1-4-10D	IR15-SB17-1-4-10D	IR15-SB18-1-4-10D	IR15-SB19-1-5-10D	IR15-SB20-1-5-10D	IR15-SB20D-1-5-10D	IR15-SB21-1-4-10D
Sample Date					11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name																
Volatile Organic Compounds (µg/kg)																
2-Butanone	--	16,000	20,000,000	2,800,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1 U	1.1 U	11 J
Acetone	--	24,000	63,000,000	6,100,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6 R	5.6 R	94 J
Benzene	--	7.3	5,400	1,100	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	0.25 J
Carbon disulfide	--	3,800	370,000	82,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.25 J	0.5 J
Toluene	--	5,500	820,000	500,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	1.1 J
Semivolatile Organic Compounds (µg/kg)																
Acenaphthylene	--	11,000	3,300,000	340,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	2.8 J
Acetophenone	--	--	2,500,000	780,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1 J	19 U	1.6 J
Anthracene	--	660,000	17,000,000	1,700,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	4 J
Benzaldehyde	--	--	1,200,000	780,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 UJ	3.7 UJ	10 J
Benzo(a)anthracene	--	180	2,100	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	32
Benzo(a)pyrene	--	59	210	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	30
Benzo(b)fluoranthene	--	600	2,100	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	7 U	5.2 U	67
Benzo(k)fluoranthene	--	5,900	21,000	1,500	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	26
Chrysene	--	18,000	210,000	15,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	36 J
Dibenz(a,h)anthracene	--	190	210	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.2 J
Di-n-butylphthalate	--	19,000	6,200,000	610,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	18 J
Di-n-octylphthalate	--	38,000	120,000	35,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	14 J	14 J	3.9 U
Fluoranthene	--	330,000	2,200,000	230,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	22 J
Pyrene	--	220,000	1,700,000	170,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	52
Pesticide/Polychlorinated Biphenyls (µg/kg)																
4,4'-DDD	--	240	7,200	2,000	NA	NA	NA	NA	NA	NA	32 J	0.19 U	1,500 J	0.15 U	0.15 U	29 J
4,4'-DDE	--	--	5,100	1,400	NA	NA	NA	NA	NA	NA	270 J	0.19 U	1,500 J	0.15 U	0.15 U	59 J
4,4'-DDT	--	340	7,000	1,700	NA	NA	NA	NA	NA	NA	630	0.19 U	**31,000**	0.15 U	0.15 U	5.8 J
alpha-Chlordane	--	68	6,500	1,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	2.8 J
Dieldrin	--	0.81	110	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	2.5 J
Endrin ketone	--	810	18,000	1,800	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 U	1.4 U	3.8 J
gamma-Chlordane	--	68	6,500	1,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	1.5 J
Metals (mg/kg)																
Aluminum	10,369	--	99,000	7,700	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,100	3,600	4,000
Antimony	0.36	--	41	3.1	2.5	0.093 J	0.27	NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.43
Arsenic	2.12	5.8	1.6	0.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.81	0.72	1.2
Beryllium	0.165	--	200	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.038 J	0.056 J	0.066 J
Cadmium	0.023	3	80	7	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04 U	0.018 J	0.12
Calcium	441	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	390	380	2,300
Chromium	14.5	3.8	5.6	0.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3	3.9	**5.9**
Chromium (hexavalent)	--	3.8	5.6	0.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.37 J	0.24 J	0.23 J
Cobalt	0.822	--	30	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.18	0.16	0.31
Copper	2.56	700	4,100	310	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.61 U	0.5 U	9
Iron	5,439	150	72,000	5,500	NA	NA	NA	14,000	30,000	20,000	NA	NA	NA	2,600	2,500	3,000 U
Lead	8.49	270	800	400	70	4.1	22	8.6	8	330	NA	NA	NA	3 U	2.9 U	36 J
Magnesium	363	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	160	140	160
Manganese	9.25	65	2,300	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	1.8 U	18
Mercury	0.071	1	31	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.017 U	0.016 U	0.047
Potassium	361	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	150	140	150
Selenium	0.505	2.1	510	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.14 J
Silver	0.129	3.4	510	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.032 J	0.032 J	0.076 J
Sodium	68.3	--	--	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	11 J	10 J	12 J
Thallium	0.38	--	1	0.078	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.027 J	0.038 J	0.035 J
Vanadium	17.2	--	520	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.1	5.6	8
Zinc	6.59	1,200	31,000	2,300	110	4.5	22	6.7	6.2	260	NA	NA	NA	3.5 U	1.8 U	58 U

Notes:

Shading indicates concentration is great than twice the mean base background concentration for subsurface soil

Bold box indicates exceedance of NC SSLs

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

NC SSL- North Carolina Soil Screening Level

RSL - Regional Screening Level

NA - Not analyzed

J - Analyte present, value may or may not be accurate or precise

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

TABLE 4-3

Groundwater Analytical Results

Site 15 ESI Report

MCB CamLej

North Carolina

Station ID	NCGWQS	Adjusted Tap Water RSLs	Camp Lejeune	IR15-MW01	IR15-MW02		IR15-MW03	IR15-MW04		IR15-MW05	IR15-MW06
Sample ID	(January, 2010)	(May, 2011)	Background GW 2X Mean	IR15-GW01-10D	IR15-GW02-10D	IR15-GW02D-10D	IR15-GW03-10D	IR15-GW04-11B	IR15-GW04D-11B	IR15-GW05-11B	IR15-GW06-11B
Sample Date				11/10/10	11/11/10	11/11/10	11/11/10	4/6/11	4/6/11	4/7/11	4/7/11
Chemical Name											
Volatile Organic Compounds (µg/L)											
Toluene	600	230	--	NA	0.5 U	0.5 U	0.5 U	0.06 J	0.1 U	0.1 U	0.1 U
Semivolatile Organic Compounds (µg/L)											
Anthracene	2,000	1,100	--	NA	0.05 U	0.05 U	0.05 U	0.041 J	0.05 U	0.05 U	0.05 U
Benzo(a)anthracene	0.05	0.029	--	NA	0.05 U	0.05 U	0.05 U	**0.12 J**	**0.041 J**	0.1 U	0.1 U
Benzo(a)pyrene	0.005	0.0029	--	NA	0.05 U	0.05 U	0.05 U	**0.072 J**	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	0.05	0.029	--	NA	0.05 U	0.05 U	0.05 U	**0.072 J**	0.1 U	0.1 U	0.1 U
Benzo(k)fluoranthene	0.5	0.29	--	NA	0.1 U	0.1 U	0.1 U	0.093 J	0.1 U	0.1 U	0.1 U
bis(2-Ethylhexyl)phthalate	3	4.8	--	NA	0.77 U	0.64 U	0.65 U	0.5 U	0.5 U	0.25 J	0.33 J
Carbazole	--	--	--	NA	0.25 U	0.25 U	0.25 U	0.13 J	0.092 J	0.1 U	0.1 U
Di-n-butylphthalate	700	370	--	NA	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
Fluoranthene	300	150	--	NA	0.05 U	0.05 U	0.05 U	0.072 J	0.1 U	0.1 U	0.1 U
Phenanthrene	200	1,100	--	NA	0.05 U	0.05 U	0.05 U	0.072 J	0.1 U	0.051 J	0.1 U
Pyrene	200	110	--	NA	0.1 U	0.1 U	0.1 U	0.062 J	0.1 U	0.1 U	0.1 U
Pesticide/Polychlorinated Biphenyls (µg/L)											
4,4'-DDD	0.1	0.28	--	NA	0.0016 U	0.0016 U	0.0016 U	0.012	0.013	0.0008 U	0.0008 U
4,4'-DDE	--	0.2	--	NA	0.0016 U	0.0016 U	0.0016 U	0.0036 J	0.0037 J	0.0008 U	0.00081 J
4,4'-DDT	0.1	0.2	--	NA	0.0016 U	0.0016 U	0.0016 U	0.00081 J	0.001 J	0.0008 U	0.0008 U
alpha-Chlordane	0.1	0.19	--	NA	0.0016 U	0.0016 U	0.0016 U	0.012	0.012	0.0008 U	0.0008 U
Endosulfan I	40	22	--	NA	0.0004 J	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
gamma-Chlordane	0.1	0.19	--	NA	0.008 U	0.008 U	0.008 U	0.0069 J	0.0072 J	0.0008 U	0.0008 U
Heptachlor epoxide	0.004	0.0074	--	NA	0.0016 U	0.0016 U	0.0016 U	0.0038 J	0.0039 J	0.0008 U	0.00081 J
Total Metals (µg/L)											
Aluminum	--	3,700	1,886	NA	2,000	2,400	890	450	430 J	1,900 J	450 J
Antimony	6	1.5	3.28	NA	1 U	1 U	**2.1**	0.62 J	0.5 UJ	0.5 UJ	0.5 UJ
Arsenic	10	0.045	5.77	NA	1 U	1.3 U	1.2 U	**0.32 J**	**0.27 J**	**0.64 J**	**0.35 J**
Barium	700	730	86.2	NA	88	88	27	46	45	58	34
Cadmium	2	1.8	0.358	NA	0.2 U	0.2 U	0.063 J	0.044 J	0.1 U	0.058 J	0.1 U
Calcium	--	--	69,078	NA	2,200	2,500	49,000	23,000	24,000	800	17,000
Chromium	10	0.043	3.13	**2.3**	**2.6**	**2.6**	**0.95 J**	2.1 U	0.86 U	3.5 U	0.95 U
Chromium (hexavalent)	--	0.043	--	**1.1 J**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cobalt	--	1.1	3.4	NA	0.99 J	0.99 J	0.88 J	0.58 J	0.52 J	1	0.63 J
Copper	1,000	150	2.76	NA	1	0.95 J	1	2.9 J	0.93 J	1.4	0.39 J
Iron	300	2,600	5,999	NA	580	620	**4,000**	240	240	1,600	230
Lead	15	15	2.8	NA	1.1	1.5	0.5 U	0.79 J	0.57 J	1.3	0.47 J
Magnesium	--	--	6,363	NA	4,200	4,700	6,200	4,600 J	4,700 J	2,300 J	3,400 J
Manganese	50	88	214	NA	15	14	68	23	22	11	17
Nickel	100	73	7.97	NA	1.5	1.3	1.1 U	2.6 J	0.87 J	1.1	0.88 J
Potassium	--	--	3277	NA	2,000	2,200	1,700	5,800	6,000	1,000	1,800
Silver	20	18	0.77	NA	0.086 J	0.2 U	0.066 J	0.1 U	0.1 U	0.1 U	0.1 U
Sodium	--	--	22,508	NA	14,000	15,000	6,800	6,200	6,500	6,800	5,700
Thallium	--	0.037	3.78	NA	0.2 U	0.2 U	**0.069 J**	**0.04 J**	0.036 J	0.033 J	0.028 J
Vanadium	--	18	4.72	NA	2	2	1.3	0.87 U	0.99 U	3.1	0.74 U
Zinc	1,000	1,100	42.1	NA	13	13	8.4 J	14	10	8 J	7.5 J

TABLE 4-3

Groundwater Analytical Results

Site 15 ESI Report

MCB CamLej

North Carolina

Station ID	**NCGWQS**	**Adjusted Tap Water RSLs**	**Camp Lejeune**	IR15-MW01	IR15-MW02		IR15-MW03	IR15-MW04		IR15-MW05	IR15-MW06
Sample ID	**(January, 2010)**	**(May, 2011)**	**Background GW 2X Mean**	IR15-GW01-10D	IR15-GW02-10D	IR15-GW02D-10D	IR15-GW03-10D	IR15-GW04-11B	IR15-GW04D-11B	IR15-GW05-11B	IR15-GW06-11B
Sample Date				11/10/10	11/11/10	11/11/10	11/11/10	4/6/11	4/6/11	4/7/11	4/7/11
Chemical Name											
Dissolved Metals (µg/L)											
Aluminum	--	3,700	1,886	NA	300	330	520	100 U	100 U	39 J	100 U
Antimony	6	1.5	3.28	NA	1 U	1 U	1 U	0.28 J	0.5 U	0.5 U	0.5 U
Arsenic	10	0.045	5.77	NA	1 U	1 U	**1.3 J**	**0.25 J**	**0.2 J**	**0.32 J**	**0.23 J**
Barium	700	730	86.2	NA	81	90	28	43	43	50	35
Cadmium	2	1.8	0.358	NA	0.078 J	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U
Calcium	--	--	69,078	NA	2,400	2,400	46,000	24,000	22,000	690	18,000
Chromium	10	0.043	3.13	NA	**0.73 J**	**0.63 J**	1 U	0.5 U	0.64 U	0.77 U	0.5 U
Cobalt	--	1.1	3.4	NA	0.92 J	0.93 J	0.95 J	0.49 J	0.51 J	0.9 J	0.63 J
Copper	1,000	150	2.76	NA	1.5 J	0.89 J	1.2	0.82 J	0.76 J	0.86 J	1.2
Iron	300	2,600	5,999	NA	47	46	**4,300**	14 J	11 J	870	19 J
Lead	15	15	2.8	NA	0.28 J	0.5 U	0.5 U	0.18 J	0.17 J	0.5 U	0.5 U
Magnesium	--	--	6,363	NA	4,500	4,200	6,200	4,800	4,300	2,100	3,500
Manganese	50	88	214	NA	12	14	67	20	20	9.2	17
Nickel	100	73	7.97	NA	1.6	1.2	1.3	0.85 J	0.78 J	1.1	1.8
Potassium	--	--	3,277	NA	2,100	2,100	1,700	5,700	5,200	900	1,800
Silver	20	18	0.77	NA	0.12 J	0.2 U	0.07 J	0.1 U	0.1 U	0.1 U	0.1 U
Sodium	--	--	22,508	NA	14,000	14,000	6,900	6,300	5,800	6,600	6,200
Thallium	--	0.037	3.78	NA	**0.086 J**	0.2 U	**0.061 J**	**0.041 J**	0.035 J	0.1 U	0.1 U
Vanadium	--	18	4.72	NA	1 U	1 U	0.88 J	0.2 U	0.23 U	0.2 U	0.2 U
Zinc	1,000	11,00	42.1	NA	15	14	6.2 U	6.8 J	8.1 J	4 U	21

Notes:

Bold box indicates exceedance of NCGWQS or the more conservative MCL

Bold text indicates exceedance of Adjusted Tap Water RSLs

Shading indicates concentration is greater than twice the mean base background concentration for groundwater

* - The MCL-Groundwater value is reported in place of the NCGWQS where the MCL value is more conservative.

RSLs were adjusted for noncarcinogens to account for exposure to multiple constituents

J - Analyte present. Value may or may not be accurate or precise

U - The material was analyzed for, but not detected

µg/L - Micrograms per liter

NA - Not Analyzed

NCGWQS- North Carolina Groundwater Quality Standard

MCL - Maximum contaminant level

RSL - Regional Screening Level

TABLE 4-4

Historical Laboratory Analysis

Site 15 ESI Report

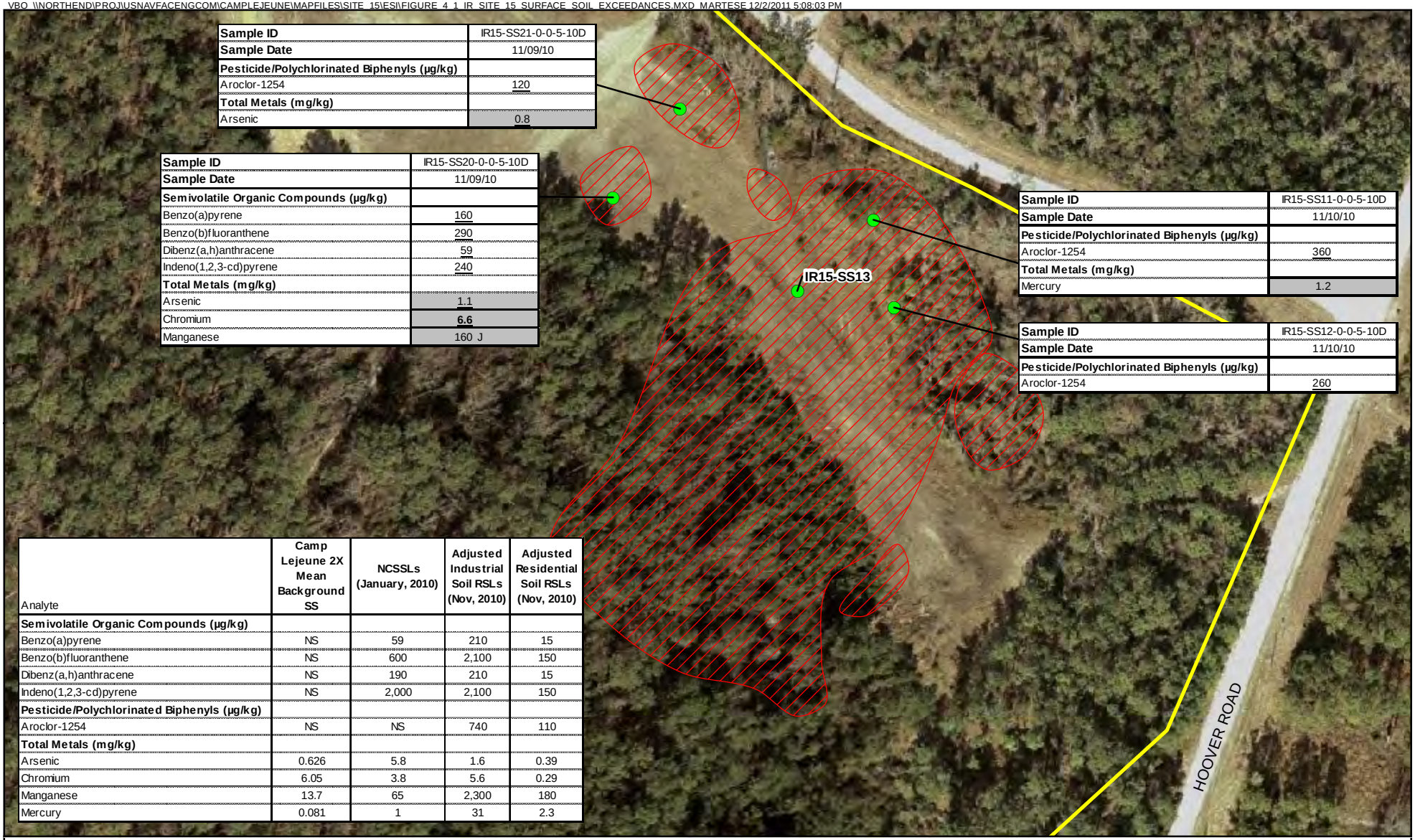
MCB CamLej

North Carolina

Investigation	Year	Media	Analytes
SWMU 46 Phase I CSI	1997	Surface Soil	SVOCs and RCRA Metals
		Subsurface Soil	SVOCs and RCRA Metals
SWMU 46 Phase II CSI	2002	Surface Soil	RCRA Metals
		Subsurface Soil	RCRA Metals
		Groundwater	RCRA Metals
SWMU 46 RFI	2005	Surface Soil	RCRA Metals
		Subsurface Soil (soil borings)	RCRA Metals
		Subsurface soil (test trenches)	VOCs, SVOCs, Pesticides, and RCRA Metals
		Groundwater	RCRA Metals
Additional Assessment	2006	Surface Soil	RCRA Metals
		Surface Soil (soil mounds)	VOCs, SVOCs, Pesticides, PCBs, and RCRA Metals
Site 15 PA/SI	2007	Surface Soil	VOCs, SVOCs, Pesticides, PCBs, and Metals
		Subsurface Soil	VOCs, SVOCs, Pesticides, PCBs, and Metals
		Groundwater	VOCs, SVOCs, Pesticides, PCBs, and Metals
Site 15 ESI	2011	Surface Soil	VOCs, SVOCs, Pesticides, PCBs, Dioxin/furans, and Metals
		Subsurface Soil	VOCs, SVOCs, Pesticides, PCBs, and Metals
		Groundwater	VOCs, SVOCs, Pesticides, PCBs, and Metals

Notes:
CSI - Confirmatory Site Investigation
RFI - RCRA Facilities Investigation
PA/SI - Preliminary Assessment/ Site Inspection
ESI - Expanded Site Inspection
RCRA - Resource Conservation and Recovery Act
VOC - Volatile Organic Compounds
SVOC - Semi-Volatile Organic Compounds
PCB - Polychlorinated Biphenyls

VBO \\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\SITE_15\ESI\FIGURE_4_1_IR_SITE_15_SURFACE_SOIL_EXCEEDANCES.MXD MARTESE 12/2/2011 5:08:03 PM



Sample ID	IR15-SS21-0-0-5-10D
Sample Date	11/09/10
Pesticide/Polychlorinated Biphenyls (µg/kg)	
Aroclor-1254	120
Total Metals (mg/kg)	
Arsenic	0.8

Sample ID	IR15-SS20-0-0-5-10D
Sample Date	11/09/10
Semivolatile Organic Compounds (µg/kg)	
Benzo(a)pyrene	160
Benzo(b)fluoranthene	290
Dibenz(a,h)anthracene	59
Indeno(1,2,3-cd)pyrene	240
Total Metals (mg/kg)	
Arsenic	1.1
Chromium	**6.6**
Manganese	160 J

Sample ID	IR15-SS11-0-0-5-10D
Sample Date	11/10/10
Pesticide/Polychlorinated Biphenyls (µg/kg)	
Aroclor-1254	360
Total Metals (mg/kg)	
Mercury	1.2

Sample ID	IR15-SS12-0-0-5-10D
Sample Date	11/10/10
Pesticide/Polychlorinated Biphenyls (µg/kg)	
Aroclor-1254	260

Analyte	Camp Lejeune 2X Mean Background SS	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (Nov, 2010)	Adjusted Residential Soil RSLs (Nov, 2010)
Semivolatile Organic Compounds (µg/kg)				
Benzo(a)pyrene	NS	59	210	15
Benzo(b)fluoranthene	NS	600	2,100	150
Dibenz(a,h)anthracene	NS	190	210	15
Indeno(1,2,3-cd)pyrene	NS	2,000	2,100	150
Pesticide/Polychlorinated Biphenyls (µg/kg)				
Aroclor-1254	NS	NS	740	110
Total Metals (mg/kg)				
Arsenic	0.626	5.8	1.6	0.39
Chromium	6.05	3.8	5.6	0.29
Manganese	13.7	65	2,300	180
Mercury	0.081	1	31	2.3

Legend

- Surface Soil Sample Location
- Approximate Electromagnetic Geophysical Anomaly Boundary
- IR Site 15 Boundary

Notes:

Shading indicates exceedance of two times the mean base background concentration

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Bold box indicates exceedance of NC SSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

J - Analyte present, value may or may not be accurate or precise

NS - Not Specified

N

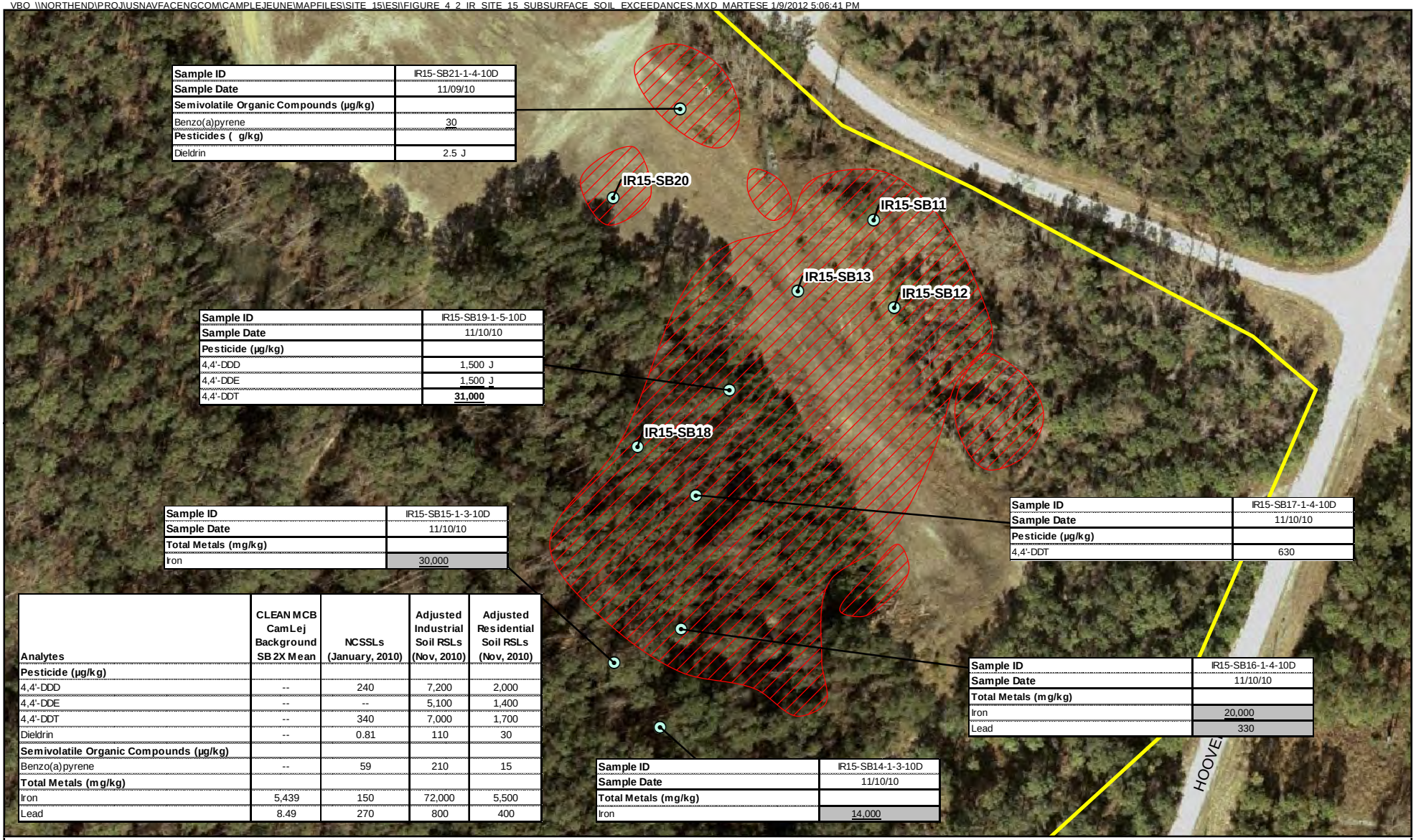
0 60 120 Feet

1 inch = 120 feet

Figure 4-1
Surface Soil Analytical Exceedances
Site 15 ESI Report
MCB CamLej
North Carolina

CH2MHILL

VBO \\NORTHEND\PROJ\USNAVFACENGCOM\CAMPLEJEUNE\MAPFILES\SITE_15\ES\FIGURE_4_2_IR_SITE_15_SUBSURFACE_SOIL_EXCEEDANCES.MXD MARTESE 1/9/2012 5:06:41 PM



Sample ID	IR15-SB21-1-4-10D
Sample Date	11/09/10
Semivolatile Organic Compounds (µg/kg)	
Benzo(a)pyrene	30
Pesticides (g/kg)	
Dieldrin	2.5 J

Sample ID	IR15-SB19-1-5-10D
Sample Date	11/10/10
Pesticide (µg/kg)	
4,4'-DDD	1,500 J
4,4'-DDE	1,500 J
4,4'-DDT	**31,000**

Sample ID	IR15-SB15-1-3-10D
Sample Date	11/10/10
Total Metals (mg/kg)	
Iron	30,000

Sample ID	IR15-SB17-1-4-10D
Sample Date	11/10/10
Pesticide (µg/kg)	
4,4'-DDT	630

Analytes	CLEAN MCB CamLej Background SB 2X Mean	NCSSLs (January, 2010)	Adjusted Industrial Soil RSLs (Nov, 2010)	Adjusted Residential Soil RSLs (Nov, 2010)
Pesticide (µg/kg)				
4,4'-DDD	--	240	7,200	2,000
4,4'-DDE	--	--	5,100	1,400
4,4'-DDT	--	340	7,000	1,700
Dieldrin	--	0.81	110	30
Semivolatile Organic Compounds (µg/kg)				
Benzo(a)pyrene	--	59	210	15
Total Metals (mg/kg)				
Iron	5,439	150	72,000	5,500
Lead	8.49	270	800	400

Sample ID	IR15-SB16-1-4-10D
Sample Date	11/10/10
Total Metals (mg/kg)	
Iron	20,000
Lead	330

Sample ID	IR15-SB14-1-3-10D
Sample Date	11/10/10
Total Metals (mg/kg)	
Iron	14,000

Legend

- Subsurface Soil Sample Location
- Approximate Electromagnetic Geophysical Anomaly Boundary
- IR Site 15 Boundary

Notes:

Shading indicates exceedance of two times the mean base background concentration

Bold text indicates exceedance of Adjusted Industrial Soil RSLs

Underline indicates exceedance of Adjusted Residential Soil RSLs

Bold box indicates exceedance of NC SSLs

J - Analyte present, value may or may not be accurate or precise

N

0 60 120 Feet

1 inch = 120 feet

Figure 4-2
Subsurface Soil Analytical Exceedances
Site 15 ESI Report
MCB CamLej
North Carolina

CH2MHILL

SECTION 5

Human Health Risk Assessment

The surface soil, subsurface soil, and groundwater analytical data for samples collected from 1997 to 2011 at Site 15 were evaluated to evaluate the potential for human health risks associated with exposure to these media. The risk evaluation was performed in two phases. The first phase, a HHRS, entailed comparing the site data to appropriate human health risk-based screening values and performing a risk ratio evaluation. If any of the media indicated the potential for unacceptable human health risks based on the HHRS, that medium was carried forward to the second phase of the risk evaluation, a complete HHRA. Only those media that showed the potential for human health risks based on the first phase were carried forward to the second phase of evaluation.

The data evaluated during both phases of the risk assessment are presented in **Appendix E**, and the samples are identified in **Table 5-1.** All of the data included in the risk assessment were validated and were evaluated to determine the reliability of the data for use in the risk assessment. A review of the data identified the following criteria for data usability:

- Estimated values flagged with a J, J+, J-, P, B, D, and N qualifier (including JP, DJ, NJ, DNJ qualifiers) were treated as detected concentrations (definitions of these data flags are included in Tables 2.1 through Table 2.3b in **Appendix E**).
- Data qualified with an R (rejected) were not used in the risk evaluation.
- For duplicate samples, the maximum concentration between the two samples was used as the sample concentration.
- Unfiltered groundwater samples were analyzed in the human health risk evaluation following USEPA Region IV guidance (USEPA, 2000a).

5.1 Human Health Conceptual Site Model

The human health Conceptual Site Model (CSM) presents an overview of site conditions, potential contaminant migration pathways, and exposure pathways to potential receptors. The human health CSM for Site 15 soil and groundwater is presented on **Figure 5-1**.

Site 15, formerly known as SWMU 46, is the former Montford Point Burn Dump. The site operated between 1946 and 1958 and was reportedly used to dispose sewage treatment sludge, litter, asphalt, and sand (Baker/ CH2M HILL, 2005). Site 15 is currently an undeveloped tract of land that consists of an open field surrounded by vegetation, encompassing approximately 24 acres (**Figure 1-1**). Historical investigations indicate that the former disposal area covered only about 2 acres in the eastern portion of the site. There are no plans for future site development.

Potential current receptors include visitors, trespassers, and Base/military personnel who occasionally use the land for training purposes. The current receptors may come in contact with surface soil. Exposure routes may include incidental ingestion of and dermal contact with the surface soil, and inhalation of volatile and particulate emissions from the surface soil.

Potential future receptors include current receptors, and construction workers who perform any future construction projects at the site. Additionally, future residents are included to evaluate unrestricted future site use. Future receptors could be exposed to surface and subsurface soil if future construction at the site results in re-working the soil and exposing the subsurface soil. Exposure routes for future exposure to the surface and subsurface soil are the same as those for current surface soil, incidental ingestion of and dermal contact with the soil, and inhalation of volatile and particulate emissions from the soil.

Potable water supplies for MCB CamLej and the surrounding residential area are provided by water supply wells that pump groundwater from the Castle Hayne aquifer to water treatment facilities prior to distribution;

therefore, there is no current exposure to shallow groundwater at Site 15. There are no active water supply wells within a 1-mile radius of Site 15 and the site is not located within a delineated wellhead protection area. The groundwater use patterns are already established for the Base and the area around Site 15; thus, use of shallow groundwater from Site 15 for industrial or residential purposes is unlikely. Additionally, the surficial aquifer at MCB CamLej is not suitable for potable water use because of high dissolved solids, hardness, and fluctuating water levels that negatively affect water yields. However, state and federal governing policies assume that underground fresh water resources are potable, and should be maintained as such; therefore, a potable use scenario was evaluated in this risk assessment. It was conservatively assumed if future residential development of the site occurs that the residents could potentially use the groundwater as a potable water supply. The residents would be exposed through ingestion, dermal contact while bathing, and inhalation of VOCs while showering. Additionally, because of the depth to groundwater (from 6 to 8 feet bgs), construction workers could be exposed through dermal contact and inhalation of VOCs from an open excavation during construction activities.

Vapor intrusion from groundwater (or soil) to indoor air is not considered a significant exposure pathway for Site 15. Buildings are not present on the site and there are no plans for future site development. Additionally, minimal amounts of VOCs were detected in the groundwater and soil.

5.2 Phase I – Human Health Risk-based Screening and Risk Ratio Evaluation

5.2.1 Methodology

The HHRS and risk ratio evaluation was conducted in three steps using a risk ratio technique (DoN, 2000). If contaminants of potential concern (COPCs) were identified after Step 1, the COPCs were evaluated in Step 2. If COPCs were identified after Step 2, the COPCs were evaluated in Step 3. The three-step screening process is described below.

5.2.1.1. Step 1

The maximum detected analyte concentrations for each medium were compared to USEPA RSLs (USEPA, 2010a), other HHRS levels (if appropriate), and two times the mean base background concentration (for inorganics). RSLs based on noncarcinogenic effects were divided by 10 to account for exposure to multiple constituents (that is, were adjusted to a hazard quotient [HQ] of 0.1, from the HQ of 1 used on the RSL table). RSLs based on carcinogenic endpoints were used as presented in the RSL table, and are based on a carcinogenic risk of 1×10^{-6}.

The soil data were compared to residential soil RSLs, which are more conservative (that is, lower) than industrial soil RSLs and are therefore protective of all potential receptors (for example, residents, industrial workers, construction workers). The NCSSLs are also shown on the Step 1 soil screening tables; however, they were not used to identify COPCs.

The groundwater data were compared to tap water RSLs, MCLs, and the NCGWQS; however, the MCL and NCGWQS were not used to identify the groundwater COPCs to carry forward to Step 2.

If the maximum detected concentration in soil and groundwater exceeded the appropriate screening value and background concentration, where applicable, the screening level risk evaluation proceeded to Step 2. In addition, if a carcinogenic polycyclic aromatic hydrocarbon (PAH) (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, or indeno(1,2,3-cd)pyrene) was selected as a COPC, all detected carcinogenic PAHs were evaluated in Step 2 based on the selection criteria of a chemical from the same class, carcinogenic PAH.

In addition to comparing the detected concentrations to the screening levels, the detection limits for non-detected analytes were compared to the screening levels. Non-detected analytes with detection limits exceeding the screening level were not identified as COPCs to carry forward to Step 2, but were discussed to evaluate the potential for underestimating the total risks.

Chromium

Chromium was evaluated in surface soil, combined suface and subsurface soil, and groundwater using two different approaches. The first approach compared the laboratory-measured hexavalent chromium concentration to the hexavalent chromium RSL. However, the majority of the soil and groundwater samples were only analyzed for total chromium, with hexavalent chromium analyzed in only two surface soil and two subsurface soil samples collected in 2010, and the six groundwater samples collected in 2010 and 2011. Therefore, the second approach involved using a ratio method to estimate the amount of hexavalent chromium and trivalent chromium based on the laboratory-measured total chromium. For each media, when both total and hexavalent chromium were detected in a sample, the ratio of hexavalent chromium to total chromium (concentration of hexavalent chromium divided by concentration of total chromium) was calculated. This ratio was then used to estimate the hexvalent chromium concentrations in the samples that were not analyzed for hexavalent chromium. To be conservative, if more than one ratio was calculated, the highest ratio was used to estimate the hexavalent chromium concentrations in all of the samples. It was assumed the remaining chromium in the total chromium concentrations was trivalent chromium. The trivalent chromium concentrations were therefore estimated by multiplying the total chromium concentration by 1 minus the highest ratio of hexavalent chromium to total chromium. The estimated hexavalent and trivalent chromium concentrations are included in a supplemental table to the Step 1 screening table for each media, and the maximum estimated concentrations are shown in the Step 1 table. The reported total chromium concentration was also shown on the Step 1 table, but because the hexavalent and trivalent forms are representive of total chromium, and there is not currently an RSL for total chromium, it was not carried through to the next screening step.

Hexavalent chromium was only analyzed in two of the 28 surface soil analyzed for total chromium, two of the 42 subsurface soil samples, and six of the 16 groundwater samples. Use of the ratios of hexavalent chromium to total chromium from only a few samples (particularly for surface soil and subsurface soil) to estimate the concentrations of hexavalent chromium and trivalent chromium in all other samples results in a high degree of uncertainty in these estimated concentrations. Additionally, these samples were not associated with the highest concentrations of total chromium detected at the site. However, to help minimize the uncertainty with underestimating the hexavelent chromium concentrations, the maximum ratio of hexavalent to total chromium was used in the estimated concentration calculations.

Dioxins/Furans

PCBs were detected in three surface soil samples, therefore, the samples were analyzed for dioxin and furan congeners. The risk screening for dioxin/furan congeners was performed using the maximum calculated dioxin toxicity equivalent concentration. The 2,3,7,8- tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalent (TEQ) concentrations for the dioxin/furan congeners were calculated for each sample in accordance with the World Health Organization (WHO) toxicity equivalency factor (TEF) approach (Van den Berg et al., 2006; USEPA, 2010a) to adjust the relative carcinogenic potency of specific dioxin/furan congeners, relative to 2,3,7,8-TCDD, the most potent dioxin congener. Using the measured concentration values for each congener and the TEF for that congener, the dioxin TEQ concentration for a mixture of dioxin/furan congeners in a specific sample was calculated using the following equation. The 2,3,7,8-TCDD TEQ concentrations were calculated using only the detected congeners. Non-detected congeners and B-flagged congers were not included in the individual sample 2,3,7,8-TCDD TEQ concentrations.

$$2,3,7,8\ TEQ\ Concentration = \Sigma\ (TEFi \times Ci)$$

Where:

2,3,7,8-TCDD TEQ	=	2,3,7,8-TCDD toxicity equivalent concentration milligrams per kilogram (mg/kg)
TEFi	=	TEF for congener "i" (unitless)
Ci	=	Concentration of detected congener "i" (mg/kg)

The TEFs used to calculate the dioxin TEQ concentrations, and the 2,3,7,8-TCDD TEQ calculations are shown in **Appendix E-1**, Table 2.1 Supplement A.

5.2.1.2. Step 2

For chemicals identified as COPCs in Step 1, a corresponding risk level was calculated using the following equation:

$$\text{corresponding risk level} = \frac{\text{concentration x acceptable risk level}}{\text{RSL}}$$

The concentration is the maximum detected concentration (the same concentration that was used in Step 1). The acceptable risk level is 1 for noncarcinogens and 10^{-6} for carcinogens. RSLs based on noncarcinogenic effects were not adjusted by 10 as was done in Step 1. Instead, they are used as presented in the RSL table.

All of the corresponding risk levels for each analyte within a media were summed to calculate the cumulative corresponding hazard index (HI) (for noncarcinogens) and cumulative corresponding carcinogenic risk (for carcinogens). A cumulative corresponding HI was also calculated for each target organ/effect. If the cumulative corresponding HI for a target organ/effect is greater than 0.5, or the cumulative corresponding carcinogenic risk is greater than 5×10^{-5}, the anayltes contributing to these values are retained as COPCs and carried forward to Step 3.

Two separate cumulative cancer risks were summed for each media: the first included the laboratory-measured hexavalent chromium concentration, and the second included the estimated hexavalent chromium concentration.

5.2.1.3. Step 3

A corresponding risk level was calculated as discussed above for Step 2. However, to obtain a more site-specific ratio, the 95 percent upper confidence limit (UCL) was used in place of the maximum detected concentration, if more than five samples were collected from a medium and the analyte was detected in more than one of the samples. If the cumulative corresponding HI by target organ/effect is greater than 0.5, or the cumulative corresponding carcinogenic risk is greater than 5×10^{-5}, then constituents contributing to these values are considered COPCs and the medium was evaluated in Phase II, the HHRA.

ProUCL Version 4.1 (USEPA, 2010b) was used to test the data distribution and calculate 95 percent UCL used for the Step 3 risk ratio calculations. The maximum concentration was used as the exposure point concentration (EPC) in cases where there were fewer than five samples in the data set, the recommended UCL exceeded the maximum detected concentration, or the analyte was only detected in one sample.

As was done in Step 2, two separate cumulative cancer risks were summed for each media: the first included the laboratory-measured hexavalent chromium concentration, and the second included the estimated hexavalent chromium concentration.

5.2.2 Results

The human health risk-based screening (comparison to risk-based criteria and background levels, Step 1) and risk ratio evaluation (Steps 2 and 3) were performed for Site 15 surface soil, combined surface and subsurface soil, and groundwater.

5.2.2.1. Surface Soil Risk Screening

Tables 2.1 through 2.1b**, Appendix E-1,** present the risk-based screening and risk ratio evaluation for surface soil. As shown in Table 2.1 in **Appendix E-1**, seven SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), Aroclor-1254, and four metals (aluminum, arsenic, hexavalent chromium, and iron) were identified as COPCs. The concentration of three of the SVOCs (benzo(a)anthracene, benzo(k)fluoranthene, and chrysene) did not exceed the screening level; however, they were identified as COPCs following USEPA Region 4 risk assessment guidance (USEPA, 2000a), because another chemical from the same chemical class (cPAH) was identified as a COPC. Based on Step 2 of the screening process (Table 2.1a, **Appendix E-1**), the SVOCs, Aroclor-1254, and two metals (arsenic and hexavalent chromium) were identified as COPCs. Step 3 eliminated all of the COPCs, regardless of whether the estimated or measured hexavalent chromium concentrations were included in the cumulative cancer risk. Therefore, exposure

to surface soil would not pose any unacceptable risks, and further evaluation of Site 15 surface soil based on human health risks is not necessary.

5.2.2.2. Combined Surface and Subsurface Soil Risk Screening

The risk-based screening and risk ratio evaluation for combined surface and subsurface soil data are presented in Tables 2.2 through 2.2b of **Appendix E-1**. As shown in Table 2.2 in **Appendix E-1**, seven SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene), three pesticides (4,4'-DDD, 4,4'-DDE, and 4,4'-DDT), Aroclor-1254, and eight metals (aluminum, arsenic, cadmium, hexavalent chromium, cobalt, iron, lead, and manganese) were identified as COPCs. The concentration of two of the SVOCs (benzo(k)fluoranthene and chrysene) did not exceed the screening level; however, they were identified as COPCs following USEPA Region 4 risk assessment guidance, because another chemical from the same chemical class (cPAH) was identified as a COPC. Based on Step 2 of the screening process (Table 2.2a, **Appendix E-1**), the seven SVOCs, three pesticides, Aroclor-1254, and four of the metals (arsenic, hexavalent chromium, iron, and lead) were identified as COPCs. Based on Step 3, Table 2.2b, **Appendix E-1**, the cumulative cancer risk based on all Step 2 COPCs was below the unacceptable risk level of 5×10^{-5} using either the measured hexavalent chromium concentration or the estimated hexavalent chromium concentration; therefore, the polycyclic aromatic hydrocarbons (PAHs), pesticides, Aroclor-1254, arsenic, and hexavalent chromium were eliminated as COPCs. However, iron was retained as a COPC in combined surface and subsurface soil because the HI was above the unacceptable risk level of 0.5. Lead was retained as a COPC based on a few elevated detected concentrations, as discussed below.

Iron was detected in combined surface and subsurface soil in 26 out of 27 soil samples, with values ranging from 153 to 179,000 mg/kg. However, iron only exceeded the residential soil RSL at one location (IR15-SB009) and the 95 percent UCL concentration of iron is below the residential soil RSL. Additionally, iron is an essential nutrient for human health. Therefore, it is unlikely there would be any adverse effects associated with exposure to the iron in Site 15 soil.

Lead is not evaluated in the same manner as the other COPCs, but is regulated by USEPA based on blood-lead uptake using a physiologically based pharmacokinetic model called the Integrated Exposure Uptake Biokinetic (IEUBK) model. As a screening tool, lead is screened at 400 mg/kg in soil based on residential exposure. The model uses the average lead concentration, not the maximum detected lead concentration, as the input value. The average lead concentration in combined surface and subsurface soil is 326 mg/kg, which is less than the lead screening level. However, lead was detected in eight subsurface soil samples (IR15-SB01, SWMU46-TT01, SWMU46-TT02, SWMU46-TT03, SWMU46-TT05, SWMU46-TT07, SWMU46-SB04, and SWMU46-IS02) at concentrations ranging from 483 mg/kg at IR15-SB01 to 12,300 mg/kg at SWMU46-IS02, which exceeded the screening level. The concentration of lead detected in subsurface soil sample SWMU46-IS02 (12,300 mg/kg) is much higher than the screening level and exposure to lead at this concentration may be a concern. Four of the sample locations, including the highest at SWMU46-IS02, are located along the southern to middle portion of Site 15. The remaining four locations are spread out along the middle to northeastern portion of the site.

Based on the USEPA risk screening procedure using the IEUBK model, lead concentrations in combined surface and subsurface soil would not present an unacceptable risk to human health. However, exposure to the maximum concentrations of lead detected in subsurface soil samples may result in an unacceptable risk to human receptors.

5.2.2.3. Groundwater Risk Screening

Tables 2.3 through 2.3b**, Appendix E-1,** present the risk-based screening and risk ratio evaluation for groundwater. As shown in Table 2.3 in **Appendix E-1**, four SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene) and four metals (hexavalent chromium, cobalt, iron, and manganese) were identified as COPCs. Based on Step 2 of the screening process (Table 2.3a, **Appendix E-1**), all four of the SVOCs and two of the metals (hexavalent chromium and iron) were retained as COPCs. In Step 3 (Table 2.3b, **Appendix E-1**), the cumulative cancer risk of either the measured or estimated hexavalent chromium concentration is 6×10^{-5}, which is above the acceptable risk level of 5×10^{-5}. Iron was retained as a COPC in

groundwater because the HI was above the unacceptable risk level of 0.5. Based on the results of Step 3, the four SVOCs, hexavalent chromium, and iron were retained as COPCs for groundwater.

Hexavalent chromium was detected in one of the six groundwater samples in which it was analyzed, at a concentration of 1.1 J (J = estimated value) micrograms per liter (μg/L). Total chromium was detected in 9 out of 16 samples, with values ranging from 0.83 to 4.7 μg/L. As shown in Table 2.3 Supplement in **Appendix E-1**, hexavalent chromium concentrations in groundwater were estimated using the ratio of hexavalent chromium to total chromium of 0.48, and multiplying this value by the reported total chromium concentration for each sample. There is uncertainty in this approach because it assumes each of the 16 reported total chromium values for groundwater have the same ratio of hexavalent chromium and trivalent chromium. The maximum estimated concentration of hexavalent chromium using this approach is 2.3 μg/L, which is based on the maximum concentration of total chromium (4.7 μg/L), and is higher than the detected hexavalent chromium concentration. Therefore, it is possible that the estimated hexavalent chromium concentrations are higher than the actual hexavalent chromium concentrations, which leads to uncertainty associated with using this approach to calculate hexavalent and trivalent chromium concentrations.

Exposure to groundwater at Site 15 could result in unacceptable human health risks from exposure to hexavalent chromium. In order to evaluate potential human health risks, Phase II (a complete HHRA) was conducted for groundwater, as presented in **Section 5.3**.

5.2.2.4. Non-detected Analytes

Two VOCs (1,2-dibromo-3-chloropropane and 1,2-dibromoethane) and five SVOCs (4,6-dinitro-2-methylphenol, bis(2-chloroethyl)ether, hexachlorobenzene, n-nitroso-di-n-propylamine, and pentachlorophenol) that were not detected in soil had detection limits above the screening level. However, in general, the detection limits for these analytes in surface and subsurface soil were only slightly above the screening level (were within one order of magnitude of the noncarcinogenic adjusted RSL). There were 21 VOCs, 27 SVOCs, 7 pesticides, 7 PCBs, and one metal (selenium) in groundwater with detection limits that exceeded the screening level. It is not expected that they are present in the groundwater, and if they are, it is likely they would be below levels of potential concern for human health because the majority of the detection limits were within an order of magnitude of the RSL or MCL.

5.3 Phase II – Human Health Risk Assessment

An HHRA was performed for groundwater based on the Phase I human health risk-based screening and risk ratio evaluations. Supplemental information used in this HHRA, and the risk calculations, are presented in **Appendix E** and include the *Risk Assessment Guidance for Superfund* (RAGS*), Volume 1, Human Health Evaluation Manual Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments* (USEPA, 2001) tables, and additional supporting tables. Guidance documents used for preparing the risk assessment include *RAGS Part A* (USEPA, 1989), *RAGS Part D* (USEPA, 2001), *RAGS Part E* (USEPA, 2004a), and USEPA Region IV *Supplemental Guidance to RAGS: Region IV Bulletins* (USEPA, 2000a).

The primary objective of the HHRA was to assess the health risks associated with exposure to groundwater under current site conditions. The risk assessment is comprised of the following components:

- **Identification of Chemicals of Potential Concern**—Identify the chemicals found onsite and select the COPCs, which are the focus of the subsequent evaluation in the risk assessment.
- **Exposure Assessment**—Identify the potential pathways of human exposure, characterize the potentially exposed populations, and estimate the magnitude, frequency, and duration of these exposures.
- **Toxicity Assessment**— Assess the potential adverse effects of the COPCs and compile the toxicity values used for developing numerical risk estimates.
- **Risk Characterization**—Integrate the results of the exposure assessment and toxicity assessment to develop numerical estimates of health risks.

- **Uncertainty Assessment**—Identify and discuss sources of uncertainty associated with the data, methodology, and values used in the risk assessment.

These components are described briefly in the following sections.

5.3.1 Identification of Chemicals of Potential Concern

All of the groundwater data used in Phase I were quantitatively evaluated in Phase II of the risk assessment. The COPC screening is presented in **Tables 2.1** and **2.2** in **Appendix E-2**. The methodology used to select the COPCs for quantitative evaluation in the HHRA was the same as Step 1 of the Phase I risk screening evaluation, as described in **Section 5.2.1**.

Table 5-2 identifies the chemicals that were selected as COPCs for groundwater, and includes four SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene) and four metals (hexavalent chromium, cobalt, iron and manganese). Hexavalent chromium was carried forward in the risk assessment using both the measured and estimated concentrations. Pesticides and VOCs were not identified as COPCs at Site 15.

5.3.2 Exposure Assessment

Exposure assessment is the estimation of the likelihood, magnitude, frequency, duration, and routes of exposure to a chemical. Exposure refers to the potential contact of an individual (or receptor) with a chemical. Exposure can occur when contaminants migrate from a source to an exposure point, or when a receptor comes into direct contact with contaminated media.

The three components of exposure assessment include:

- Characterization of exposure setting
- Identification of exposure pathways
- Quantification of exposure

5.3.2.1. Characterization of Exposure Setting

Descriptions and the history of MCB CamLej and Site 15 are included in **Section 2** as well as in **Section 5.1**.

Section 5.1 describes the potential receptors and potable water supplies for Site 15.

5.3.2.2. Identification of Exposure Pathways

An exposure pathway can be described as the physical course that a COPC takes from the point of release to a receptor. To be complete, an exposure pathway must have all of the following components:

- A source (for example, constituent residues in soil)
- A mechanism for chemical release and migration (for example, leaching)
- An environmental transport medium (for example, groundwater)
- A point or site of potential human contact (exposure point; for example, drinking water)
- A route of intake (for example, ingestion of groundwater used as a drinking water source)

In the absence of any one of these components, an exposure pathway is considered incomplete and, by definition, there is no risk or hazard. In some cases, a receptor may contact a source directly, eliminating the release and transport pathways.

The potential exposure pathways for groundwater at Site 15 are identified in the CSM (**Figure 5-1**) and shown in **Table 1.1, Appendix E-2**. There are no current exposure pathways for groundwater. Additionally, VOCs were not identified as COPCs for groundwater; therefore, there are no inhalation exposure pathways for groundwater, although they were shown as potential pathways on the CSM. The future land use exposure pathways include:

- Resident (adult and child): ingestion of groundwater, and dermal contact with groundwater while showering/bathing
- Construction Worker: dermal contact with groundwater during excavation and construction activities

5.3.2.3. Quantification of Exposure

Exposure is quantified by estimating the EPCs of COPCs in environmental media and COPC intake by the receptor.

Exposure Concentrations

EPCs are estimated constituent concentrations that a receptor may contact and are specific to each exposure medium. EPCs may be directly measured or estimated using environmental fate and transport models. At Site 15, constituent concentrations in groundwater were measured. Fate and transport modeling did not need to be performed for the Phase II human health risk evaluation because VOCs were not identified as COPCs for the groundwater to air pathway exposure while showering or in an excavation.

ProUCL software Version 4.00.05 (USEPA, 2010b) was used to determine the distribution that the data fit and to calculate the 95 percent UCLs used as the reasonable maximum exposure (RME) EPC. ProUCL identifies three possible data distributions: normal, log-normal, and gamma distribution. The UCL calculation method is then selected based on the data distribution (that is, normal, lognormal, gamma, or nonparametric if the data do not fit any of the distributions). The recommendations outlined in the ProUCL software documentation were followed to select the appropriate UCL (USEPA, 2010b). The maximum detected concentration was used as the RME EPC in cases where the estimated 95 percent UCL was greater than the maximum detected concentration, less than 5 samples were available for a data grouping, or the COPC was only detected in one sample.

Central tendency exposure (CTE) risk evaluations were performed for exposure pathways that resulted in a risk above 1×10^{-4}, or a HI above 1. The arithmetic mean of the data set was used as the CTE EPC.

Appendix E-2, Tables 3.1.RME and 3.1.CTE present the EPCs for the COPCs for groundwater and the rationale for the selected EPC.

5.3.2.4. Estimation of Chemical Intakes

Chemical intake is the amount of the chemical constituent entering the receptor's body. The quantification of exposure is based on an estimate of the average daily intake, which is the average amount of the chemical contaminant entering the receptor's body per day. Chemical intakes are generally expressed as follows:

$$ADI = \frac{C \times CR \times EF \times ED}{BW \times AT}$$

Where:

- ADI = average daily intake (milligrams per kilogram per day [mg/kg/day])
- C = chemical concentration (milligrams per liter [mg/L], mg/kg)
- CR = contact rate (liter/day, milligrams per day [mg/day])
- EF = exposure frequency (days per year)
- ED = exposure duration (years)
- BW = body weight (kilograms [kg])
- AT = averaging time (days)

The intake equation requires exposure parameters that are specific to each exposure pathway. Many of the exposure parameters have default values, which were used for this assessment. These assumptions, based on estimates of body weights, media intake levels, and exposure frequencies and duration, are provided in USEPA guidance. Both RME and CTE exposure parameters were compiled. CTE exposure parameters are provided only for scenarios where the RME risk was greater than USEPA's noncarcinogenic hazard or carcinogenic risk target levels, because these were the only CTE scenarios quantified in the HHRA. Tables 4.1.RME and 4.1.CTE in **Appendix E-2** identify the exposure parameters and intake equations for each of the scenarios evaluated in the risk assessment.

5.3.3 Toxicity Assessment

Toxicity assessment is used to define the relationship between the magnitude of exposure and possible severity of adverse effects, and to weigh the quality of available toxicological evidence. Toxicity assessment generally

consists of two steps: hazard identification, and dose-response assessment. Hazard identification is the process of determining the potential adverse effects from exposure to the constituent along with the type of health effect involved. Dose-response assessment is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the constituent administered or received and the incidence of adverse health effects in the exposed population. Toxicity criteria (for example, reference doses [RfDs] and slope factors) are derived from the dose-response relationship.

USEPA recommends that a tiered approach be used to obtain the toxicity values, RfDs, and cancer slope factors (CSFs) (USEPA, 2003), used to calculate non-cancer and cancer risks. The sources of toxicity values are as follows:

- USEPA's IRIS database (USEPA, 2011b)
- Provisional peer reviewed toxicity value (PPRTV) database maintained by USEPA's National Center for Environmental Assessment (NCEA) and Superfund Health Risk Technical Support Center (STSC)
- Other USEPA and non-USEPA sources, including NCEA, Agency for Toxic Substances and Disease Registry (ATSDR), Human Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997), California EPA, USEPA's Office of Water, and WHO

The use of provisional toxicity values, such as those from the PPRTV database and California EPA, increases the uncertainty of the quantitative risk estimate. Oral chronic and subchronic RfDs, and associated uncertainty factors (UFs) and modifying factors (MFs) for the COPCs are listed in Table 5.1 in **Appendix E-2**. CSFs are listed in Table 6.1 in **Appendix E-2**.

Dermal RfDs and CSFs were estimated from oral RfDs and CSFs using an oral to dermal adjustment factor. This factor converts the orally administered dose toxicity factors to dermally absorbed dose toxicity factors (USEPA, 2004a). The oral RfDs were converted to dermal RfDs by multiplying by the oral to dermal adjustment factor (gastrointestinal [GI] absorption factor) and the oral CSFs were converted to dermal CSFs by dividing by the GI absorption factor. If a chemical-specific GI absorption factor was not available or was greater than 50 percent, a GI absorption factor of 100 percent was assumed. The dermal RfDs are included in Table 5.1, **Appendix E-2**. The dermal CSFs are presented in Table 6.1, **Appendix E-2**.

5.3.3.1. Approach for Potential Mutagenic Effects

Cancer risks for COPCs that act via a mutagenic mode of action (MMOA) were estimated using age-dependent adjustment factors (ADAFs), which is consistent with the Cancer Guidelines and Supplemental Guidance (USEPA, 2005a and 2005b). The four SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene) and hexavalent chromium were the COPCs that are categorized as chemicals with an MMOA and evaluated using the MMOA method in the risk assessment. The calculation of cancer risk using ADAFs is presented in Table**s** 7.3.RME Supplement A and 7.3.CTE Supplement A of **Appendix E-2**.

5.3.4 Risk Characterization

Risk characterization combines the results of the previous elements of the risk assessment to evaluate the potential health risks associated with exposure to the COPCs.

Potential human health risks are discussed independently for carcinogenic and noncarcinogenic constituents because of the different toxicological endpoints, relevant exposure duration, and methods used to characterize risk. Some constituents may produce both noncarcinogenic and carcinogenic effects, and were evaluated in both groups. The methodology used to estimate noncarcinogenic hazards and carcinogenic risks is described below.

5.3.4.1. Noncarcinogenic Hazard Estimation

Noncarcinogenic health risks are estimated by comparing the calculated intake to an RfD. The calculated intake divided by the RfD is equal to the HQ:

$$HQ = Intake / RfD$$

The intake and RfD represent the same exposure period (that is, chronic or subchronic) and the same exposure route (that is, oral intakes are divided by oral RfDs). An HQ that exceeds 1 (that is, the intake exceeds the RfD) indicates that there is a potential for adverse health effects associated with exposure to that constituent.

To assess the potential for noncarcinogenic health effects posed by exposure to multiple constituents, an HI approach is used (USEPA, 1986). This approach assumes that noncarcinogenic hazards associated with exposure to more than one constituent are additive. Synergistic or antagonistic interactions between constituents are not considered. The HI may exceed 1 even if all of the individual HQs are less than 1. HIs are also added across exposure routes and media to estimate the total noncarcinogenic health effects to a receptor posed by exposure through multiple routes and media. If the HI is greater than 1, separate HIs are estimated for each target organ to assess whether the HI for a specific target organ is greater than 1. A target-organ-specific HI greater than 1 indicates that there is some potential for adverse noncarcinogenic health effects associated with exposure to the COPCs. If the HI for each target organ does not exceed 1, noncarcinogenic hazards are not expected.

5.3.4.2. Carcinogenic Risk Estimation

The potential for carcinogenic effects from exposure to site-related constituents is evaluated by estimating the excess lifetime carcinogenic risk (ELCR). ELCR is the incremental increase in the probability of developing cancer during one's lifetime in addition to the background probability of developing cancer. For an individual exposed to a carcinogen with a calculated cancer risk of 2×10^{-6}, for example, the probability of that individual developing cancer increases by 2 in a million above background levels.

Carcinogenic risk for ingestion and dermal pathways is calculated by multiplying the intake by the CSF:

$$ELCR = Intake \times CSF$$

The combined risk from exposure to multiple constituents was evaluated by adding the risks from individual constituents. Risks were also added across the exposure routes and media if an individual would be exposed through multiple routes and to multiple media.

When a cumulative carcinogenic risk to an individual receptor under the assumed RME exposure conditions at the site exceeds 100 in a million (that is, 10^{-4} excess carcinogenic risk), CERCLA generally requires remedial action to reduce risks at the site (USEPA, 1991). If the cumulative risk is less than 10^{-4}, action generally is not required.

Additional Evaluation for Inorganics

If an inorganic constituent is an essential human nutrient (that is, iron and manganese) and is the main contributor to a hazard and/or risk that exceeds USEPA's risk range, the inorganic is further evaluated. The maximum concentration is compared to the recommended daily allowance (RDA) to estimate if ingestion would be within nutritive requirements. In addition, the concentration is compared to the range of Base background levels typically associated with MCB CamLej.

5.3.5 Risk Assessment Results

The results of the risk characterization for groundwater are presented by receptor. The risks are calculated in **Appendix E-2**, Tables 7.1.RME through 7.4.RME, and 7.1.CTE through 7.3.CTE. The risks are summarized in **Tables 5-3** and **5-4**, and **Appendix E-2**, Tables 9.1.RME through 9.4.RME and 9.1.CTE through 9.3.CTE. Tables 10.1.RME through 10.3.RME and Table 10.1.CTE, **Appendix E-2**, show only the COPCs, the constituents that contributed HIs above 0.1 to total cumulative receptor HIs greater than 1.0 or carcinogenic risks greater than 10^{-6} to total cumulative receptor carcinogenic risks greater than 10^{-4}. CTE risks were calculated only when the RME hazard exceeded 1 or the RME carcinogenic risk exceeded $1x10^{-4}$.

Risks and HIs calculated using both measured and estimated hexavalent chromium concentrations are shown in Tables 7, 9, and 10 for comparison. The higher of the two hexavalent chromium values was used when summing the cumulative risks and hazards. The risks and HIs based on estimated hexavalent chromium concentrations were above or equal to the risks and HIs based on measured hexavalent chromium concentrations in all RME receptors. Therefore, the risks and HIs based on estimated hexavalent chromium were included in RME cumulative risks. The risks and HIs based on measured hexavalent chromium concentrations were above the risks and HIs based on

estimated hexavalent chromium concentrations in all CTE receptors. Therefore, the risks and HIs based on measured hexavalent chromium concentrations were included in CTE cumulative risks.

5.3.5.1. Future Adult Resident, Noncarcinogenic Hazard (Tables 9.1.RME and 9.1.CTE, Appendix E-2)

The risk assessment assumed that a future adult resident could be exposed to groundwater used as a potable water supply through ingestion and dermal contact. The use of the potable water supply, as described in **Section 5.1**, is unlikely. The RME noncarcinogenic HI = 1 is equal to USEPA's target HI of 1. However, there are no individual constituents or target organs with HIs above 1 for the RME. In addition, the CTE noncarcinogenic HI = 0.2 is below USEPA's target HI of 1.

5.3.5.2. Future Child Resident, Noncarcinogenic Hazard (Tables 9.2.RME and 9.2.CTE, Appendix E-2)

The risk assessment assumed that a future child resident could be exposed to groundwater used as a potable water supply through ingestion and dermal contact. The use of the potable water supply, as described in **Section 5.1**, is unlikely. The RME noncarcinogenic HI = 3 exceeds USEPA's target HI of 1. This hazard is primarily associated with ingestion of iron HI = 1, which is equal to USEPA's target HI of 1. The CTE noncarcinogenic hazard HI = 0.7 is below USEPA's target HI of 1.

5.3.5.3. Future Lifetime Resident, Carcinogenic Risk (Table 9.3.RME and 9.3.CTE, Appendix E-2)

Carcinogenic risks were not calculated individually for an adult and child resident but were calculated for a lifetime resident, following USEPA guidance. The risk assessment assumed that a lifetime resident could be exposed to groundwater used as a potable water supply through ingestion and dermal contact.

The RME carcinogenic risk (7×10^{-4}) and the CTE carcinogenic risk (3×10^{-4}) are above USEPA's target risk range of 10^{-6} to 10^{-4}. The concentration of benzo(a)pyrene is the primary contributor to estimated risks, contributing an individual cancer risk above $1x10^{-4}$ for both the RME and CTE evaluation. A lesser contribution comes from several additional PAHs as well as hexavalent chromium.

5.3.5.4. Future Construction Worker (Table 9.4.RME, Appendix E-2)

The risk assessment assumed that a future construction worker could be exposed to groundwater through dermal contact during excavation and construction activities. The RME noncarcinogenic HI = 0.007 is below USEPA's target HI of 1.0. The RME carcinogenic risk ($4x10^{-7}$) is below USEPA's target risk range of $1x10^{-6}$ to $1x10^{-4}$.

5.3.6 Uncertainty Associated with Human Health Assessment

The risk measures used in HHRAs are not fully probabilistic estimates of risk, but are conditional estimates given that a set of assumptions about exposure and toxicity are realized. Thus it is important to specify the assumptions and uncertainties inherent in the risk assessment to place the risk estimates in proper perspective (USEPA, 1989).

5.3.6.1. General Uncertainty in COPC Selection

The general assumptions used in the COPC selection process were conservative to be sure that true COPCs were not eliminated from the quantitative risk assessment and that the highest possible risk was estimated.

5.3.6.2. Uncertainty Associated with Exposure Assessment

Uncertainty in the exposure assessment was generally treated with conservative decision rules and assumptions, and therefore, the uncertainty likely overestimates actual exposure to COPCs. Several exposure pathways evaluated by this HHRA, such as potable use of groundwater, are hypothetical and are not anticipated to exist in the future. It is not likely that the groundwater in the surficial aquifer will ever be used as a potable water supply.

The exposure factors used for the quantitation of exposure were conservative and reflect worst-case or upper-bound assumptions on the exposure. The reliability of the values chosen for the exposure factors also contributes substantially to the uncertainty of the resulting risk estimates. Because most of the exposure factors are worst-case or upper-bound assumptions, the resulting risks are worst-case and likely overestimate the actual risk.

Site-related contamination is expected to decrease with time as a result of naturally occurring attenuation processes (for example, degradation caused by weathering, volatilization, advection, dispersion, leaching by infiltrating precipitation, etc.). The risk assessment assumed concentrations would remain constant throughout the exposure period and that these concentrations occur everywhere throughout the site, resulting in an over-estimation of risk.

Chromium is present in natural systems in two oxidation states: the carcinogenic hexavalent chromium, and the noncarcinogenic trivalent chromium. A subset of the groundwater and soil samples was analyzed for hexavalent and total chromium; however, previous samples collected at the site were only analyzed for total chromium. Hexavalent chromium was identified as a COPC for the groundwater and carried through the risk calculations. As discussed in **Section 5.2.1**, the concentrations of hexavalent chromium and trivalent chromium were estimated in the samples in which only total chromium was analyzed. The ratio of hexavalent chromium to total chromium was calculated for the groundwater samples in which both were analyzed and detected. Because hexavalent chromium was only detected in one out of six samples analyzed, this one detection was used to create the ratio of 0.48 hexavalent chromium to total chromium. This ratio was then used to estimate the concentrations of hexavalent chromium in samples that were only analyzed for total chromium. The use of this ratio is very conservative and is associated with a large amount of uncertainty, because hexavalent chromium was only detected at a very low estimated concentration in one of the six groundwater samples for which it was analyzed, and therefore hexavalent chromium is not likely present in many of the groundwater samples for which concentrations were estimated. Some of the estimated concentrations were higher than the concentration detected in the one sample. Based on historical activities at the site, it is not likely hexavalent chromium was used or produced. Additionally, there is a relatively large amount of uncertainty associated with the analytical colorimetric method for hexavalent chromium compared to the mass spectroscopy method for total chromium analysis. The hexavalent chromium method is subject to positive interference from natural color in the sample and from iron. Elevated iron concentrations have been detected in groundwater samples collected at Site 15.

5.3.6.3. Uncertainty Associated with Toxicity Assessment

Uncertainty associated with the noncarcinogenic toxicity factors is included in **Appendix E-2**, **Table 5.1**. Several UFs were applied by USEPA to extrapolate dose points from animal studies to humans. These UFs range between 1 and 3,000. Additional modification factors are also used based on the professional judgment of the USEPA. Therefore, there is a high degree of uncertainty in the noncarcinogenic toxicity criteria, based on the available scientific data for each constituent. The noncarcinogenic toxicity factors are most likely an overestimate of actual toxicity.

The uncertainty associated with CSFs is mostly associated with the low dose extrapolation where carcinogenicity at low doses is assumed to be a linear response. This is a conservative assumption, which introduces a high uncertainty into slope factors that are extrapolated from this area of the dose-response curve. The CSFs are based on the assumption that there is no threshold level for carcinogenicity; however, most of the experimental studies indicate existence of a threshold level. Therefore, CSFs developed by USEPA represent upper-bound estimates. Carcinogenic risks generated in this assessment should be regarded as an upper-bound estimate on the potential carcinogenic risks, rather than an accurate representation of carcinogenic risk. The true carcinogenic risk is likely to be less than the predicted value (USEPA, 1989).

Additional uncertainty is in the prediction of relative sensitivities of different species of animals and the applicability of animal data to humans.

A large degree of uncertainty is associated with the oral to dermal adjustment factors (based on constituent-specific GI absorption factors) used to transform the oral RfDs and CSFs based on administered doses to dermal RfDs and CSFs based on absorbed doses. It is not known if the adjustment factor results in an underestimation or overestimation of the actual toxicity associated with dermal exposure.

5.3.6.4. Uncertainty in Risk Characterization

The uncertainties identified in each component of risk assessment ultimately contribute to uncertainty in risk characterization. The addition of risks and HIs across pathways and chemicals contributes to uncertainty based on

the interaction of chemicals such as additivity, synergism, potentiation, and susceptibility of exposed receptors. The simple assumption of additivity used for this site may or may not be accurate and may over- or under-estimate risk; however, a better alternative is not available at this time.

In addition, there is some uncertainty whether human nutrient metals are truly hazards and risks. Ingestion of iron in groundwater was identified as a noncarcinogenic hazard for a future child resident. Iron was detected in groundwater in nine out of nine samples for which it was analyzed, with values ranging from 230 to 25,800 μg/L. The Base-wide background groundwater concentration, two times the arithmetic mean background shallow groundwater concentration, for iron is 5,999 μg/L and the range of detections in the background data set is from 140 J to 32,700 J μg/L (Baker, 2002). The maximum detected iron concentration at Site 15 (25,800 μg/L) falls within the range of background values; therefore, detected concentrations of iron at Site 15 could be attributed to background levels.

Iron is also considered an essential human nutrient. To estimate the maximum chemical intake of iron for a future residential child via ingestion of groundwater, the maximum groundwater concentration (25,800 μg/L) is converted to milligrams per liter and multiplied by the ingestion rate of water for a child of 1 liter per day (L/day) (USEPA, 1997). The maximum estimated intake of iron via ingestion of groundwater is 25.8 mg/day, which is above the RDA range for children ages 7 months to 8 years (7 to 11 mg/day) (NIH, 2011). The estimated intake of iron can also be compared to the upper limit, which is the maximum level of daily nutrient intake that is likely to pose no risk of adverse effects. The estimated intake of iron via ingestion of groundwater (25.8 mg/day) is below the upper limit of iron for a child (40 mg/day). Intake of iron via groundwater ingestion by residential children using groundwater at Site 15 as a potable source is greater than the range of iron typically associated with nutritive requirements but less than the upper limit that is likely to pose a risk of adverse effects.

Based on these considerations, it is likely that iron does not need to be retained as a COPC for Site 15 groundwater because it is within the Base-wide background concentration range and it is below upper limits that are likely to pose a risk of adverse effects for a child.

5.4 Human Health Risk Summary

The human health risk evaluation for surface soil, combined surface and subsurface soil, and groundwater at Site 15 was performed in two phases. The first phase entailed comparing the site data to appropriate human health risk-based screening values and performing a risk ratio evaluation to determine if a baseline HHRA was necessary for any of the media. If any of the media indicated the potential for unacceptable human health risks based on the HHRS, that medium was carried forward to the second phase of evaluation, a complete HHRA.

The Phase I evaluation indicated that exposure to surface soil would not result in any COPCs, or unacceptable risks to human health. Therefore, further assessment of surface soil, based on human health risks, was not necessary, and a baseline HHRA was not performed. Exposure to combined surface and subsurface soil could possibly result in an unacceptable risk to human receptors from lead exposure. However, a baseline HHRA was not performed for combined surface and subsurface soil because lead was the only COPC and is not evaluated in the same manner as the other COPCs. Lead is evaluated on its own using the IEUBK model and a baseline HHRA would not change lead results. The potential adverse effects associated with lead were associated with the concentration detected in one subsurface soil sample; however, when considering exposure to the average lead concentration that is used in the IEUBK evaluation, there would be no adverse effects associated with exposure to lead.

The Phase I evaluation indicated the potential for unacceptable risks associated with exposure to shallow groundwater; therefore, a more complete risk assessment was performed for groundwater. The complete HHRA evaluated exposure to groundwater for future adult and child residents, and construction workers.

Table 5-3 and Tables 9.1.RME through 9.4.RME in **Appendix E-2** summarize the RME cancer risks and noncarcinogenic hazard indices**. Table 5-4** and Tables 9.1.CTE through 9.3.CTE in **Appendix E-2** summarize the CTE cancer risks and noncarcinogenic hazard indices. Potential risks and HIs for both measured and estimated hexavalent chromium are shown in Tables 9.1.RME through 9.4.RME and Tables 9.1.CTE through 9.3.CTE, **Appendix E-2**. The higher of the two hexavalent chromium values was used when summing the exposure point

totals. Exposure point totals had relatively the same value, regardless of whether the estimated or measured hexavalent chromium value was used in the receptor total.

Potential future contact with shallow groundwater by construction workers would not result in unacceptable risks and hazards exceeding USEPA's acceptable risk range and hazard level.

Potential contact with groundwater by future adult residents (noncarcinogenic hazard) would result in hazards within USEPA acceptable levels.

Potential contact with groundwater by future child residents may result in an RME noncarcinogenic hazard above USEPA's target HI. This hazard is associated with ingestion of iron. As discussed in the uncertainty section (**Section 5.3.6**), it is likely that iron does not need to be retained as a chemical of concern (COC) for Site 15 groundwater because it is within Base-wide background concentration ranges and it is below the upper limit that is likely to pose a risk of adverse effects to a child. In addition, the CTE noncarcinogenic hazard is below USEPA's target HI of 1.

Potential contact with groundwater by future lifetime residents (carcinogenic risks) would result in RME and CTE risks above USEPA's acceptable level of $1x10^{-4}$. The concentration of benzo(a)pyrene is the primary contributor to estimated risks, with a lesser contribution from several additional PAHs, as well as chromium. The carcinogenic PAHs (including benzo(a)pyrene) were detected in only one of the eight groundwater samples analyzed for PAHs (in monitoring well IR15-MW04), and three of the four PAHs (including benzo(a)pyrene) were not detected in the duplicate of this sample. The maximum detected concentrations of the PAHs were used as the EPC.

5.5 Human Health Risk Management

Calculated potential noncarcinogenic hazards and carcinogenic risks associated with potable use of groundwater exceeded acceptable risk levels for future residents. However, risk management considerations based on the conservative nature of the risk assessment and comparisons of the COCs to Base-background are presented below:

- Calculated noncarcinogenic hazards for future child residents that use groundwater as a potable water supply were above USEPA's target HI of 1, associated with ingestion of iron. However, as discussed in previous subsections, the concentration of iron in the groundwater is within Base-wide background concentration ranges, and therefore this potential hazard is associated with background conditions. Additionally, the concentration of iron detected in the groundwater is below the upper limit that is likely to pose a risk of adverse effects to a child. Therefore, there would be no site-related adverse effects associated with exposure to groundwater by future residential children, in the unlikely event the shallow groundwater is used as a potable water supply.
- Calculated carcinogenic risks for future lifetime residents that use groundwater as a potable water supply were above USEPA's acceptable risk level of $1x10^{-4}$, primarily associated with dermal contact with benzo(a)pyrene, with a lesser contribution from dermal contact with several additional PAHs, and ingestion of hexavalent chromium. The carcinogenic PAHs (including benzo(a)pyrene) were detected at estimated concentrations in only one of the eight groundwater samples analyzed for PAHs (in monitoring well IR15-MW04), and three of the four PAHs (including benzo(a)pyrene) were not detected in the duplicate of this sample. The maximum detected concentrations of the PAHs were used as the EPC. The maximum detected concentration of benzo(a)pyrene and the maximum and estimated concentrations of hexavalent chromium are below their respective MCLs. Benzo(a)pyrene is the only carcinogenic PAH with an MCL and the detected estimated concentration was below the MCL.

TABLE 5-1

Summary of Samples Evaluated in Phases I and II of the Human Health Risk Evaluation

Site 15 ESI Report

MCB Camlej

North Carolina

					Analyses													
Site ID	**Station ID**	**Sample ID**	**Year Collected**	**Sample Depth**	**VOC (8260B)**	**SVOC (8270C)**	**Pest (8081A)**	**PCB (8082)**	**TAL Metals/Mercury (6010B/6020/7470)**	**Select TAL Metals (6010B): Lead, Antimony, Zinc**	**Select TAL Metals (6010B): Lead, Zinc, Iron**	**Aroclor 1254 (8020)**	**DDD, DDT, DDE (8081A)**	**Mercury (7471)**	**Dissolved TAL Metals/Mercury (6010B/6020/7470)**	**Total Chromium (6010B/6020)**	**Hexavalent Chromium[1] (7196A)**	**Dioxins and Furans[2] (8290)**
Surface Soil Samples																		
SWMU 46	IS01	SWMU46-IS01-00	1997	0-2	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	IS02	SWMU46-IS02-00	1997	0-2	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	IS03	SWMU46-IS03-00	1997	0-2	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	IS04	SWMU46-IS04-00	1997	0-2	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW02	SWMU46-TW02-00	2002	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW03	SWMU46-TW03-00	2002	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW05	SWMU46-TW05-00	2002	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB02	SWMU46-SB02-00	2004	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB03	SWMU46-SB03-00	2004	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 47	SB04	SWMU46-SB03-00-D[1]	2005	0-2	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB04	SWMU46-SB04-00	2004	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB05	SWMU46-SB05-00	2004	0-1	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SM01	SWMU46-SM01-0-1	2006	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
SWMU 46	SM02	SWMU46-SM02-0-1	2006	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
SWMU 46	SM03	SWMU46-SM03-0-1	2006	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
SWMU 46	SM05	SWMU46-SM05-0-1	2006	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
SWMU 46	SM08	SWMU46-SM08-0-1	2006	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
SWMU 46	SM08	SWMU46-SM08D-0-1[1]	2006	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS01	IR15-SS01-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS02	IR15-SS02-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS03	IR15-SS03-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS03	IR15-SS03D-00-01-09C[1]	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS04	IR15-SS04-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS05	IR15-SS05-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS06	IR15-SS06-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS07	IR15-SS07-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS08	IR15-SS08-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS09	IR15-SS09-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-SS10	IR15-SS10-00-01-09C	2009	0-1	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-IS11	IR15-SS11-0-0_5-10D	2010	0-1	--	--	--	--	--	--	--	X	X	X	--	--	--	X
Site 15	IR15-IS12	IR15-SS12-0-0_5-10D	2010	0-1	--	--	--	--	--	--	--	X	X	X	--	--	--	X
Site 15	IR15-IS13	IR15-SS13-0-0_5-10D	2010	0-1	--	--	--	--	--	--	--	X	X	X	--	--	--	--
Site 15	IR15-MW02	IR15-SS20-0-0_5-10D	2010	0-1	X	X	X	X	X	--	--	--	--	--	--	--	X	X
Site 15	IR15-MW02	IR15-SS20D-0-0_5-10D[1]	2010	0-1	X	X	X	X	X	--	--	--	--	--	--	--	X	X
Site 15	IR15-MW03	IR15-SS21-0-0_5-10D	2010	0-1	X	X	X	X	X	--	--	--	--	--	--	--	X	--
35 total surface soil samples (including 4 duplicates)																		
Subsurface Soil Samples																		
SWMU 46	IS01	SWMU46-IS01-04	1997	8-10	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	IS02	SWMU46-IS02-04	1997	8-10	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	IS03	SWMU46-IS03-04	1997	8-10	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	IS04	SWMU46-IS04-04	1997	8-10	--	X	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW01	SWMU46-TW01-05	2002	9-11	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW02	SWMU46-TW02-04	2002	7-9	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW03	SWMU46-TW03-04	2002	7-9	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW04	SWMU46-TW04-04	2002	7-9	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW05	SWMU46-TW05-05	2002	9-11	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TW06	SWMU46-TW06-04	2002	7-9	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB01	SWMU46-SB01-03	2004	5-7	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB02	SWMU46-SB02-04	2004	7-9	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB03	SWMU46-SB03-02	2004	3-5	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB04	SWMU46-SB04-02	2004	3-5	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	SB05	SWMU46-SB05-04	2004	7-9	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT01	SWMU46-TT01-01	2004	6-7	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT02	SWMU46-TT02-01	2004	4-5	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT02	SWMU46-TT02-02	2004	6-7	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT03	SWMU46-TT03-01	2004	6	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT03	SWMU46-TT03-02	2004	4-5	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT04	SWMU46-TT04-01	2004	5-6	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT04	SWMU46-TT04-02	2004	5-6	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT05	SWMU46-TT05-01	2004	3	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT05	SWMU46-TT05-02	2004	3	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT06	SWMU46-TT06-01	2004	5	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT06	SWMU46-TT06-02	2004	3	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--

TABLE 5-1

Summary of Samples Evaluated in Phases I and II of the Human Health Risk Evaluation

Site 15 ESI Report

MCB CamLej

North Carolina

					Analyses													
Site ID	**Station ID**	**Sample ID**	**Year Collected**	**Sample Depth**	**VOC (8260B)**	**SVOC (8270C)**	**Pest (8081A)**	**PCB (8082)**	**TAL Metals/Mercury (6010B/6020/7470)**	**Select TAL Metals (6010B): Lead, Antimony, Zinc**	**Select TAL Metals (6010B): Lead, Zinc, Iron**	**Aroclor 1254 (8020)**	**DDD, DDT, DDE (8081A)**	**Mercury (7471)**	**Dissolved TAL Metals/Mercury (6010B/6020/7470)**	**Total Chromium (6010B/6020)**	**Hexavalent Chromium[1] (7196A)**	**Dioxins and Furans[2] (8290)**
SWMU 46	TT07	SWMU46-TT07-01	2004	4-5	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT07	SWMU46-TT07-01D[1]	2004	4-5	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT07	SWMU46-TT07-02	2004	5-6	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT08	SWMU46-TT08-01	2004	2-4	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU 46	TT08	SWMU46-TT08-02	2004	5-6	X	X	X	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
Site 15	SB01	IR15-SB01-4-6-09C	2009	4-6	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB02	IR15-SB02-2-7-09C	2009	2-7	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB02	IR15-SB02D-2-7-09C[1]	2009	2-7	X	X	X	X	X			--	--	--	--	--	--	--
Site 15	SB03	IR15-SB03-2-7-09C	2009	2-7	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB04	IR15-SB04-2-7-09C	2009	2-7	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB05	IR15-SB05-2-7-09C	2009	2-7	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB06	IR15-SB06-2-7-09C	2009	2-7	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB07	IR15-SB07-2-4-09C	2009	2-4	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB08	IR15-SB08-2-4-09C	2009	2-4	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB09	IR15-SB09-2-7-09C	2009	2-7	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB10	IR15-SB10-2-4-09C	2009	2-4	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	SB11	IR15-SB11-1-5-10D	2010	1-5	--	--	--	--	--	X	--	--	--	--	--	--	--	--
Site 15	SB12	IR15-SB12-1-5-10D	2010	1-5	--	--	--	--	--	X	--	--	--	--	--	--	--	--
Site 15	SB13	IR15-SB13-1-5-10D	2010	1-5	--	--	--	--	--	X	--	--	--	--	--	--	--	--
Site 15	SB14	IR15-SB14-1-3-10D	2010	1-3	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Site 15	SB15	IR15-SB15-1-3-10D	2010	1-3	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Site 15	SB16	IR15-SB16-1-4-10D	2010	1-4	--	--	--	--	--	--	X	--	--	--	--	--	--	--
Site 15	SB17	IR15-SB17-1-4-10D	2010	1-4	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Site 15	SB18	IR15-SB18-1-4-10D	2010	1-4	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Site 15	SB19	IR15-SB19-1-5-10D	2010	1-5	--	--	--	--	--	--	--	--	X	--	--	--	--	--
Site 15	SB20	IR15-SB20-1-5-10D	2010	1-5	X	X	X	X	X	--	--	--	--	--	--	--	X	--
Site 15	SB20	IR15-SB20D-1-5-10D[1]	2010	1-5	X	X	X	X	X	--	--	--	--	--	--	--	X	--
Site 15	SB21	IR15-SB21-1-4-10D	2010	1-4	X	X	X	X	X	--	--	--	--	--	--	--	X	--
54 total subsurface soil samples (including 3 duplicates)																		
Groundwater																		
SWMU46	TW01	SWMU46-TW01	2002	NA	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU46	TW02	SWMU46-TW02	2002	NA	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU46	TW03	SWMU46-TW03	2002	NA	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU46	TW04	SWMU46-TW04	2002	NA	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU46	TW05	SWMU46-TW05	2002	NA	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
SWMU46	MW01	SWMU46-MW01	2004	NA	--	--	--	--	X (RCRA metals)	--	--	--	--	--	--	--	--	--
Site 15	IR15-TW01	IR15-TW01-09C	2009	NA	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-TW02	IR15-TW02-09C	2009	NA	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-TW03	IR15-TW03-09C	2009	NA	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-TW03	IR15-TW03D-09C[1]	2009	NA	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-TW04	IR15-TW04-09C	2009	NA	X	X	X	X	X	--	--	--	--	--	--	--	--	--
Site 15	IR15-MW01	IR15-GW01-10D	2010	NA	--	--	--	--	--	--	--	--	--	--	--	X	X	--
Site 15	IR15-MW02	IR15-GW02-10D	2010	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--
Site 15	IR15-MW02	IR15-GW02D-10D[1]	2010	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--
Site 15	IR15-MW03	IR15-GW03-10D	2010	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--
Site 15	IR15-MW04	IR15-GW04-11B	2011	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--
Site 15	IR15-MW04	IR15-GW04D-11B[1]	2011	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--
Site 15	IR15-MW05	IR15-GW05-11B	2011	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--
Site 15	IR15-MW06	IR15-GW06-11B	2011	NA	X	X	X	X	X	--	--	--	--	--	X	--	X	--

[1] = Duplicate sample of sample listed above
VOC = Volatile organic constituents
SVOC = Semi-volatile organic constituents
Pest = Pesticide
PCB = Polychlorinated Biphenyl
TAL = Target Analyte List

TABLE 5-2

Summary of COPCs for the Phase II Risk Evaluation

Site 15 ESI Report

MCB CamLej

North Carolina

Groundwater
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Chromium (VI), measured
Chromium (VI), estimated
Cobalt
Iron
Manganese

TABLE 5-3

Summary of RME Cancer Risks and Hazard Indices for Groundwater

Site 15 ESI Report

MCB CamLej

North Carolina

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks >10^{-4}	Chemicals with Cancer Risks >10^{-5} and <10^{-4}	Chemicals with Cancer Risks >10^{-6} and <10^{-5}	Hazard Index	Chemicals with HI>1
Future Resident Adult	Groundwater	Ingestion	NA	--	--	--	1	--
		Dermal Contact	NA	--	--	--	0.04	--
		Total	NA	--	--	--	1	--
Future Resident Child	Groundwater	Ingestion	NA	--	--	--	3	Iron
		Dermal Contact	NA	--	--	--	0.1	--
		Total	NA	--	--	--	3	Iron
Future Resident Child/Adult	Groundwater	Ingestion	6.E-05		Benzo(a)pyrene, Chromium (VI)	Benzo(a)anthracene, Benzo(b)fluoranthene	NA	--
		Dermal Contact	6.E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Chromium (VI)	Benzo(k)fluoranthene	NA	--
		Total	7.E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Chromium (VI)	Benzo(k)fluoranthene	NA	--
Future Construction Worker Adult	Groundwater	Ingestion	NA	--	--	--	NA	--
		Dermal Contact	4.E-07	--	--	--	0.007	--
		Total	4.E-07	--	--	--	0.007	--

TABLE 5-4

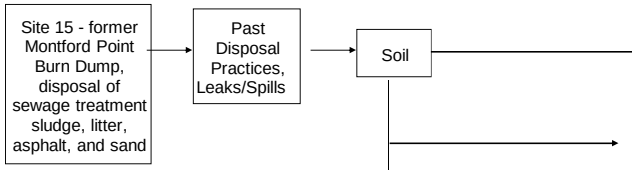
Summary of CTE Cancer Risks and Hazard Indices for Groundwater

Site 15 ESI Report

MCB CamLej

North Carolina

Receptor	Media	Exposure Route	Cancer Risk	Chemicals with Cancer Risks $>10^{-4}$	Chemicals with Cancer Risks $>10^{-5}$ and $<10^{-4}$	Chemicals with Cancer Risks $>10^{-6}$ and $<10^{-5}$	Hazard Index	Chemicals with HI>1
Future Resident Adult	Groundwater	Ingestion	NA	--	--	--	0.2	--
		Dermal Contact	NA	--	--	--	0.006	--
		Total	NA	--	--	--	0.2	--
Future Resident Child	Groundwater	Ingestion	NA	--	--	--	0.7	--
		Dermal Contact	NA	--	--	--	0.01	--
		Total	NA	--	--	--	0.7	--
Future Resident Child/Adult	Groundwater	Ingestion	3.E-05		Benzo(a)pyrene, Chromium (VI)	Benzo(a)anthracene, Benzo(b)fluoranthene	NA	--
		Dermal Contact	3.E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene	Benzo(k)fluoranthene, Chromium (VI)	NA	--
		Total	3.E-04	Benzo(a)pyrene	Benzo(a)anthracene, Benzo(b)fluoranthene, Chromium (VI)	Benzo(k)fluoranthene	NA	--



		Potential Human Receptors					
		Current/Future			Future		
Exposure Media	Exposure Route	Base/Military Personnel	Trespasser/ Visitor Adult	Trespasser/ Visitor Youth	Residential Adult	Residential Child	Construction Worker
Surface Soil	Ingestion	X[1]	X[1]	X[1]	X	X	X
	Dermal Contact	X[1]	X[1]	X[1]	X	X	X
	Inhalation	X[1]	X[1]	X[1]	X	X	X
Combined Surface and Subsurface Soil	Ingestion	X[1]	X[1]	X[1]	X	X	X
	Dermal Contact	X[1]	X[1]	X[1]	X	X	X
	Inhalation	X[1]	X[1]	X[1]	X	X	X
Groundwater	Ingestion	NA	NA	NA	X	X	NA
	Dermal Contact	NA	NA	NA	X	X	X
	Inhalation	NA	NA	NA	X	X	X

[1]Current receptor populations may be exposed to surface soil. Future receptor populations may be exposed to surface and subsurface soil.
NA - Not Applicable or pathway is incomplete
X - Potentially complete exposure pathways

Figure 5-1
Conceptual Site Model for HHRA
Site 15 ESI Report
MCB CamLej
North Carolina

SECTION 6

Ecological Risk Assessment

6.1 Introduction

The following screening level ecological risk assessment (SLERA) completes Steps 1 through 3a of the ERA process for Site 15. This ERA evaluates surface soil, subsurface soil, and groundwater data that were collected at Site 15 in 1997, 2002, 2004, 2005, 2009, and 2010. The ERA was performed in accordance with the following guidance:

- *Ecological Risk Assessment Guidance for Superfund (RAGS): Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997)
- *Region 4 Ecological Risk Assessment Bulletins – Supplement to RAGS* (USEPA, 2001)
- *Navy Guidance for Conducting Ecological Risk Assessments* (DoN, 2003)
- *NCDENR Guidelines for Performing Screening Level Ecological Risk Assessments within the North Carolina Division of Waste Management* (NCDENR, 2003).

6.2 Step 1—Preliminary Problem Formulation and Ecological Effects Evaluation

6.2.1 Problem Formulation

The problem formulation covers the physical layout of the site, its history and ecology, available analytical data, fate and transport mechanisms, complete exposure pathways, and receptors of concern.

6.2.1.1. Site Description

Site 15, formerly referred to as SWMU 46, is a 24-acre site located on Hoover Road within the Camp Johnson portion of the Base. Historical investigations indicate that the former disposal area covered approximately 2 acres in the eastern portion of the site. Since 1997, several soil and groundwater investigations and excavations have been conducted at the site.

The surface is relatively flat and level with the surrounding topography; however, small soil mounds have been observed across the site. Several of these soil mounds have been removed; however, buried debris and contaminated soil remain in the subsurface. A detailed description of the history of site use is included in **Section 2**.

6.2.1.2. Ecological Setting

The New River is a coastal blackwater river. The New River watershed sits within Onslow County and includes MCB CamLej and the City of Jacksonville to the north. The watershed upgradient of Jacksonville is characterized by gum-cypress swamps, with upland areas used primarily for forestry and agriculture. At Jacksonville, the river widens into a broad, slow-moving tidal embayment. About 16 miles south of Jacksonville, it discharges into the Atlantic Ocean through a narrow opening called New River Inlet. Jacksonville and MCB CamLej comprise the majority of land in the lower watershed (the area downstream of the U.S. 17 Bypass). There are 223 stream miles, 22,810 estuarine acres, and 15 miles of Atlantic coastline in this subbasin.

This portion of the North Carolina coast consists of sandy beaches. The adjacent upland area transitions to a region of pines (*Pinus* sp.), scrub oaks (*Quercus* sp.), sweet gum (*Liquidambar styraciflua*), and dogwood (*Cornus* sp.). Wire grass (*Cynodon dactylon*) is the primary undergrowth species. The area is interspersed with bottomland hardwood forests which are dominated by bald cypress (*Taxodium distichum*) and swamp tupelo (*Nyssa sylvatica* var. *biflora*). Croplands are common in this area, and consist of mostly corn, cotton, peanuts, and tobacco.

The climate in Jacksonville is characterized by short, mild winters and long, hot, humid summers. Average annual net precipitation is approximately 50 inches. Ambient air temperatures generally range from 33 to 53°F in the winter months, and 71°F to 88°F during the summer months.

Site 15 encompasses approximately 24 acres and consists of an open area surrounded by forest habitats. The open area is present in the northeastern portion of the site and is used for military maneuver training. The forests are predominately pine-hardwood mixed with thick undergrowth. Several soil mounds are located throughout the forested habitats, but some of the mounds were removed from the southeast area.

The ecological checklist (**Appendix F-1**) identifies the terrestrial and aquatic habitats both on site and nearby. Threatened or endangered species located in Onslow County are not expected to occur at the site or in adjacent areas (**Table 1, Appendix F-2**).

6.2.1.3. Summary of Available Analytical Data

Soil data used for this assessment were collected in 1997, 2002, 2004, 2005, 2006, 2009, and 2010 from various areas of the site. Groundwater data were collected in 2002, 2004, 2009, 2010, and 2011. The following data were used for the assessment:

- 32 surface soil samples (plus four field duplicates) from 0 to 1 foot bgs
- 38 subsurface soil samples (plus three field duplicates) from 1 to 5 feet bgs
- 16 groundwater samples (plus three field duplicates)

Samples are listed in **Table 2, Appendix F-2**. Laboratory analysis of the soil and groundwater samples varied between the investigations, and has included inorganics, VOCs, SVOCs, PCBs, and pesticides. Three surface soil samples were analyzed for dioxins/furans. Data for dissolved inorganics were also available for groundwater samples.

It should be noted that dioxin/furan congener data were available and were evaluated in the ERA based on 2,3,7,8 - TCDD TEQ. TEQs for mammals and birds were calculated based on methods published by the WHO (Van den Berg et al., 2006). In this ERA, dioxin and furans are evaluated in the food chain transfer section only. Compared to vertebrates, invertebrates are relatively tolerant to dioxin exposure (Hemming et al., 2002).

6.2.1.4. Fate and Transport Mechanisms

Release and transport mechanisms at the site, as they relate to ecological exposures, are briefly discussed below.

Leaching to Groundwater

Several VOCs (3), SVOCs (10), pesticides (7), and inorganics (21) were detected in groundwater samples. Groundwater represents an incomplete exposure pathway for ecological receptors; however, site-related constituents in groundwater may migrate offsite and affect aquatic habitat by discharging into surface water, where aquatic life could be exposed. Groundwater may discharge to the brackish waters of the New River or the tidally influenced portions of associated tributaries.

Surface Water Runoff and Erosion

Surface water bodies are not located within or adjacent to the site or nearby. The New River is located 0.3-mile southwest of the site and is not expected to receive surficial runoff from Site 15, because precipitation at the site will likely infiltrate through the soil. Consequently, contamination is not likely to reach surface water through overland flow.

Volatilization from Surface/Subsurface Soil

This exposure pathway is expected to be insignificant because VOC contamination was not elevated or widespread in surface soils or subsurface soils, and detected VOC concentrations were generally low. Many of the detected VOCs are likely laboratory contaminants (such as acetone, 2-butanone, or chloroform), and not actual site-related chemicals. Additionally, although burrowing may occur on the site, burrow depths are likely to be shallow given the type of receptors present.

Dust

Soil dust at the site is not expected to be significant because the majority of the site is covered by vegetation.

6.2.1.5. Conceptual Site Model

Information regarding the general habitat features of Site 15 and the fate and transport of the chemicals associated with site media was used to build an ecological CSM. Key components of the CSM include chemical sources, release and transport mechanisms, exposure media, receptors, and exposure routes (**Figure 6-1**).

Potentially complete and significant exposure pathways to terrestrial ecological receptors include the following:

- Direct exposure to terrestrial plants (root uptake) and soil invertebrates (dermal and direct ingestion)
- Incidental ingestion and dermal exposure for wildlife
- Food chain (prey consumption) exposures for wildlife

Terrestrial bird and mammal species that are representative of Site 15 include the meadow vole (mammalian herbivore), short-tailed shrew (mammalian insectivore), white-footed mouse (mammalian omnivore), red fox (mammalian omnivore), white-tailed deer (mammalian herbivore), American robin (avian omnivore), mourning dove (avian herbivore), and red-tailed hawk (avian carnivore).

6.2.2 Ecological Effects Evaluation

The potential for effects from exposure to each medium was initially evaluated by comparing ecological screening values (ESVs) to maximum concentrations (Step 2) of constituents detected at the site. For soil, the USEPA Ecological Soil Screening Levels (EcoSSL) (USEPA, 2009b) were preferentially selected over USEPA Region 4 values (USEPA, 2001). If no USEPA EcoSSL was available for a constituent, the USEPA Region 4 value was selected.

A selection hierarchy was also applied to groundwater. The National Recommended Water Quality Criteria (NRWQC) (USEPA, 2009a) were preferentially selected over the USEPA Region 4 values. However, when no NRWQC was available for a constituent, the USEPA Region 4 value was selected as the ESV for that constituent. Marine screening values were selected for the groundwater comparison because of the likelihood to discharge to the New River. It should be noted that comparison of groundwater concentrations to surface water ESVs is a highly conservative comparison, because it is expected that dilution and dispersion would occur prior to discharge, and significant dilution would occur immediately following any discharge to the New River.

Maximum soil and groundwater inorganic concentrations were also compared to two times the mean Base background concentrations as part of Step 2 (Baker, 2001a).

6.3 Step 2—Preliminary Exposure Estimate and Risk Calculation

In Step 2, risk to ecological receptors was evaluated by calculating HQ. HQs are calculated by dividing the maximum concentration detected within a media by the corresponding medium-specific ESV. Maximum concentrations for detected analytes and maximum detection limits for undetected analytes were used to conservatively estimate potential chemical exposures to ecological receptors. Risk estimates were calculated for surface soil, subsurface soil, and groundwater (**Tables 3 through 5, Appendix F-2**).

North Carolina SLERA guidance (NCDENR, 2003) requires that constituents falling into one of the following categories be identified as a Step 2 COPC:

- Category 1 – Contaminants with a maximum detection exceeding the ESV
- Category 2– Undetected contaminants with a laboratory sample quantitation limit (SQL) exceeding the ESV
- Category 3 – Detected contaminants with no ESV
- Category 4 – Undetected contaminants with no ESV

Results of the Step 2 screenings are summarized in **Table 6, Appendix F-2**. Based on the results, 119 COPCs in surface soil, 105 COPCs in subsurface soil, and 105 COPCs in groundwater were carried forward to Step 3. It should be noted that if maximum detected concentrations of inorganics were consistent with MCB CamLej

background values or within the range of background concentrations, the analyte was not considered a Step 3 COPC.

6.4 Step 3a —Refinement of Conservative Exposure Assumptions

Using the same CSM, Step 3a involves re-evaluation of the conservative assumptions used in Steps 1 and 2, resulting in a refinement of the COPC list. Step 3a includes a re-assessment of the risks to lower trophic level receptors (direct exposure) and an evaluation, for the subset of contaminants that are bioaccumulative, of the potential for risks to upper trophic level receptors (food chain transfer).

It should be noted that non-detected analytes that were identified as COPCs in Step 2 were not considered potential COPCs in Step 3a and are not discussed further. If the non-detected COPCs were present, the actual concentrations would be less than the maximum method detection limit, which was compared to the ESV in the Step 2 evaluation. Consequently, risks estimated based on comparison to the method detection limit are biased high and non-detected constituents are considered unlikely to pose a significant risk to populations of site receptors. A discussion of the uncertainty associated with non-detect analytes is presented in **Section 6.4.5**.

6.4.1 Direct Exposure

The risk to lower trophic level receptors was recalculated using a conservative estimate of the mean chemical concentration as the EPC. Conservative estimates of the mean EPC were calculated using ProUCL Version 4.00.05 (USEPA, 2010b). If a conservative estimate of the mean EPC could not be calculated, the arithmetic mean concentration was used as the EPC. Potential risks were further evaluated using a weight-of-evidence (WOE) approach not used in Step 2. The WOE approach considers the magnitude of the recalculated risks, toxicity information not used in the Step 2 screening, frequency of detection, magnitude of exceedance, and the distribution of detected concentrations.

When ESVs were not available from the sources used in the Step 2 evaluation, a supplemental ESV from the literature was identified in Step 3. Constituents with no available supplemental ESVs are discussed in the Uncertainty section (**Section 6.4.5**).

The results of the direct exposure assessment for surface soil, subsurface soil, and groundwater, are listed in Tables E-7 through E-9, respectively. A summary of the screening results is presented below.

6.4.1.1. Surface Soil

Forty-six detected COPCs in surface soil (and 73 nondetect analytes) were carried forward to Step 3. Based on the refined screening, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chloroform, high molecular weight (HMW) PAHs, DDT and metabolites, Aroclor-1254, endrin, lead, mercury, zinc, and hexavalent chromium have HQs greater than 1 (**Table 7, Appendix F-2**).

Chloroform had an HQ greater than 1; however, it is a common laboratory contaminant (DTSC, 2006) and it was not considered to pose a significant risk to lower trophic level receptors.

SVOCs were not identified as posing risk to lower trophic level receptors. Bis(2-ethylhexyl)phthalate and butylbenzylphalate both had HQs above 1, but the magnitudes of exceedance were low (both HQs less than 2), with each analyte only exceeding the ESV in one or two samples. Additionally, phthalates are common laboratory artifacts (DTSC, 2006), suggesting that these analytes are not likely the result of site-related activities.

The HQ for the HMW PAHs was only 1.2, based on the single sample with the highest detected sum. Frequency of detection was also low, with the highest for an individual PAH being 3 of 17. These facts indicate the site-wide central tendency concentration to which receptor populations would be exposed would be far lower than the ESV. The ESV used in the analysis, the EcoSSL of 1,100 μg/kg, is for mammals. The EcoSSL for soil invertebrates, 18,000 μg/kg, is an order of magnitude higher than the maximum HMW concentration at Site 15.

Pesticides in surface soil are not predicted to pose risk to lower trophic level receptors. The EPC-based HQ for endrin only slightly exceeded 1 (HQ=1.51) and only exceeded in 1 of 17 samples for which pesticides were

analyzed. Likewise, the concentrations of DDT and metabolites were relatively low. The HQ for total DDT and metabolites was 2.3, based on the single sample with the highest detected sum (48.5 μg/kg). Considering the low magnitude of exceedance based on the maximum detected concentration, the site-wide central tendency concentration to which receptor populations would be exposed would be far lower than the ESV.

The EPC-based HQs were 9.25 for Aroclor-1254 and 13.1 for 2,3,7,8-TCDD TEQ (dioxin/furans) and both were considered to pose potential risk to lower trophic level receptors. The dataset for dioxin/furans was limited to three samples.

Four inorganics, lead, mercury, zinc, and hexavalent chromium, had HQs slightly greater than 1 but less than 5. Lead had an EPC-based HQ of 2.7. The maximum lead background concentration is 38.5 mg/kg, which is higher than the mean EPC for lead (29.8 mg/kg). Additionally, the lead ESV (11 mg/kg) is based on the EcoSSL for birds. The EcoSSL values for invertebrates (1,700 mg/kg) and plants (120 mg/kg) are much higher, suggesting that effects to lower trophic level receptors (plants and invertebrates) from lead are unlikely. Mercury had an EPC-based HQ of 4.27 and exceeded the ESV in 4 of 31 samples. The concentration of mercury was greater than the ESV in only four samples; therefore, the risk from mercury on a community basis to lower trophic level receptors is likely low. While the HQ for zinc was slightly greater than 1 (HQ=2.46), similar to lead, the most conservative EcoSSL was based on birds. However, the plant eco SSL (160 mg/kg) and the invertebrate EcoSSL (120 mg/kg) suggest that risk to lower trophic level receptors is negligible.

Based on this refined screen for surface soils, Aroclor-1254 was found to pose potential risk to lower trophic level receptors and was identified as a Step 3 COPC.

6.4.1.2. Subsurface Soil

Thirty-eight detected COPCs in subsurface soil (and 67 nondetect analytes) were carried forward to Step 3 (**Table 8, Appendix F-2**). Based on refined screening, HMW PAHs, DDT and metabolites, alpha-chlordane and, 10 inorganics) were found to have HQs greater than 1.

The HQ for the HMW PAHs was 6, based on the single sample with the highest detected sum. Site-wide, the frequency of detection for individual PAHs was consistently low, never exceeding more than 2 of 27 samples. Based on the limited distribution, the site-wide central tendency concentration to which receptor populations would be exposed would be far lower than the ESV, indicating limited risk. The ESV used in the analysis, the EcoSSL of 1,100 ug/kg, is for mammals. The EcoSSL for soil invertebrates (18,000 μg/kg) is almost three times the maximum HMW PAH concentration (6,600 μg/kg) at the site.

The HQ for total DDT and metabolites was 1,571, and the compounds were consistently detected across the site. These pesticides pose a potential risk to lower trophic level receptors. In contrast, alpha-chlordane had a low magnitude of exceedance (HQ = 1.98) and the detected concentrations exceeded the ESV in only 3 of 27 samples analyzed for pesticides.

Six metals, barium, chromium, manganese, selenium, zinc, and hexavalent chromium, had low magnitudes of exceedance with HQs less than 3. Antimony had an HQ of just above 3 but was detected in only 3 of 15 samples at concentrations greater than the maximum background value (0.5 mg/kg). The magnitude of exceedance was low and only a few locations exceeded maximum background; therefore, risk from antimony to lower trophic level receptors is considered low. Cadmium had an EPC-based HQ of 8.28; however, the ESV was based on birds. The cadmium EcoSSL values for plants (32 mg/kg) and invertebrates (140 mg/kg) are much higher, suggesting that risk to lower trophic level receptors from cadmium is unlikely. The HQ for iron was above 1, but was detected in only 3 of 15 samples at concentrations above the maximum background value of 15,600 mg/kg, suggesting that risk is low. The EPC-based HQ for lead is 142; however, the ESV was based on the EcoSSL for birds. Based on the lead EcoSSL for plants (120 mg/kg), the HQ (13) would still result in a predicted risk to lower trophic level receptors. Consequently, lead in subsurface soils is considered to pose a potential risk to lower trophic level receptors.

Based on this refined screen for subsurface soils, total DDT and metabolites and lead were identified as posing a potential risk to lower trophic level receptors.

6.4.1.3. Groundwater

Seventeen detected COPCs (and 88 nondetect analytes) were carried forward to Step 3 (**Table 9, Appendix F-2**). Based on the refined screening, benzo(a)pyrene, 4,4'-DDT, alpha-chlordane, gamma-chlordane, heptachlor epoxide, and nickel had HQs greater than or equal to 1.

4,4'-DDT, alpha-chlordane, gamma-chlordane, and heptachlor epoxide had low magnitudes of exceedance with HQs of 3 or less. Additionally, each analyte only exceeded the ESV in 1of 8 groundwater samples. Consequently, 4,4'-DDT, alpha-chlordane, gamma-chlordane, and heptachlor epoxide were not considered to pose significant risk.

Benzo(a)pyrene had an EPC-based HQ of 5.14; however, only one out of eight groundwater samples analyzed for SVOCs contained detectable levels of benzo(a)pyrene. Additionally, benzo(a)pyrene was only detected in 1 of 17 surface soil samples and 1 of 27 subsurface samples analyzed for SVOCs, suggesting that a significant source of benzo(a)pyrene does not exist at the site and benzo(a)pyrene is not considered to pose significant risk.

Nickel was detected in both total and dissolved samples and had a low magnitude of exceedance (HQ=2.89) based on the total concentration. The HQ was slightly higher based on the dissolved concentration (HQ=3.1). Nickel was detected at concentrations (total and dissolved) above the maximum background value (16.5 µg/L) in only two groundwater samples, which were collected from temporary wells (IR15-TW01 and IR15-TW02). Additionally, nickel was not identified as a COC in soil. Consequently, nickel is not considered to pose significant ecological risk.

Based on this refined screening, no analytes in groundwater were considered to pose potential risk to aquatic receptors. It should also be noted that the assumption that concentrations in groundwater would be similar to those in surface water is very conservative, considering dilution and dispersion would occur at significant rates prior to and upon discharge to a surface water body.

6.4.2 Food Chain Transfer

Food chain modeling was conducted for detected constituents carried to Step 3 and identified as bioaccumulative in USEPA (2000b). Food chain modeling was initially conducted for the terrestrial receptors using maximum concentrations. If analytes posed a risk based on maximum concentrations, modeling was refined using a conservative estimate of the mean.

COPCs evaluated for surface soil included lead, mercury, zinc, DDT and metabolites, endrin, Aroclor-1254, PAHs, and dioxin/furans. COPCs evaluated for subsurface soil included cadmium, chromium, lead, mercury, selenium, silver, zinc, DDT and metabolites, aldrin, alpha-chlordane, gamma-chlordane, and PAHs. Receptors selected for the terrestrial evaluation include the meadow vole, short-tailed shrew, white-footed mouse, red fox, white-tailed deer, American robin, mourning dove, and red-tailed hawk.

Risks to the upper trophic level receptors were evaluated by modeling exposure via the ingestion of constituents that have accumulated in prey. Incidental ingestion of soil was also included when calculating exposure. Dietary items for which tissue concentrations were modeled included terrestrial plants, terrestrial invertebrates, and mammals. The uptake of chemicals from abiotic media into these food items was modeled based on conservative assumptions.

For the maximum exposure case, two HQs were developed. Each exposure estimate was calculated and compared to two types of toxicity reference values (TRVs), no observed adverse effect levels (NOAELs) and lowest observed adverse effects levels (LOAELs). If the LOAEL-based HQ was over 1, the exposure estimate based on a conservative estimate of the mean (that is, also referred to as the EPC) was calculated. When HQs based on the LOAEL are above 1, risk may be present. When HQs based on the NOAEL are below 1, there is high confidence of no significant risk.

6.4.2.1. Exposure Assessment

Exposure Point Concentrations

EPCs are the environmental media concentrations of COPCs that receptors are assumed to encounter in an exposure area. Risk calculations were initially developed using the maximum concentration. If the LOAEL-based

HQ was greater than 1, risk was re-evaluated using a conservative estimate of the mean and/or an arithmetic mean. Conservative estimates of the mean were calculated using ProUCL Version 4.00.05 (USEPA, 2010b). To be conservative, the maximum detected value or the maximum detection limit between the field duplicate and native sample was used when calculating UCLs. When a conservative estimate of the mean could not be calculated, the lower of the maximum detection and arithmetic mean was used to estimate the exposure dose.

The bird and mammal TEQs associated with the maximum and average dioxin/furan concentrations are presented in **Table 10, Appendix F-2.**

Exposure Parameters

Receptor-specific inputs are presented in **Table 11, Appendix F-2**. Central tendency estimates (for example, mean, median, or midpoint) for body weight and ingestion rates from the scientific literature were used for each receptor. It was assumed that chemicals were 100 percent bioavailable to the receptor and that each receptor spent 100 percent of its time on the site (that is, an area use factor [AUF] of 1.0 was assumed).

Concentrations in Food Items

The concentrations of COPCs in food items were estimated rather than measured. For the purposes of exposure estimation, partitioning of constituents from environmental media to prey was estimated from literature values. The conservative model assumptions included bioaccumulation factors (BAFs) from the literature. The BAFs and other uptake or biotransfer factors used to estimate constituent concentrations in food items are provided in **Tables 12 through 14, Appendix F-2**. In all cases, it was assumed that tissue uptake occurs under steady-state conditions.

Calculation of Chemical Intakes

Dietary exposure includes multiple pathways and requires modeling. The end product or exposure estimate resulting from exposure modeling for wildlife is a dosage (amount of chemical per kg receptor body weight per day [mg/kg/d]). Dietary exposure from food and incidental ingestion of soil was estimated using a generalized exposure model modified from Suter et al. (2000):

$$E_j = \left[\left(Med_{jk} * Pk * FIR \right) + \left(\sum_{i-1}^{N} B_{ij} * P_i * FIR \right) \right] * AUF$$

Where:

E_j	=	total dietary exposure (mg/kg/d)
Med_{jk}	=	concentration of chemical (j) in medium (k) (mg/kg dry weight)
P_k	=	ingestion rate of medium (k) as proportion of diet
FIR	=	species-specific food ingestion rate (kg of food per kg body weight per day)
B_{ij}	=	concentration of chemical (j) in biota type (i) (mg/kg dry weight)
P_i	=	proportion of biota type (i) in diet
AUF	=	area use factor (unitless)

6.4.2.2. Effects Assessment

Compilation of Toxicity Data

Currently available toxicological data were evaluated and a range of potential effects was determined by using procedures recommended by USEPA (1997). Data were extracted from original literature sources (when available) to verify levels of effects, quality of study design, magnitude of dose, and other study parameters. Sources for toxicity data included the following:

- Toxicological Benchmarks for Wildlife, produced for the Department of Energy at Oak Ridge National Laboratories (Sample et al., 1996)
- USEPA EcoSSLs (USEPA, 2009b)

- Peer-reviewed scientific literature
- The National Institutes of Health (NIH) ATSDR Toxicity profiles and reports

Ingestion TRVs were selected for both chronic NOAEL and chronic LOAEL endpoints (**Tables 15 and 16, Appendix F-2**). Because the risk assessment is based on population- or community-level effects, no intraspecies UFs were applied. Taxonomic class-type UFs were also not applied because the TRVs selected were typically derived based on data from a broad range of taxonomic groups.

Food chain COPCs were identified based on a comparison of exposure doses from site-specific food chain modeling with the NOAEL- and LOAEL-based ingestion TRVs.

6.4.2.3. Risk Results

The results of the food chain modeling for terrestrial wildlife exposed to maximum concentrations in surface and subsurface soil are presented in **Tables 17 and 18 of Appendix F-2**, respectively. For surface soil, the short-tailed shrew had NOAEL-based HQs greater than 1 for mercury, but the LOAEL-based HQ was less than 1. None of the other analytes had LOAEL-based HQs greater than 1.

For subsurface soil , there were NOAEL-based HQs greater than 1 for cadmium, chromium, lead, 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT. Of these, lead, 4,4'-DDE, and 4,4'-DDT were the only analytes with LOAEL-based HQs greater than 1. LOAEL-based HQs for lead were greater than 1 for short-tailed shrew, American robin, and mourning dove. LOAEL-based HQs for 4,4'-DDE were greater than 1 for short-tailed shrew and red-tailed hawk. LOAEL-based HQs for 4,4'-DDT were greater than 1 for red fox, short-tailed shrew, white-footed mouse, American robin, and red-tailed hawk.

The analytes with LOAEL-based HQs above 1 (lead, 4,4'-DDE, and 4,4'-DDT) were further evaluated using the EPC (**Table 19, Appendix F-2**). Based on the refined assessment, the LOAEL-based HQs for lead were greater than 1 for short-tailed shrew and mourning dove. The LOAEL-based HQs for 4,4'-DDE was greater than 1 for short-tailed shrew only. The LOAEL-based HQs for 4,4'-DDT were greater than 1 for red fox, short-tailed shrew, white-footed mouse, and red-tailed hawk. The HQs for red fox and mouse were near 1. If the site use factor were taken into account, the HQs for red fox and red-tailed hawk would likely fall below 1 given the larger home ranges of these receptors.

6.4.3 Subsurface Soil Exposure Investigation

The ERA results indicated the potential for adverse effects to lower trophic-level receptors (for example, earthworms) and higher trophic-level receptors (for example, mammals and birds) if these receptors should come into contact with DDT family compounds and/or lead in subsurface soils. As indicated in the CSM (**Figure 6-1**), the exposure pathways to subsurface soils are limited. Ecological receptors could only come into contact with chemicals in subsurface soils if one or more of the following exposure pathways are complete:

- **Deep-dwelling Earthworms** – Anecic earthworms (for example, *Lumbricus* sp.) create permanent burrows that reach to a depth of 2 to 3 feet in subsurface soils (NRCS, 2011). This is in contrast to the other three main groups of earthworms (compost, epigeic, and endogeic), which only occur in the upper few inches of soil and in leaf litter. Anecic earthworms are not native to North America, but were introduced by European settlers. Accordingly, their distribution is patchy and they typically occur in areas having a history of agricultural or gardening activity. However, if present on Site 15, anecic earthworms could be exposed to chemicals in subsurface soil while burrowing. This exposure could result in adverse effects to earthworms and/or the accumulation of chemicals in earthworm tissues, to which vermivorous wildlife (for example, shrew) then could be exposed while foraging.
- **Burrowing Mammals** – A literature-based mammal survey indicates that mammals such as southeastern shrew, coyote, long-tailed weasel and striped skunk could occur in the habitats present on Site 15 and could burrow to a depth ranging between 2 and 4 feet. If present onsite, these mammals could be directly exposed to chemicals in subsurface soil while burrowing. This exposure could result in adverse effects to these mammals and/or the accumulation of chemicals in small mammal tissues, to which higher trophic-level predators (for example, hawks) and/or carrion-eating species (for example, vultures) could be exposed.

Mammal burrowing activity could also bring chemicals in subsurface soil to the surface, at which point a broader range of ecological receptors could be exposed to chemicals.

- **Tree Falls and Root Exposure** – Tree species with deeper root systems could be exposed to chemicals in subsurface soil. If present onsite, these trees could be affected by direct exposure to chemicals in subsurface soil. These species could also excavate and expose subsurface soils upon falling, at which point a broader range of ecological receptors could be exposed to chemicals.

Site-specific earthworm, burrowing mammal, and tree surveys were conducted October 18, 2011, to evaluate each of these potential exposure pathways to determine if there are complete exposure pathways to subsurface soil for ecological receptors at Site 15.

6.4.3.1. Methods

The following sections describe the objective and methods used for each of the surveys.

Earthworm Survey

A survey was conducted to determine if deep-burrowing anecic earthworms (for example, *Lumbricus* sp.) are present on Site 15 and if there is a potential exposure pathway to subsurface soils based on the presence of these earthworms at the Site. The survey was conducted according to procedures presented in Open Air Laboratories (OPAL) (OPAL, 2011a and 2011b) to determine the earthworm types and numbers present on Site 15. The survey involved collecting soils from test pits (8 inches square by 4 inches deep), to characterize the earthworms present in shallow soils, and the addition of a mustard solution into the test pit to drive deeper dwelling worms upwards into the pit for subsequent counting and identification.

Eight onsite (Site 15) and four reference sample test pits were created and sampled. The onsite test pits, which are shown on **Figure 6-2**, were placed at locations that are co-located with or close to previous subsurface soil sample locations. Site samples (IR15-TP1 through IR15-TP8) were taken from locations that are representative of a range of both DDT and lead concentrations and the habitats across the site. Reference samples (IR15-R1 through IR15-R4) were taken from locations to the northwest of the site. The reference samples were collected to determine if the onsite survey outcomes were affected by the presence of chemicals, if differences were observed between the onsite and reference sample outcomes. Reference sample locations were selected to be representative of the habitat types from which the onsite samples were taken.

The SOP used for the earthworm survey is presented in **Appendix F-3**. The results of the earthworm survey are shown in **Table 20, Appendix F-2**.

Small Mammal Burrow Survey

A survey was conducted to determine if small mammal burrows are present onsite, and if those burrows could represent a potential exposure pathway to subsurface soils. The small mammal burrow survey involved the visual inspection of a 9.1-meter radial area centered around the locations shown on **Figure 6-2**, which are the same locations at which the earthworm test pits were dug. Eight onsite and four reference locations were surveyed. Multiple 9.1-meter linear transects were walked outward from the center of each location, until the entire 9.1-meter radial survey area was visually inspected. Burrows that were observed within the surveyed area were then measured and photographed, and any animal materials (for example, scat) around the burrow documented to help with the later identification of the species likely to be using the burrow.

The SOP used for the small mammal burrow survey is presented in **Appendix F-3**. The results of the small mammal burrow survey are shown in **Table 21, Appendix F-2**.

Tree Community Survey

A survey was conducted to characterize the tree community onsite to determine if trees are present that could have roots extending to deeper subsurface soils and/or if tree falls could have exposed subsurface soils. The tree survey involved the visual inspection of a 9.1-meter radial area centered around the sample locations shown on **Figure 6-2**, which are the same locations at which the earthworm test pits were dug.

Eight onsite and four reference locations were surveyed. The dominant species in two different size classes (greater than 10 centimeters [cm] diameter at breast height [DBH] and greater than 6 meters tall; and less than 10 cm DBH and less than 6 meters tall) were identified and the DBH of the five largest trees within each of those size classes measured. The objective of characterizing the composition and size of the dominant tree species present onsite was to qualitatively evaluate the potential for trees to have roots extending into subsurface soils based on consideration of both the species and size of the dominant species present at the site. Tree falls observed within the Site 15 area were also characterized by identifying the species of the fallen tree, estimating the DBH, and measuring the size of root ball associated with the fallen tree to characterize the amount of soil displaced and exposed by the fallen tree. Signs of tree stress were also noted.

The SOP used for the tree community survey is presented in **Appendix F-3**. The results of the tree community survey are shown in **Table 22**, **Appendix F-2**.

6.4.3.2. Results

The following sections summarize the results of the earthworm, small mammal, and tree community surveys and discuss the implications of the observed outcomes on the ecological exposure pathways at Site 15.

Earthworm Survey

The earthworm survey results did not indicate the presence of earthworms in soils at a depth greater than 10 cm within samples collected from either the onsite or reference sample locations (**Table 20, Appendix F-2**). Earthworms were observed in shallow soils (less than 4 inches) within samples collected from four of the Site 15 locations (IR15-TP5, IR15-TP6, IR15-TP7 and IR15-TP8) and one reference location (IR15-R4). However, none of the earthworms were deep-burrowing anecic earthworms (for example, *Lumbricus* sp.). The collected earthworms were comprised of gray worms, compost worms, and possibly tree worms (**Table 20, Appendix F-2**). Several earthworms less than 2 cm in length were also found in the shallow soils collected from one Site 15 sample (IR15-TP8) and one reference sample (IR15-R4). However, consistent with OPAL (2011a and 2011b) guidance, earthworms less than 2 cm are considered immature and were not identified.

The earthworm survey indicates that anecic deep-burrowing earthworms are not present at either the Site 15 or reference areas. This is not unexpected because anecic earthworms are an introduced species that occur primarily in areas where there has been past agricultural activity. The earthworm species that were found in the shallow soil samples consist of shallow-soil and litter-dwelling species that would not burrow more than a few inches into subsurface soils. Based on the results of this survey, it is concluded that earthworms would not be exposed to subsurface soils, and therefore would not represent a contaminated food source for foraging birds and mammals.

Small Mammal Burrow Survey

The small mammal burrow survey results indicated the presence of only two very small (less than 1 inch diameter) holes at one Site 15 sample location (IR15-TP1) (**Table 21, Appendix F-2**). Burrows were not observed at any of the other onsite or reference sample locations. The diameter of the two holes is not large enough to accommodate small mammals. They were likely made by large insects. It is concluded that small mammals would not be exposed to subsurface soils and this is not a complete exposure pathway at Site 15.

Tree Community Survey

The tree community survey results indicate that pine and maple are the dominant species at both the onsite and reference locations (**Table 22, Appendix F-2**). Tree falls were observed at a limited number of the onsite (IR15-TP5 and IR15-TP7) and reference (IR15-R3) sample locations. The tree falls consist of mostly pine trees with a DBH toward the upper end of the size range detected (greater than 30.5 cm DBH onsite and greater than 20.3 cm DBH in the reference area).

Measurement of the root ball depths suggest that, although pine trees typically have shallow root systems, the roots of larger pine trees may extend down to a depth where they could come into direct contact with the chemicals in subsurface soils. Further, although only a limited number of tree falls were observed, the measured root ball pit sizes indicate that larger tree falls could expose the elevated chemical concentrations present in

subsurface soils to ecological receptors. It is therefore concluded that larger trees represent a potential exposure pathway for ecological receptors, via both the direct exposure of the roots of larger trees to chemicals in subsurface soil and the exposure of chemicals in subsurface soils following tree falls.

6.4.4 Risk Characterization

Aroclor-1254 in surface soil was identified as potentially posing risk to lower trophic level receptors. Overall risk to ecological receptors from Aroclor-1254 is considered low because it was the only Aroclor detected, was only detected in 4 of 20 samples, and food chain risks were not predicted. In addition, the ESV for soil (20 micrograms per kilogram [µg/kg]) is a target value (Swartjes, 1999). Target values for soil are related to negligible risk for ecosystems. The negligible risk level is assumed to be 1 percent of the maximum permissible risk level for ecosystems. Because the average Aroclor-1254 level was less than 10 times the screening value, population level risks are unlikely.

Based on food chaining modeling, risk to several upper trophic level receptors was predicted from exposure to lead and the DDT family of pesticides in subsurface soil. The investigation that was undertaken to determine whether the exposure pathway is complete indicated that the site is not inhabited by deep-dwelling earthworms and there is little, if any, burrowing activity by small mammals. The only exposure to subsurface soils identified was for tree roots and the pits that are formed as a result of fallen trees. With regard to the former, there was no evidence that trees and other vegetation are being negatively affected by subsurface soil contamination. For the latter, the investigation suggests that the type most likely to fall are pine, which have relatively shallow root systems. It is unlikely that enough trees would tip during one event to expose an area of subsurface soil that would result in significant impacts to receptor populations. In addition, the pits created by the tree falls would naturally fill in, eliminating exposure over time.

Soil excavation is the only other mechanism by which receptors could be exposed to subsurface soils at the site. This activity could potentially occur in the future if there are no restrictions on site activities (for example, a land use control).

6.4.5 Uncertainty

Uncertainties are inherent in all risk assessments. In general, risks are over-estimated in this evaluation through the use of conservative exposure, effects, and risk characterization assumptions described in the previous sections. A qualitative evaluation of the major general uncertainties associated with this assessment is presented below.

6.4.5.1. Effects Assessment Uncertainties

Literature-derived toxicity data based on laboratory studies were the only available data used to evaluate risk to all receptor groups. It was assumed that effects observed in laboratory species were indicative of effects that would occur in wild species. The suitability of this assumption is unknown.

The use of UFs in the development of TRVs is designed to ensure that the TRV is a conservative estimate of a toxicological effect level or endpoint. However, there is some additional uncertainty associated with extrapolating TRVs between toxicological endpoints, species, duration, and study conditions to site conditions.

Undetected chemicals for which no toxicological data were available were identified as posing no risk. Although some uncertainty is associated with this approach, it was assumed that if chemicals were present at ecologically relevant levels, they would be detected in some samples. Additionally, those analytes that were detected but lacked toxicological data were also identified as posing no risk although they were considered an uncertainty. A lack of toxicological data demonstrates that these chemicals historically have not been identified as significant ecological risk drivers and it is unlikely these chemicals pose an ecological risk.

The TRVs developed from literature studies are usually based on a highly soluble and bioavailable form of the chemical. It is generally accepted that forms present in environmental media are not likely to be in a highly soluble form and, as a result of physical and chemical processes in the environment, are likely to be far less than

100 percent bioavailable. This difference between literature studies and site conditions may contribute to an over-estimation of potential exposure and risks from the COPCs.

Standard industry laboratory methods of analysis were used for the development of detection limits. In some instances, the methods produced detection limits that were higher than the ESVs. This is considered an acceptable uncertainty. Because these chemicals were not detected, they are not known to be present onsite, but the potential for risks cannot be totally discounted because the reporting limits for at least some samples are higher than the screening values.

6.4.5.2. Exposure Assessment Uncertainties

Exposure Media and Pathways

Wildlife doses were estimated based on the ingestion pathway only. This is because of limitations in the field of ERA with regard to adequately evaluating the volatilization (inhalation) and dermal absorption pathways. Although these pathways would not be expected to contribute significantly to the overall dose that receptors might receive from COPCs at this site, this is nonetheless an uncertainty inherent in the assessment.

Bioavailability

The exposure dose estimates in this assessment assume that 100 percent of the chemical concentrations to which receptors are exposed are in the bioavailable form. However, most chemicals will not be 100 percent bioavailable. In cases where bioavailability is less than 100 percent, risk is over-estimated.

The exposure concentrations used in the evaluation of trophic transfer were assumed to remain constant for the duration of exposure. Physical, chemical, and biological processes that could reduce chemical concentrations and their bioavailability over time were not factored into the calculation of the exposure concentrations. Use of this additional conservative assumption is also likely to over-estimate exposure to the COPCs.

Analytical chemistry data collected within the exposure area at Site 15 were assumed to adequately represent the exposure to wildlife and exposure concentrations were assumed to represent the distribution of constituents present. However, because of the heterogeneous nature of waste, concentrations may be lower or higher in areas where samples were not collected. These assumptions could either under- or over-estimate risk.

Receptor Life History Data

No avian or mammalian life history data specific to the site were available; therefore, exposure parameters were either modeled based on allometric relationships (for example, food ingestion rates) or were based on data from these same species in other portions of their range. Because diet composition as well as food, water, and soil ingestion rates can differ among individuals and locations, published parameter values may not accurately reflect conditions at the site. Consequently, risk may be either over- or under-estimated.

Dietary Composition

Dietary compositions were simplified for the site receptors to estimate concentrations in food items using bioaccumulation models. It was assumed that concentrations were similar in comparable food types. The suitability of this assumption is unknown. Consequently, risk may be either over- or under-estimated.

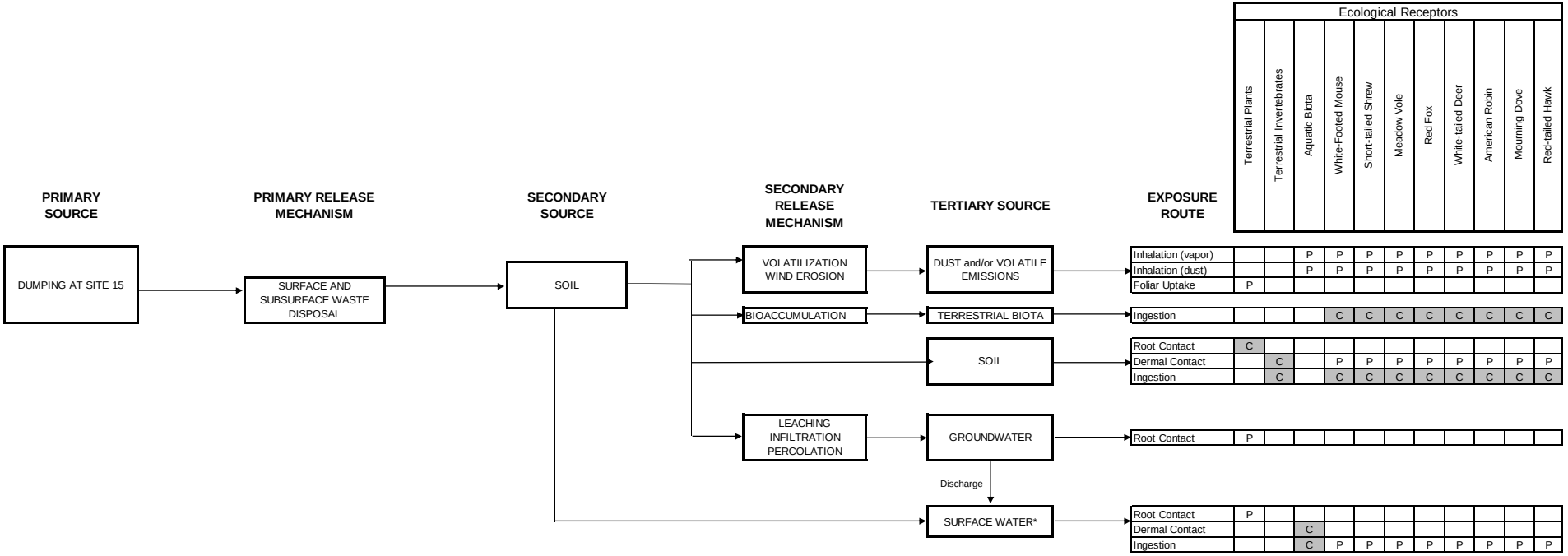
Estimating Prey Tissue Concentration

There is uncertainty associated with the estimated chemical concentrations in the tissues of prey. Prey tissue concentrations were estimated using literature-based values for all dietary items. Potential risks based on these tissue concentration estimates, therefore, could be either over- or under-estimated.

6.4.6 Conclusions

No significant risks were identified for ecological receptors potentially exposed to surface soil or groundwater. For subsurface soil, potentially significant risks to lower and upper trophic level receptors could occur if the lead and pesticides in subsurface soil is exposed. However, given the lack of deep-dwelling earthworms, limited burrowing

activity, the unlikelihood for excavation in the waste disposal area, and the relatively small area exposed by occasional tree falls, exposure to subsurface soils is limited.



C - Pathway considered complete for purposes of ecological risk assessment
P - Pathway considered potentially complete, but insignificant
Pathways evaluated quantitatively in ecological risk assessment
* - Constituents in groundwater were assumed to be representative of constituents in surface water.

Figure 6-1
Conceptual Site Model of Ecological
Exposures at Site 15
Site 15 ESI Report
MCB CamLej
North Carolina

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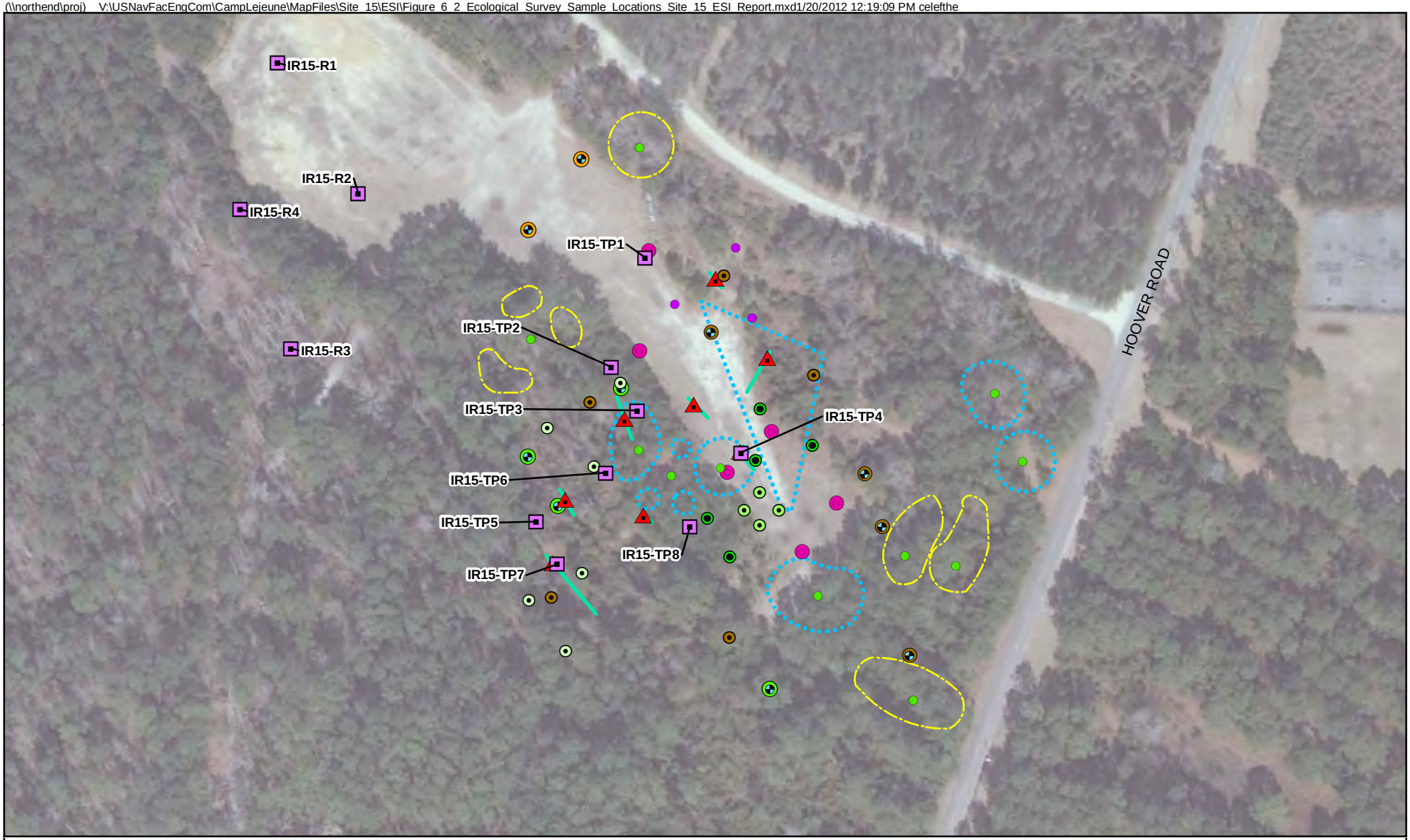

Legend

- Earthworm, Small Mammal Burrow, and Tree Community Survey Location
- Soil Sample Location
- Subsurface Soil Sample Location
- Soil and Groundwater Sample Location
- ESI Groundwater Sample Location
- PA/SI Surface/Subsurface Soil Sample
- PA/SI Surface/Subsurface Soil/Groundwater Sample
- IRM Soil Sample
- RFI Soil Boring
- Test Trench Sample
- Phase II CSI Temporary Well
- Phase I CSI Soil Boring
- 2005 Test Trench
- IRM Surface Soil and Soil Mound Removal Areas
- Soil Mounds

N

0 75 150 Feet

1 inch = 150 feet

Figure 6-2
Ecological Survey
Sample Locations
Site 15 ESI Report
MCB CamLej
North Carolina

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SECTION 7

Conclusions and Recommendations

The ESI and previous investigations have defined the nature and extent of contamination and potential risks to human health and the environment at Site 15. The conclusions of these investigations and recommendations for site management are presented below.

7.1 Conclusions

7.1.1 Waste

Surface waste mounds have been identified across the site. Three surface mounds were removed from the site during the IRM removal action, during which 1,039 tons of surface soil and soil mounds were excavated.

The extent of the buried waste disposal area has been identified through geophysical investigations and intrusive soil excavations. Test pit excavation confirmed the presence of debris in areas of geophysical anomalies and test pits excavated along the inferred boundary of the buried waste provide further evidence of the disposal area boundary. Buried debris, including glass, metal debris, ceramic, ash, and car parts were encountered in test trench excavations within the boundary of geophysical anomalies. Buried inert material, such as metal and glass, is still present at the site.

7.1.2 Surface and Subsurface Soil

Through the multiple phases of investigation at Site 15, 42 surface soil and 53 subsurface soil samples have been collected to characterize the site. SVOCs, pesticides, PCBs, and metals are present in the soil at concentrations that exceed the applicable SSLs. The magnitude of the SVOC and PCB exceedances is generally low and is primarily limited to the surface soils in the northern portion of the site. The distribution of pesticide exceedances are primarily confined to subsurface soils in a narrow area covering approximately 0.1-acre in the western portion of the site. Metals concentrations in soil samples are generally consistent with naturally occurring levels that are present across the site.

The HHRS did not identify unacceptable human health risks from exposure to surface and subsurface soils at Site 15.

The ERA evaluated potential risks for lower trophic level receptors (for example, soil invertebrates) and upper trophic level receptors (for example, birds and mammals) from exposure to soil. No significant risks were identified from exposure to surface soil. For subsurface soil, potential risks to lower and upper trophic level receptors could occur if the lead and pesticides in subsurface soil is exposed. However, given the lack of deep-dwelling earthworms, limited burrowing activity, unlikelihood for excavation in the waste disposal area, and the relatively small area exposed by occasional tree falls, exposure to subsurface soils is unlikely.

7.1.3 Groundwater

Groundwater investigations at Site 15 have been conducted within the surficial aquifer through the installation and sampling of 17 temporary and permanent wells. VOCs, pesticides, and PCBs were not detected in the groundwater samples at concentrations exceeding NCGWQS. Three SVOCs, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)flouranthene, were detected at estimated concentrations in one groundwater sample at concentrations exceeding the NCGWQS. The duplicate of this sample did not contain two of these SVOCs above the method reporting limit. Total chromium and hexavalent chromium were detected in the groundwater samples at concentrations exceeding screening criteria.

The HHRS indicated the potential for unacceptable risks associated with exposure to shallow groundwater. Therefore, an HHRA was conducted to evaluate exposure to groundwater for future adult and child residents, and construction workers.

Potential contact with groundwater by future child residents may result in a noncarcinogenic hazard above USEPA's target HI. This hazard, based on RME, is associated with ingestion of iron; however, the concentrations of iron are within Base-wide background concentration ranges and below the upper limit that is likely to pose a risk of adverse effects to a child. In addition, the more realistic CTE noncarcinogenic hazard is below USEPA's target HI of 1.

Potential contact with groundwater by future lifetime residents through ingestion and dermal contact were estimated to result in carcinogenic risks above USEPA's acceptable level. The concentration of benzo(a)pyrene is the primary contributor, with a lesser contribution from several additional PAHs, as well as chromium. However, the carcinogenic PAHs (including benzo[a]pyrene) were detected at estimated concentrations in only one of the eight groundwater samples analyzed for PAHs (in monitoring well IR15-MW04), and three of the four PAHs (including benzo[a]pyrene) were not detected above the method reporting limit in the duplicate of this sample. The concentration of benzo(a)pyrene detected in the sample collected from IR15-MW04 was also below the MCL.

The ERA did not identify unacceptable risks from exposure to groundwater at Site 15.

7.2 Recommendations

Based on the results and conclusions of previous investigations and risk assessments at Site 15, no further action is recommended.

SECTION 8

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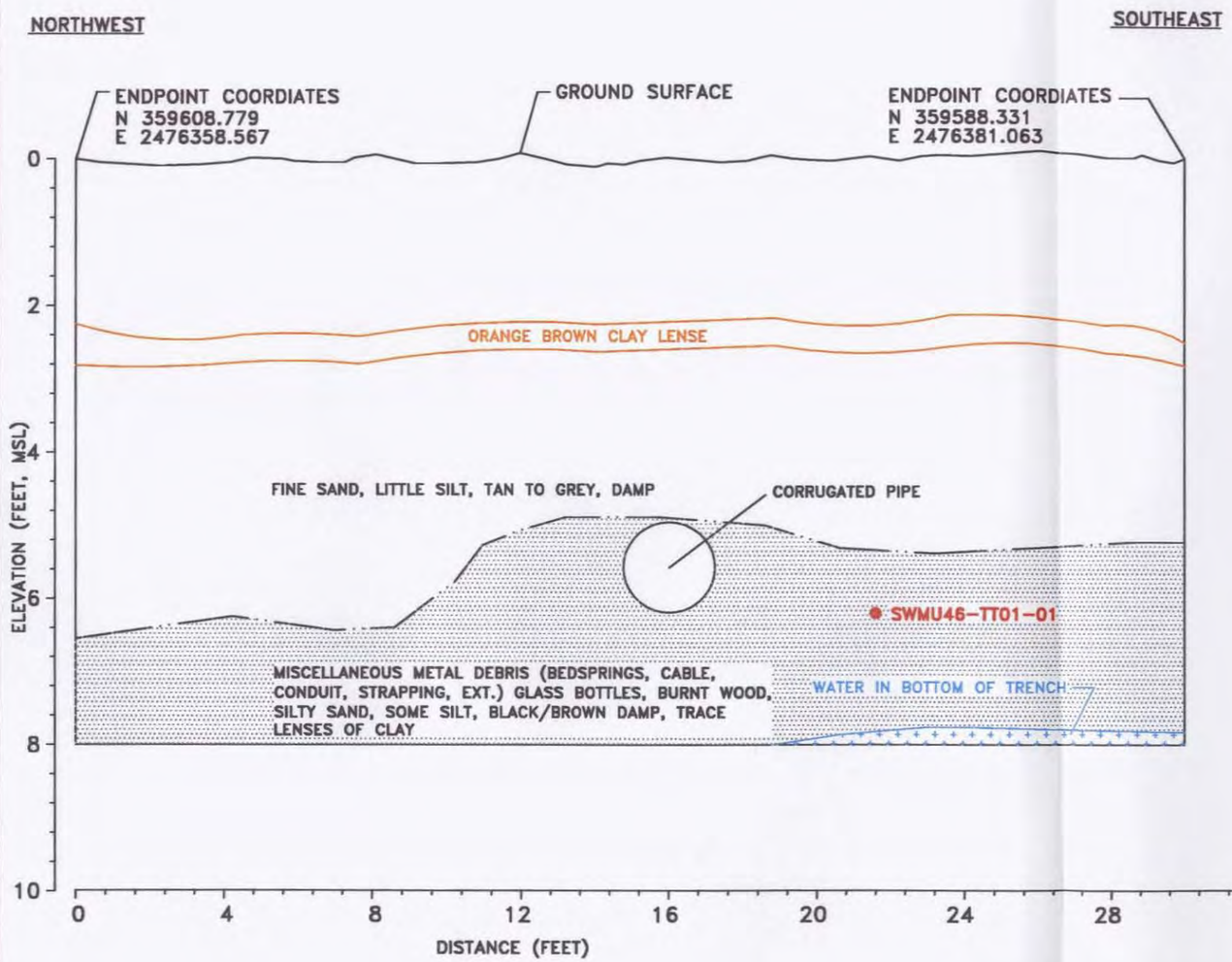
Appendix A
Test Pit Logs

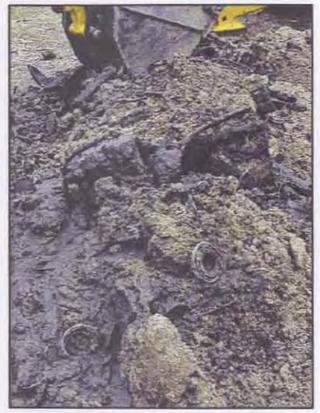
TEST TRENCH CROSS SECTION



VIEW LOOKING: NORTHEAST

VIEW LOOKING: NORTHWEST

DEBRIS FROM SOUTHEAST END
(Conduit, Cable, Glass, etc.)



DEBRIS FROM SOUTHEAST END
(Metal pieces, bedsprings, etc.)

2 0 1 2
1 inch = 2 ft.
VERTICAL SCALE

4 0 2 4
1 inch = 4 ft.
HORIZONTAL SCALE

Baker

DATE: 4/01/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly cloudy, ~72 F
VIEW LOOKING: northeast

LEGEND

SWMU46-TT02-01
● – TEST TRENCH SAMPLE
– – – – – – APPROXIMATE DEBRIS BOUNDARY
– DEBRIS
– WATER

FIGURE 2-5
TEST TRENCH RECORD
SWMU46-TT01
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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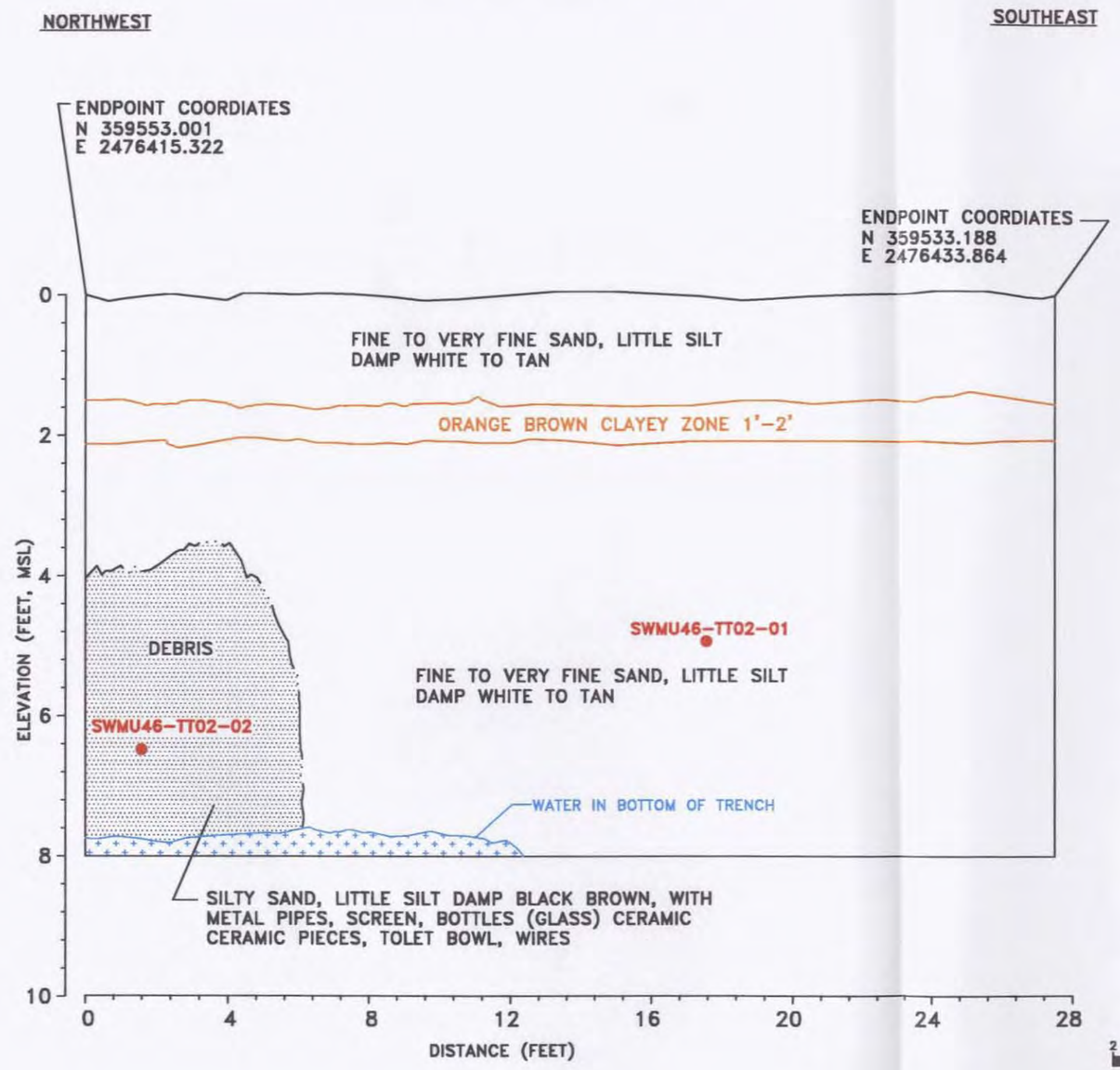
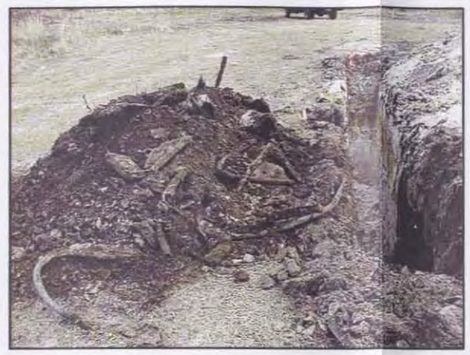
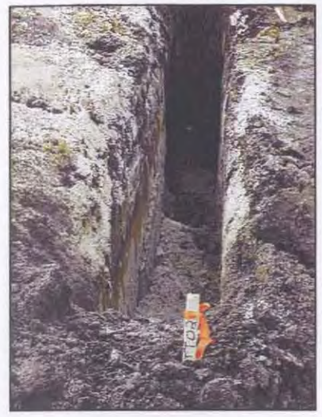
TEST TRENCH CROSS SECTION





VIEW LOOKING: SOUTHEAST/DEBRIS PILE
(ceramic pieces, metal pipes, etc.)



VIEW LOOKING: NORTHWEST

DEBRIS FROM THE NORTHWEST END OF TRENCH
(glass bottles, wire, misc. metal, etc.)

VIEW LOOKING: SOUTHEAST

2 0 1 2
1 inch = 2 ft.
VERTICAL SCALE

4 0 2 4
1 inch = 4 ft.
HORIZONTAL SCALE

Baker

DATE: 4/01/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly cloudy, ~72 F
VIEW LOOKING: northeast

LEGEND

SWMU46-TT02-02
● – TEST TRENCH SAMPLE
– – – – – APPROXIMATE DEBRIS BOUNDARY
▨ – DEBRIS

FIGURE 2-6
TEST TRENCH RECORD
SWMU46-TT02
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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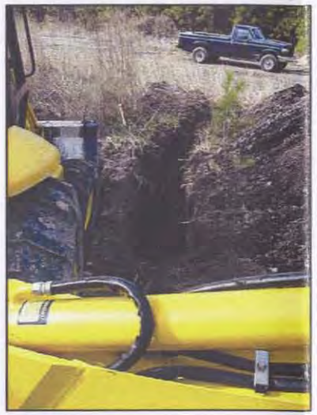
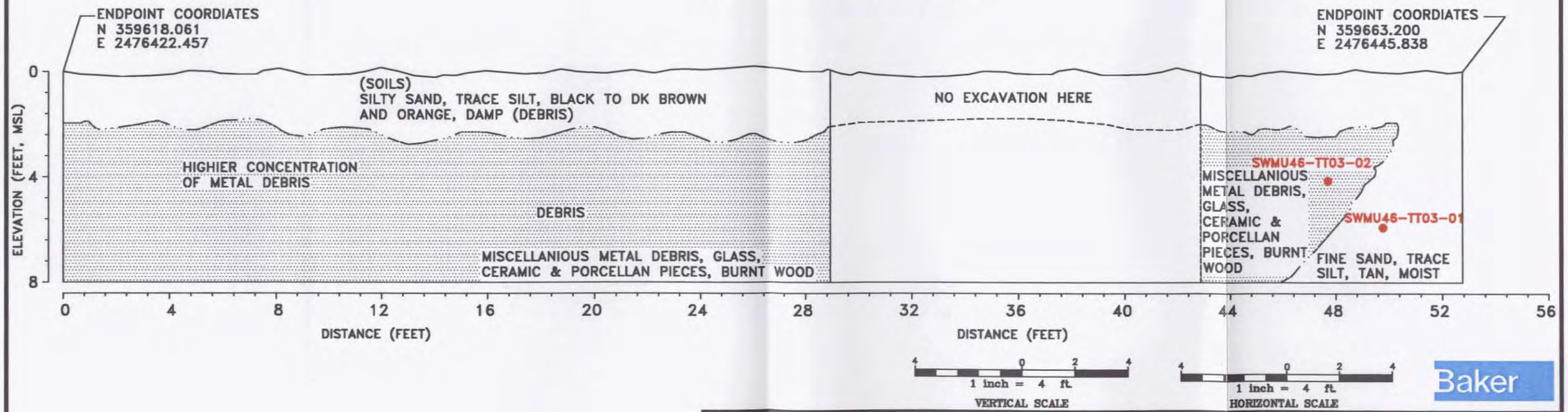
VIEW LOOKING: NORTHEAST



VIEW LOOKING: SOUTHWEST

DEBRIS PILE (glass bottles and misc. metal pieces, etc.)

TEST TRENCH CROSS SECTION



DATE: 4/01/04 AND 4/02/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly cloudy, ~72 F
VIEW LOOKING: northwest

LEGEND

SWMU46-TT03-02
● – TEST TRENCH SAMPLE
– APPROXIMATE DEBRIS BOUNDARY
– DEBRIS

FIGURE 2-7
TEST TRENCH RECORD
SWMU46-TT03
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

VIEW LOOKING: NORTHWEST

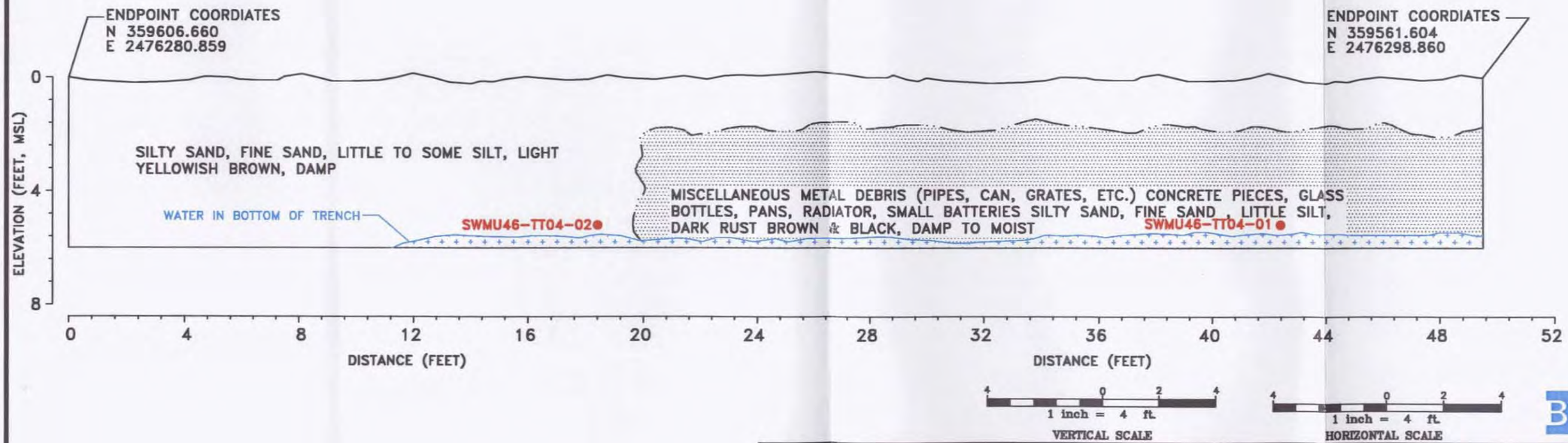
VIEW LOOKING: SOUTHEAST

METAL DEBRIS

VIEW LOOKING: SOUTHEAST

LARGE PIECE OF METAL DEBRIS (radiator)

TEST TRENCH CROSS SECTION



Baker

DATE: 4/02/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly cloudy, ~74 F
VIEW LOOKING: northeast

LEGEND

SWMU46-TT04-01
● – TEST TRENCH SAMPLE
– APPROXIMATE DEBRIS BOUNDARY
– DEBRIS

FIGURE 2-8
TEST TRENCH RECORD
SWMU46-TT04
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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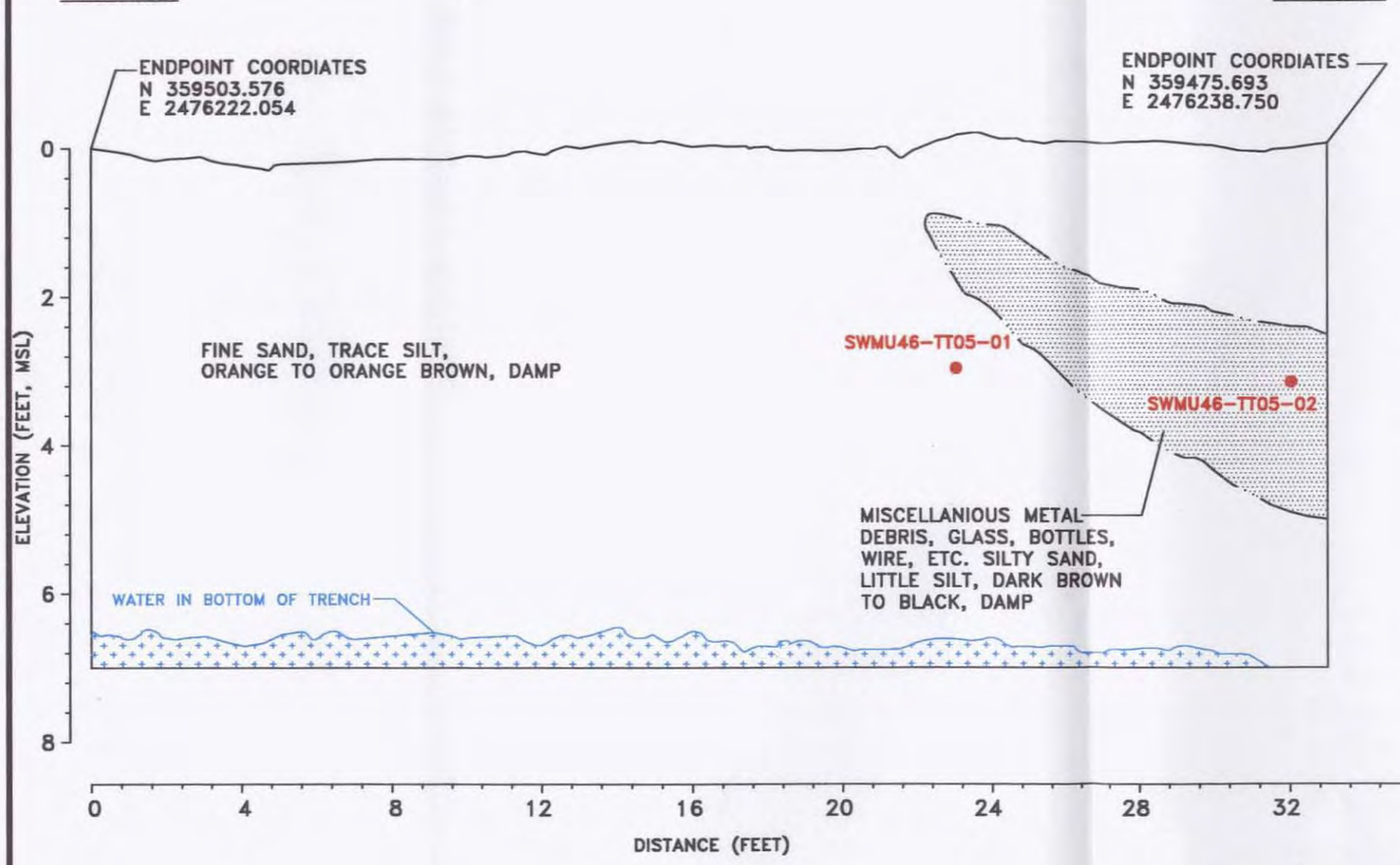
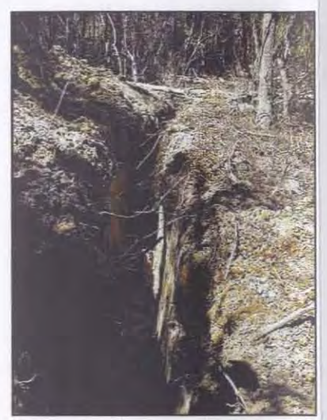
TEST TRENCH CROSS SECTION



DEBRIS (glass bottles, metal pieces, etc.)



VIEW LOOKING: NORTHWEST

VIEW LOOKING: SOUTHEAST

2 0 1 2
1 inch = 2 ft.
VERTICAL SCALE

4 0 2 4
1 inch = 4 ft.
HORIZONTAL SCALE

Baker

DATE: 4/05/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly Sunny, ~70 F
VIEW LOOKING: northeast

LEGEND

SWMU46-TT05-02 ● – TEST TRENCH SAMPLE
—·—·— – APPROXIMATE DEBRIS BOUNDARY
▭ – DEBRIS
+ + + – WATER

FIGURE 2-9
TEST TRENCH RECORD
SWMU46-TT05
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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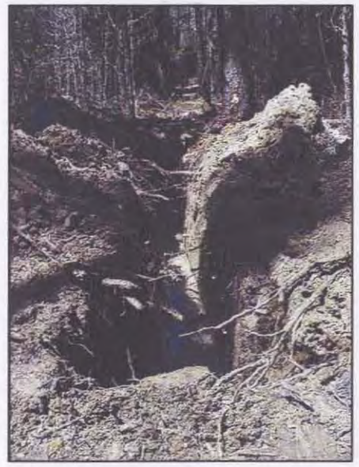
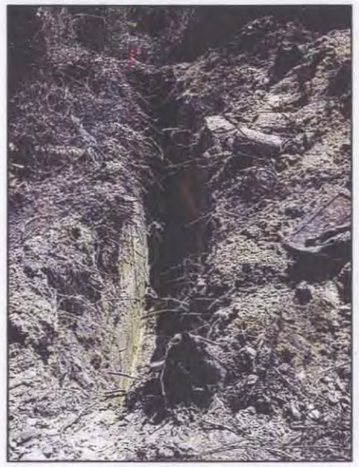


VIEW LOOKING: NORTHWEST

NORTHWEST



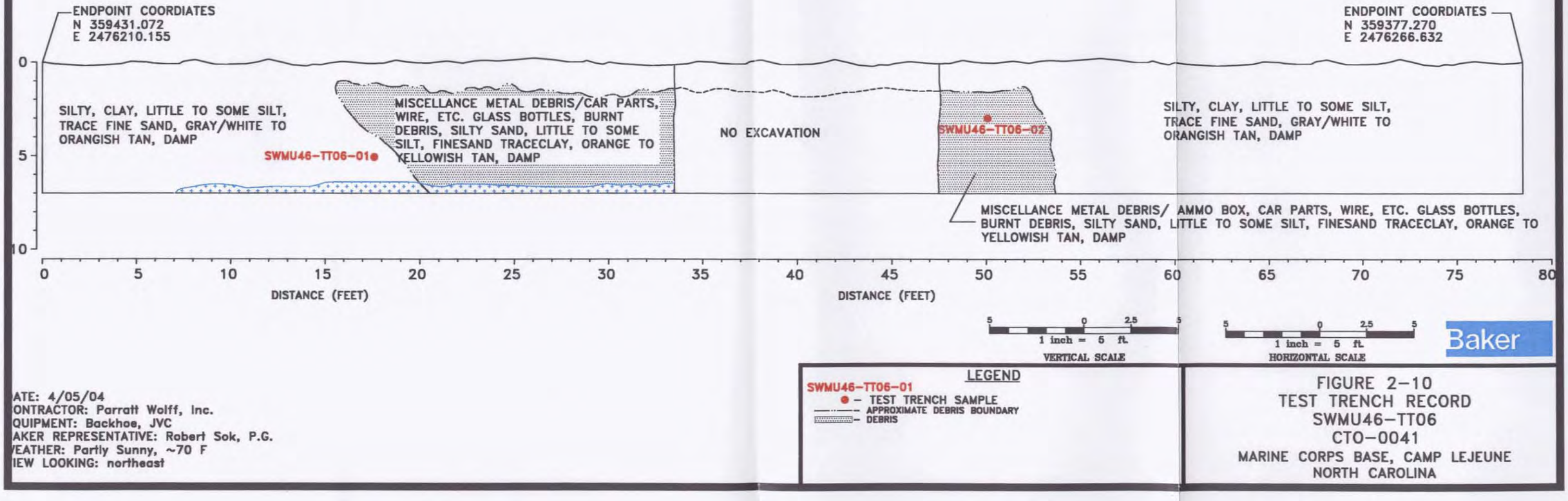
VIEW LOOKING: SOUTHEAST

DEBRIS INCLUDING VEHICLE HOOD

WATER FLOWING INTO TRENCH

SOUTHEAST

TEST TRENCH CROSS SECTION



Baker

DATE: 4/05/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly Sunny, ~70 F
VIEW LOOKING: northeast

LEGEND

SWMU46-TT06-01
● – TEST TRENCH SAMPLE
– APPROXIMATE DEBRIS BOUNDARY
– DEBRIS

FIGURE 2-10
TEST TRENCH RECORD
SWMU46-TT06
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

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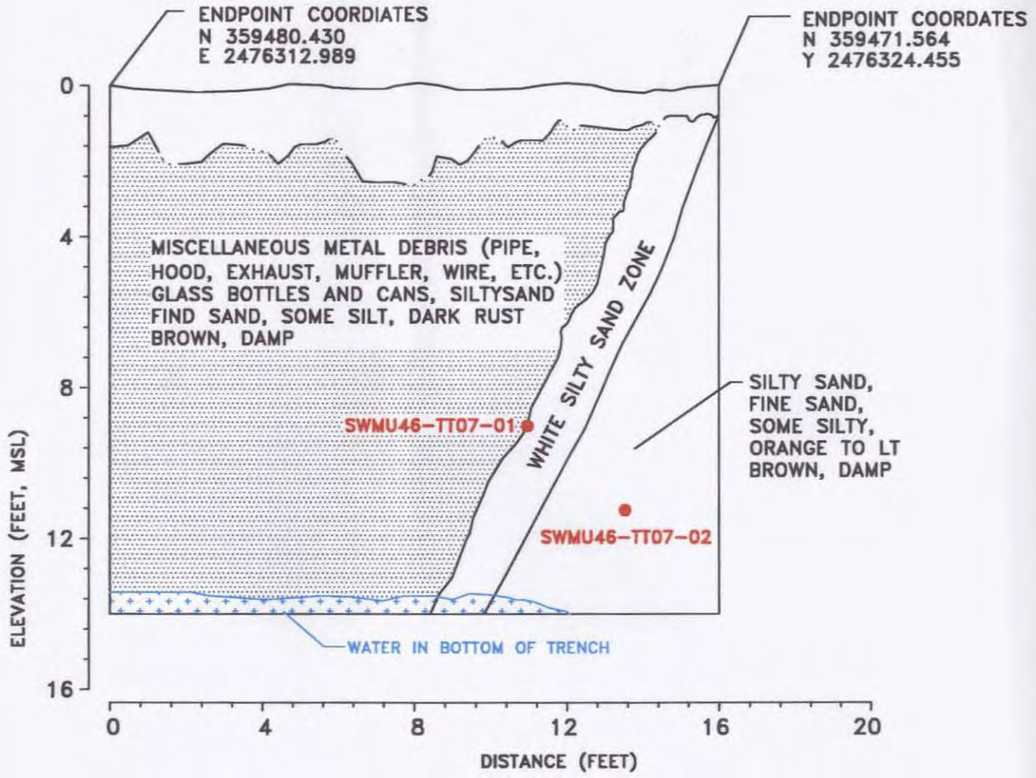
NORTHWEST

SOUTHEAST

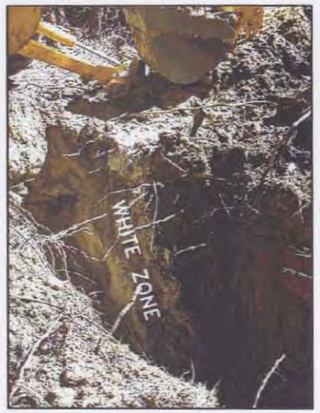


METAL DEBRIS AND GLASS BOTTLE

EDGE OF DEBRIS TO THE SOUTH

VIEW LOOKING: NORTHWEST AT TT07

METAL PIPES AND DEBRIS



VIEW OF DEBRIS CONTACT AND WHITE SILTY SAND ZONE

4 0 2 4
1 inch = 4 ft.
VERTICAL SCALE

4 0 2 4
1 inch = 4 ft.
HORIZONTAL SCALE

Baker

DATE: 4/05/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly Sunny, ~70 F
VIEW LOOKING: northeast

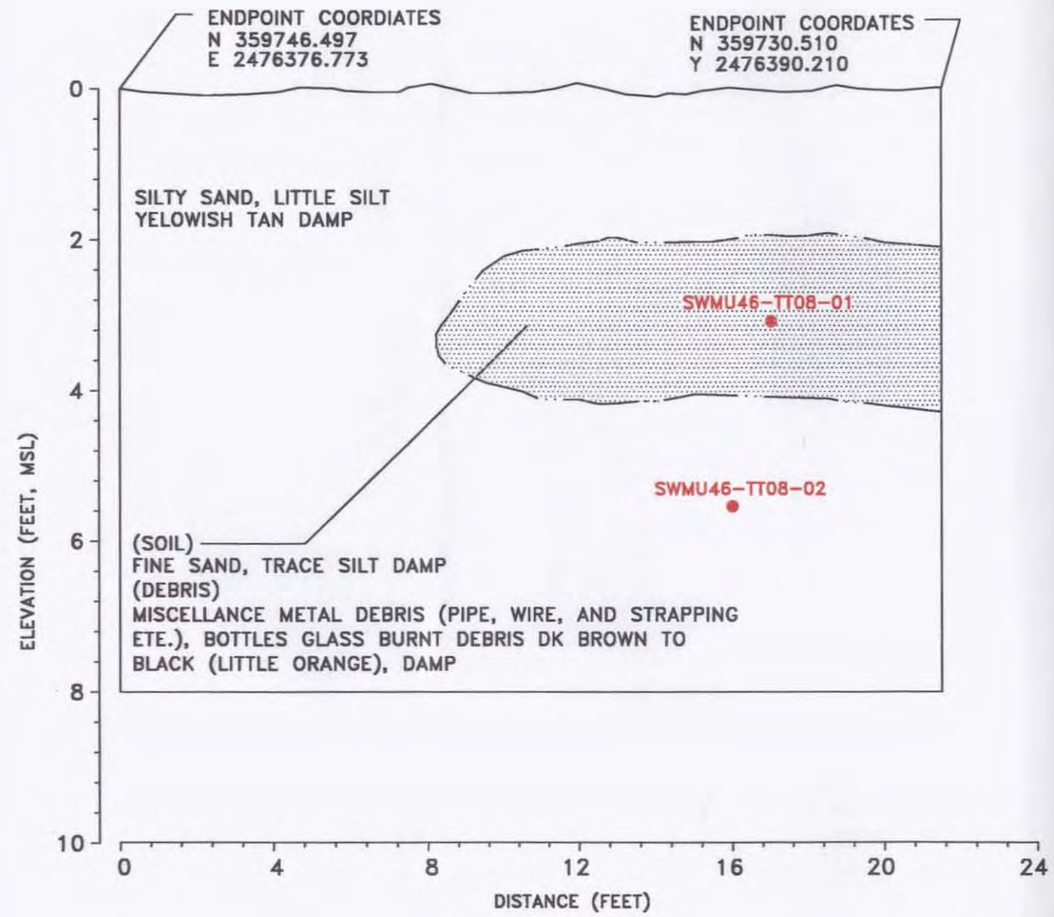
LEGEND

SWMU46-TT08-01
● – TEST TRENCH SAMPLE
—·—·— – APPROXIMATE DEBRIS BOUNDARY
▨ – DEBRIS

FIGURE 2-11
TEST TRENCH RECORD
SWMU46-TT07
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

K\CH2M HILL CLEAN III\CTO-041\CAD\RFI\SWMU46\Final Figures\4041_RF146_2-12

TEST TRENCH CROSS SECTION



MISC. METAL DEBRIS

VIEW LOOKING: SOUTHEAST

VIEW LOOKING: NORTHWEST

VIEW SHOWING DEBRIS LENSE

2 0 1 2
1 inch = 2 ft.
VERTICAL SCALE

4 0 2 4
1 inch = 4 ft.
HORIZONTAL SCALE

Baker

DATE: 4/02/04
CONTRACTOR: Parratt Wolff, Inc.
EQUIPMENT: Backhoe, JVC
BAKER REPRESENTATIVE: Robert Sok, P.G.
WEATHER: Partly cloudy, ~72 F
VIEW LOOKING: northeast

LEGEND

SWMU46-TT08-01
● – TEST TRENCH SAMPLE
—·—·— – APPROXIMATE DEBRIS BOUNDARY
▨ – DEBRIS

FIGURE 2-12
TEST TRENCH RECORD
SWMU46-TT08
CTO-0041
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	IR15-TP01	SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 CJCA LOCATION: Camp Johnson LOGGER: EMust

ELEVATION: CONTRACTOR: SAEDACCO

EXCAVATION EQUIPMENT USED: DEERE 310g DATE EXCAVATED: 7/27/09

WATER LEVEL: APPROX. DIMENS: Length: 9 ft Width: 2 ft Max. Depth: 2 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.)	COMMENTS (DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.) OVM (ppm): Headspace Analysis	
1			0-1 - Topsoil - Silty Sand (SM) DK grey fg sand + organics (roots) loose, dry-moist	0.0	0-1
				0.0	1-1.5
2			1-2 - Silty Sand (SM) Lt Tan fg Sand & silt, loose, moist, some roots.	0.0	1.5-2
3					
4			Terminated @ 2' bgs		
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	TP01	SHEET 1 c

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: EMust

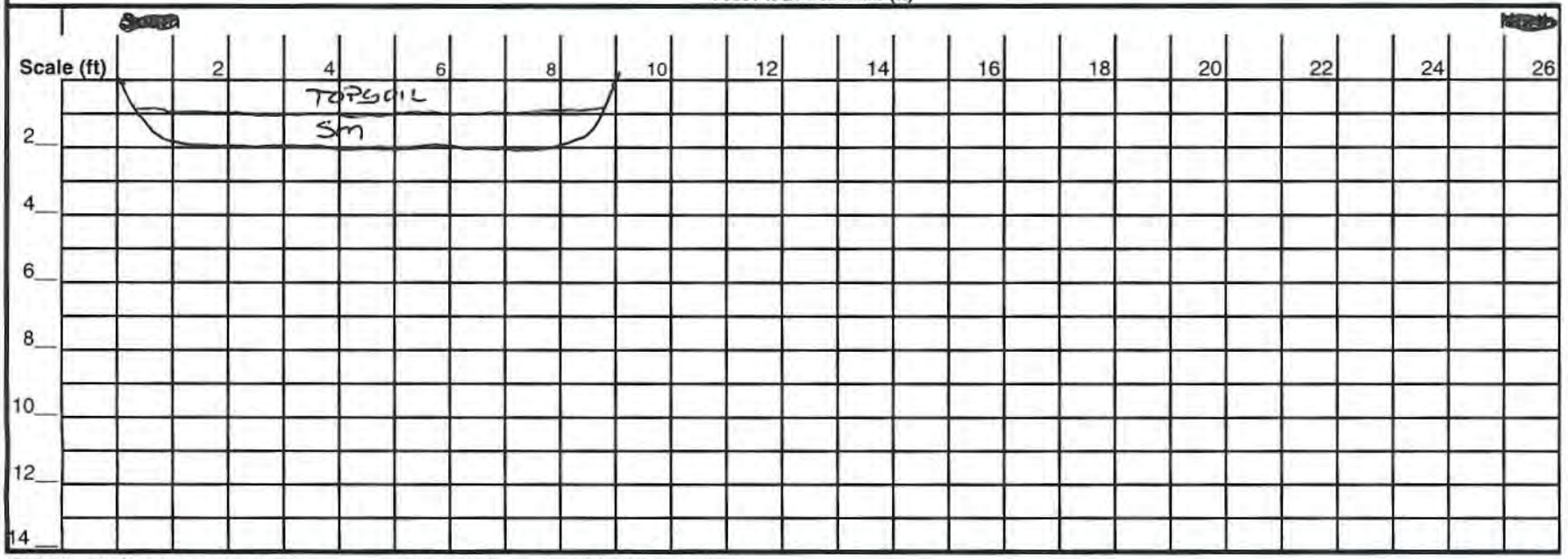
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/27/09

WATER LEVEL: APPROX. DIMENS: Length: 9ft Width: 2ft Max. Depth: 2ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis

0.0ppm 0-1
0.0 1-1.5
0.0 1-2

OVM (ppm): Breathing Zone Analysis

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER
377812	IRIS-TP02 SHEET 1 OF 1

TEST PIT LOG

PROJECT: IRIS LOCATION: Camp Johnson LOGGER: EMust

ELEVATION: CONTRACTOR: SAEDACCO

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/27/09

WATER LEVEL: APPROX. DIMENS: Length: 10 ft Width: 2 ft Max. Depth: 3.5 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.)	OVM (ppm): Headspace Analysis	COMMENTS (DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.)
1			0 - 0.5 - Topsoil - DK gray organic rich silt & sand loose, moist	0.0ppm	1-2' bgs oxidated soil ~~rust staining~~ and red brick & PVC piping
2			0.5-2.5 - Silty Sand (SM) - Tan fg sand & silt, loose moist, some brick & PVC		0.0ppm from 0-3.5' bgs
3			2.5-3 - Silty Sand (SM) - Orange fg sand & silt, loose moist		
4			3-3.5 - Sand (SP) - Lt Tan fg sand, loose, moist		
5					
6					
7			Terminated @ 3.5' bgs		
8					
9					
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	SHEET
377812	IR15 - TP02	1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: E Must/RDM

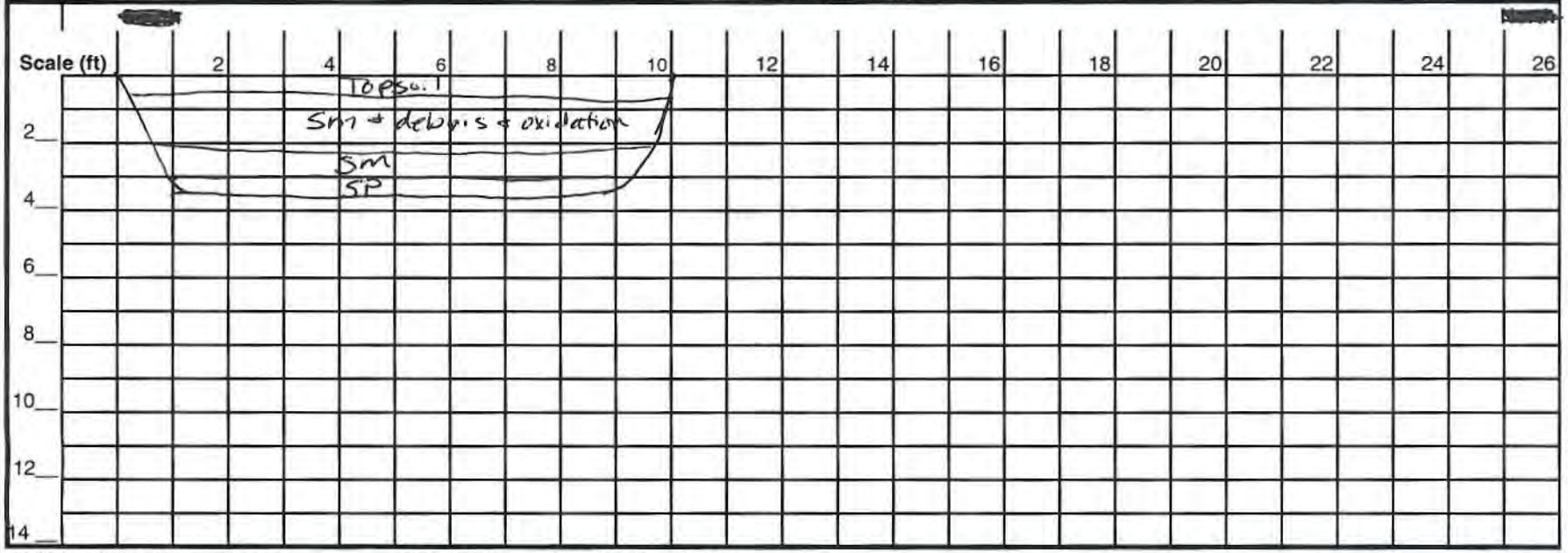
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310 g DATE EXCAVATED: 7/27/09

WATER LEVEL: APPROX. DIMENS: Length: 10 ft Width: 2 ft Max. Depth: 3.5 ft bgs

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis OVM (ppm): Breathing Zone Analysis

0.0ppm 0-3.5' bgs

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER
377812	IR15 - TP03 SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: EMust

ELEVATION: CONTRACTOR: SAEDACCO

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 8 ft Width: 2 ft Max. Depth: 3 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS. OVM (ppm): Headspace Analysis	
1			0-0.5 - Topsoil - Dk grey organic rich Silt & Sand, loose, moist	4.1	0-1
2			0.5-2 - Silty Sand (SM) - Tan fg sand, some silt, loose, moist. large roots	0.0	1-2
3			2-3 - Sand (SP) - Lt Tan fg sand, loose, moist	0.0	2-3
4			Terminated @ 3' bgs		
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	SHEET 1 c
377812	TP03	

TEST PIT LOG

PROJECT: IR#5 LOCATION: Camp Johnson LOGGER: EMust/RDU

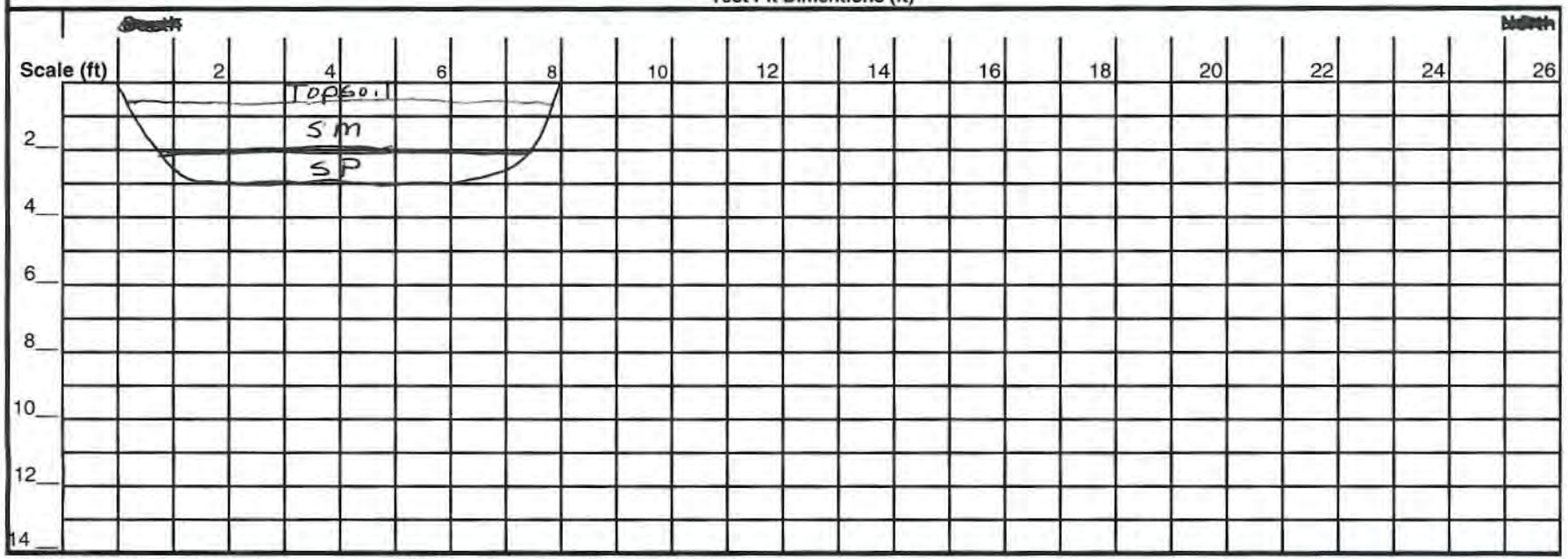
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310 g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 8 ft Width: 2 ft Max. Depth: 3 ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis OVM (ppm): Breathing Zone Analysis

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER
377812	IR15-TP04 SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: E Must

ELEVATION: CONTRACTOR: SAEDACC

EXCAVATION EQUIPMENT USED: Deere 310J DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 9 ft Width: 2 ft Max. Depth: 5 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	OVM (ppm): Headspace Analysis	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.
1			0-~~0.5~~1 - Topsoil & ~~Silty Sand (sm)~~ Dk grey fg Sand & silt, loose, moist	0.0	0-1
2			~~0.5~~-3 - Silty Sand (sm) - Tan fg sand & silt, trace clay, small coarse sand size shell fragments, med dense - ~~Sand~~ (Fill) mottled orange	0.0	~~2~~ (Fill) 1-2
3				0.0	2-3 Small piece of red ceramic
4			3-4 - Silty Sand (sm) As above - orange		
5				0.0	3-4 - Metal pipe, ceramic & glass
6			4-5 - Sand (SP) - White - Lt tan fg sand, loose, moist	0.0	4-5
7					
8			Terminated @ 5' bgs		
9					
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	IR15-TP04	SHEET 1

TEST PIT LOG

PROJECT :

LOCATION : Camp Johnson

LOGGER : EMust/RDU

ELEVATION :

EXCAVATION EQUIPMENT USED : Deere 310g

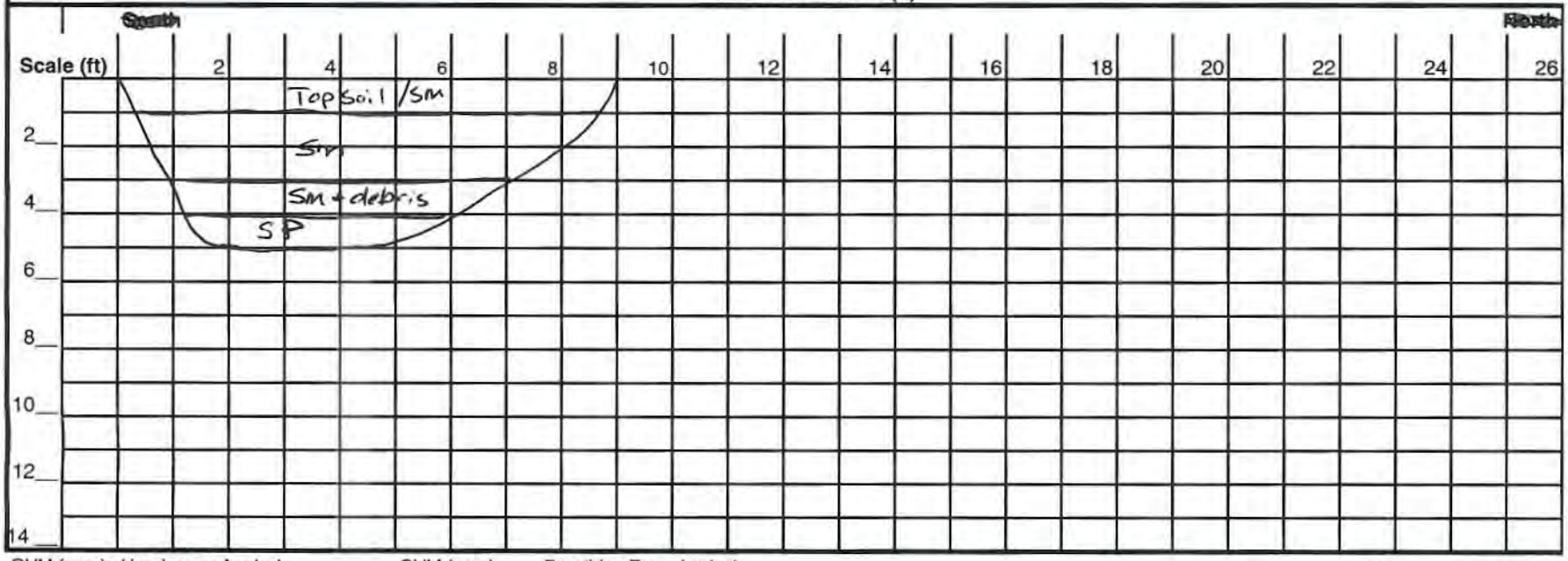
DATE EXCAVATED: 7/28/09

WATER LEVEL :

APPROX. DIMENS: Length: 9 ft Width: 2 ft Max. Depth: 5 ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis 0.0 -0-5' bgs

OVM (ppm): Breathing Zone Analysis 0.0 ppm

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	IR15-TP05	SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: E Must

ELEVATION: CONTRACTOR: SAEDACCO

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 9 ft Width: 2 ft Max. Depth: 7 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.)	COMMENTS (DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.) OVM (ppm): Headspace Analysis	
0			0-1 - Topsoil + Silty Sand (SM)	0.0	0-1
1			Dk grey fg ~~mg~~ SM sand + silt		
			organic rich, moist, loose	0.0	1-2
2			1-~~3~~3 - Silty sand (SM) -		
			Tan + orange fg sand + silt	0.0	2-3
3			loose, moist		
			3-5 - Sandy clay (CL)	7.2	3-5
4			Grey/orange fg sand +		
			clay, firm, moist	4.3	5-7
5			5-7 - Sand (SP) -		
			white - Lt Tan fg sand,		
6			loose, moist		
7			Terminated @ 7' bgs		
8					
9					
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	SHEET
377812	TP05	1 of

TEST PIT LOG

PROJECT: IR 15 LOCATION: Camp Johnson LOGGER: EMust/RDU

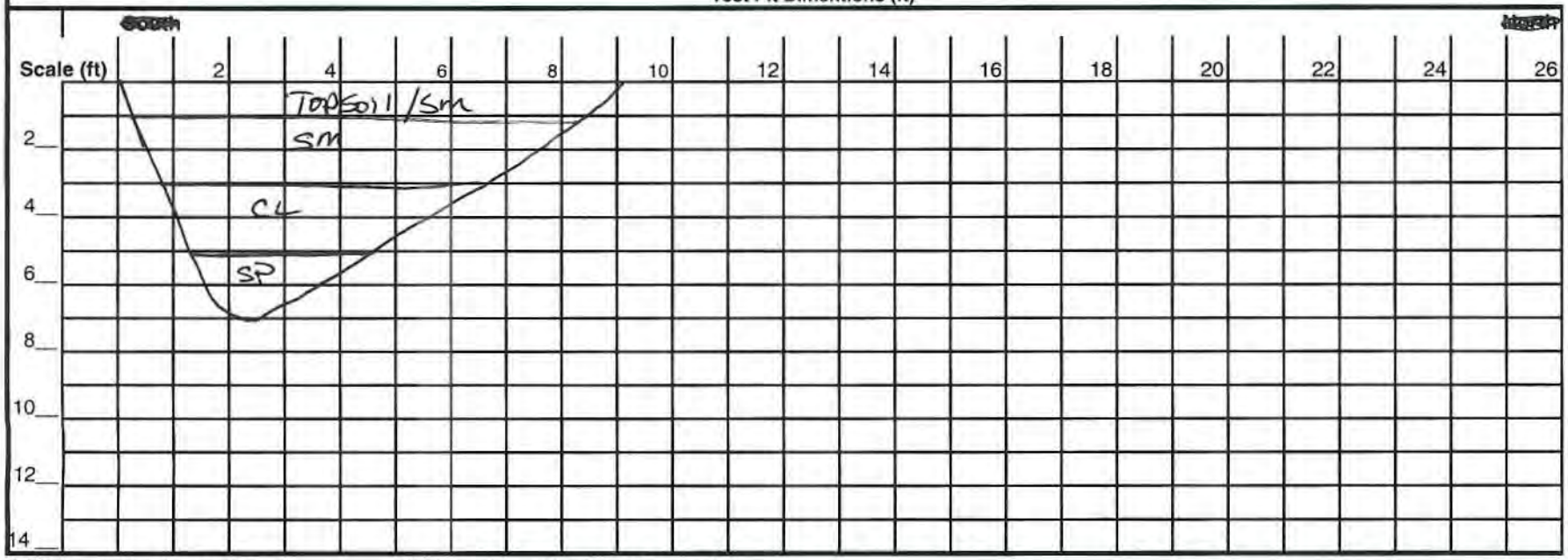
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 9 ft Width: 2 ft Max. Depth: 7 ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis OVM (ppm): Breathing Zone Analysis

CH2MHILL

PROJECT NUMBER: 377812

TEST PIT NUMBER: IR15-TP06 SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: Ernst

ELEVATION: CONTRACTOR: SAE DACCO

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 9 ft Width: 2 ft Max. Depth: 6 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	OVM (ppm): Headspace Analysis	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.
1			0-1 - Topsoil, Mulch, Silty Sand Dk grey fg sand + silt, organic rich, mulch, moist	31.4 6.9 → recheck PID = 0.0ppm 6.1	0-1 - Highly organic 1-2
2			1-2 Silty Sand (SM) - Orangish Tan fg sand, some silt, loose, moist	0.0	2-3
3				0.0	3-4
4			2-3 Sand (SP) - Tan fg-mg sand loose, moist	0.0	4-5
5			3-6 - Sandy clay (CL) Grey/orange/Tan fg sand + clay, firm, dry-moist.	0.0	5-6
6			5-6 - Sand (SP) White - LT Tan fg sand loose, moist	~~0.0~~	(EM)
7					
8					
9			Terminated @ 6' bgs		
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	TP06	SHEET 1 c

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: EMust

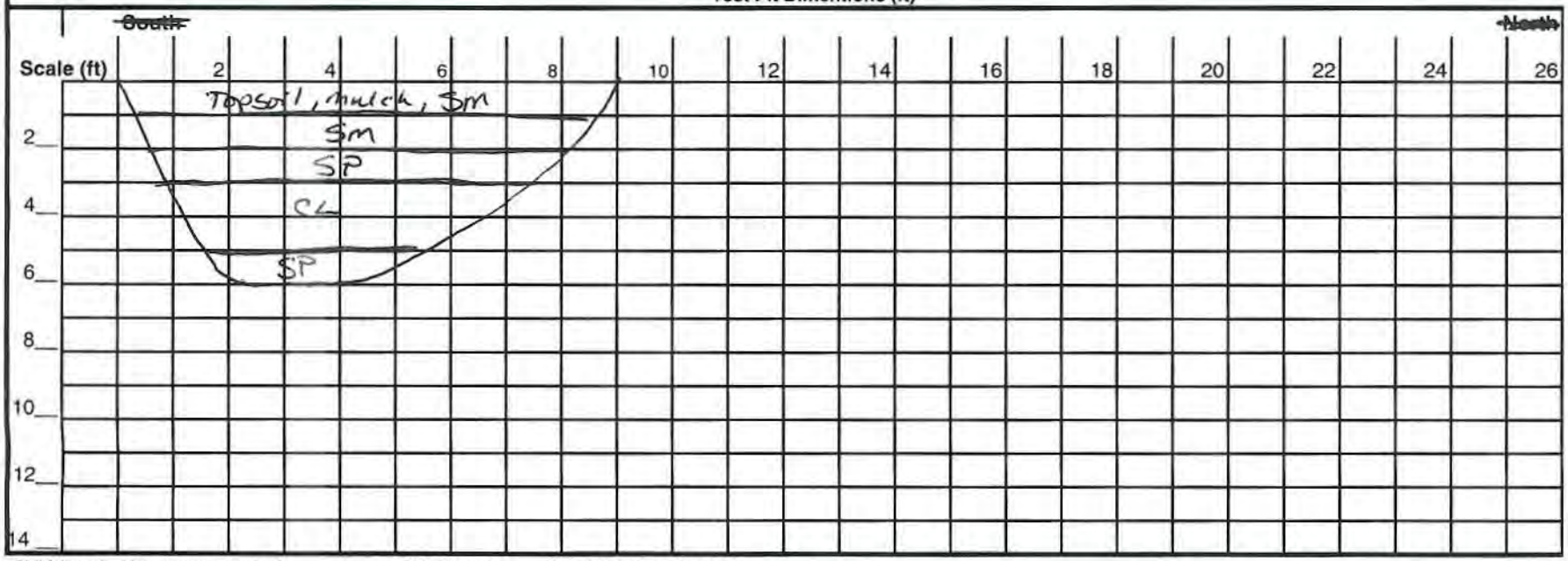
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 9ft Width: 2ft Max. Depth: 6ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis OVM (ppm): Breathing Zone Analysis

CH2MHILL

PROJECT NUMBER: 377812

TEST PIT NUMBER: IR15-TP07 SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: EMust

ELEVATION: CONTRACTOR: SAEDACCO

EXCAVATION EQUIPMENT USED: Deere 310J DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 10 ft Width: 2 f Max. Depth: 6 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.	OVM (ppm): Headspace Analysis
1			0-0.5 - Topsoil - Dk grey organic rich silt + sand. moist	0.0	0-1
2			0.5-3 - Silty Sand (SM) Orangish tan fg sand, little silt, loose, moist	0.0	1-2
3				0.0	2-3
4			3-5.5 - Sandy Clay(CL) Orange/Grey fg sand + clay, firm, dry-moist	0.0	3-4
5				0.0	4-5
6			5.5-6 - Sand (SP) - Orange/Tan fg sand, loose, moist.	0.0	5-6
7					
8					
9			Terminated @ 6' bgs		
10					
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	TP07	SHEET 1 c

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: EM

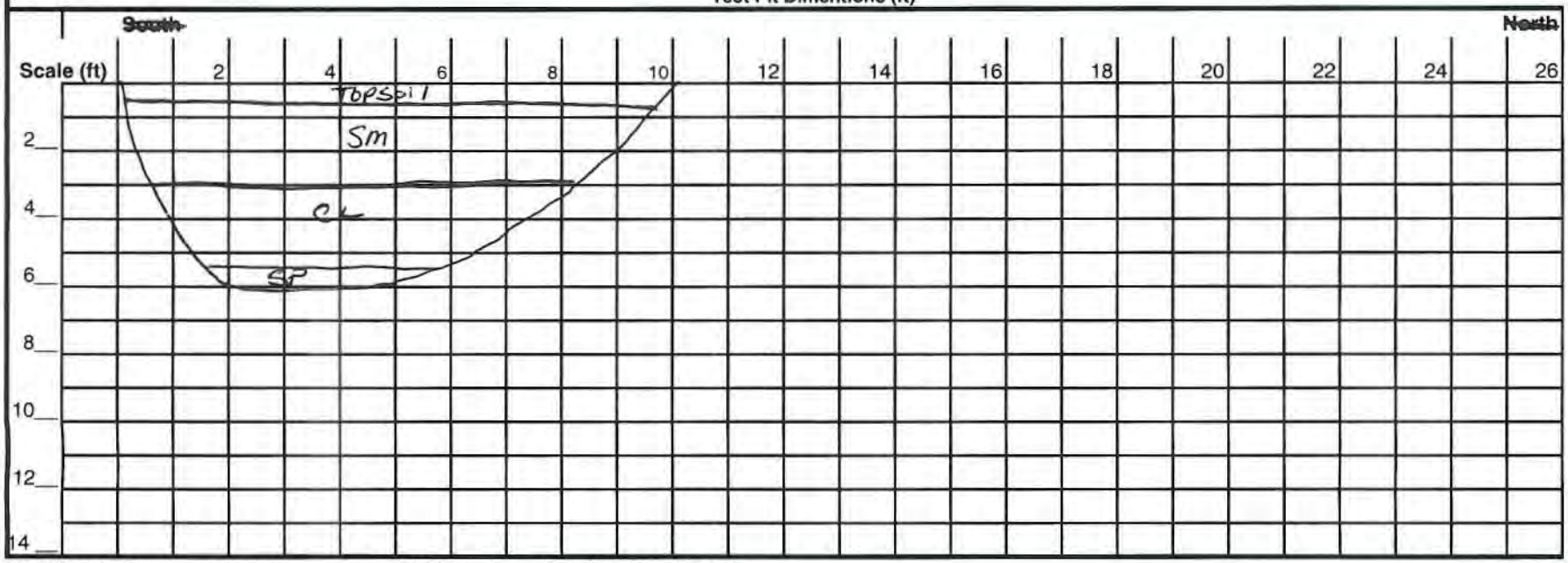
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310J DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 10 ft Width: 2 ft Max. Depth: 6 ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



OVM (ppm): Headspace Analysis OVM (ppm): Breathing Zone Analysis

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER
377812	IR15 TP08 SHEET 1 OF 1

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: Emust
ELEVATION: CONTRACTOR: SAEDACCO
EXCAVATION EQUIPMENT USED: Deere 310 g DATE EXCAVATED: 7/28/09
WATER LEVEL: APPROX. DIMENS: Length: 8 ft Width: 2 ft Max. Depth: 5.5 ft

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL	SAMPLE NUMBER AND TYPE	SOIL DESCRIPTION (SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.)	OVM (ppm): Headspace Analysis	COMMENTS (DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.)
1			0-0.5 - Topsoil - Dk grey organic silt + sand, loose, dry-moist	0.0	D-1
2			0.5-1 - Sand (SP) Tan fg sand, loose, moist	0.0	1-2
3			1-3 - Sandy Clay (CL) Grey/Orange fg sand + clay, firm, moist	4.5	2-3
4				0.0	3-4
5				2.9	4-5
6			3-4 - Silty Sand (SM) Orange/tan fg sand + silt, loose, moist		
7					
8			4-5.5 - Sand (SP) White fg sand, loose moist		
9					
10			Terminated @ 5.5' bgs		
11					
12					
13					
14					

CH2MHILL

PROJECT NUMBER	TEST PIT NUMBER	
377812	TP08	SHEET 1 c

TEST PIT LOG

PROJECT: IR15 LOCATION: Camp Johnson LOGGER: E Must

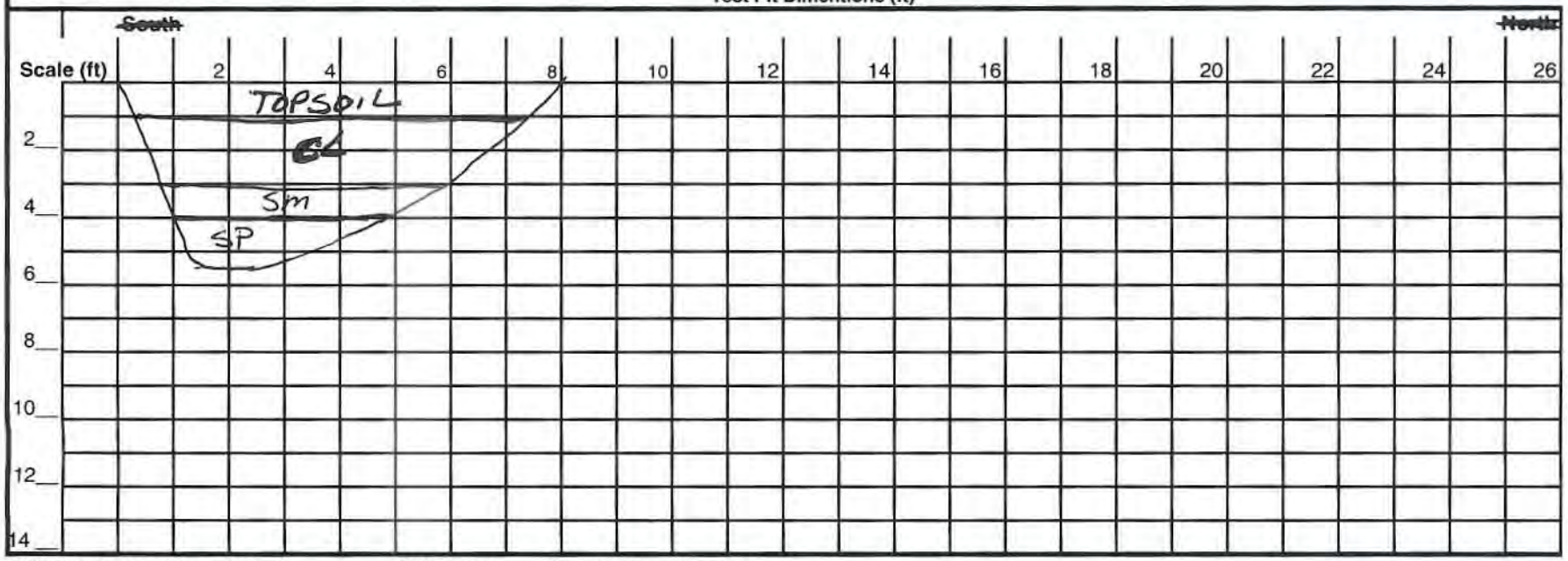
ELEVATION:

EXCAVATION EQUIPMENT USED: Deere 310g DATE EXCAVATED: 7/28/09

WATER LEVEL: APPROX. DIMENS: Length: 8 ft Width: 2ft Max. Depth: 5.5 ft

SOIL DESCRIPTION	COMMENTS
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DIFFICULTY IN EXCAVATION, RUNNING GRAVEL CONDITION, COLLAPSE OF WALLS, SAND HEAVE, DEBRIS ENCOUNTERED, WATER SEEPAGE, GRADATIONAL CONTACTS, TESTS, INSTRUMENTS.

Test Pit Dimentions (ft)



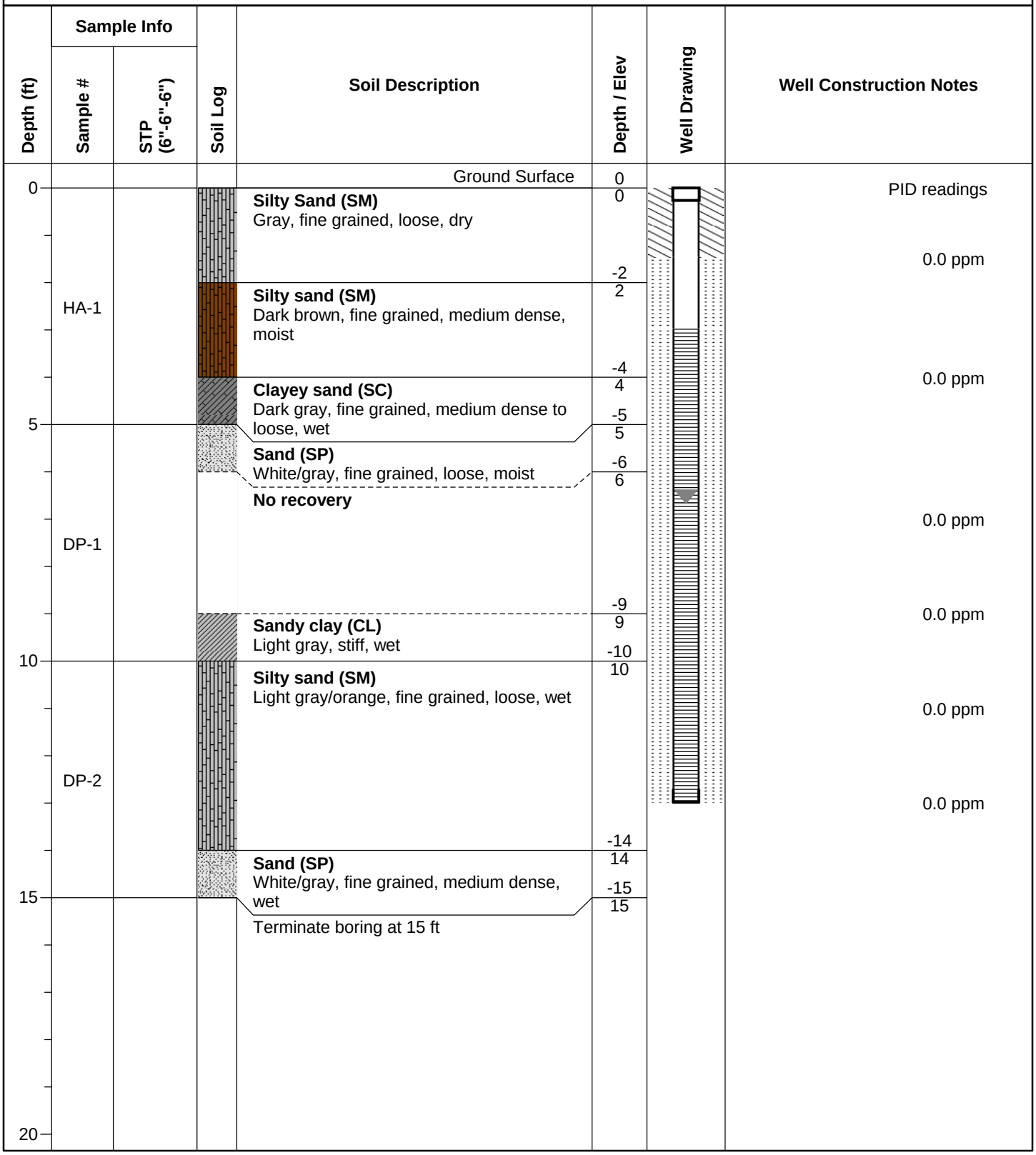
OVM (ppm): Headspace Analysis OVM (ppm): Breathing Zone Analysis

Appendix B
Boring Logs and Well Completion Diagrams

Well Number: IR15-MW01

Client: NAVFAC
Project: Site 15
Location: MCB CamLej
Project Number: 405353

Driller: Probe Technology
Drilling Method: DPT with 4.25-in HSA
Sampling Method: macro-core
Logged by: D. Brown
Start/Finish Date: 11/8/10



Well Number: IR15-MW02

Client: NAVFAC
Project: Site 15
Location: MCB CamLej
Project Number: 405353

Driller: Probe Technology
Drilling Method: DPT with 4.25-in HSA
Sampling Method: macro-core
Logged by: D. Brown
Start/Finish Date: 11/9/10

Depth (ft)	Sample Info: Sample #	Sample Info: STP (6"-6"-6")	Soil Log	Soil Description	Depth / Elev	Well Drawing	Well Construction Notes
				Ground Surface	0		
0	HA-1			**Silty Sand (SM)** Brown, fine grained, loose, moist, trace clay	0 / -1		PID readings
				Sandy clay (CL) Brown, fine grained, stiff, moist	1 / -2		0.0 ppm
				Silty sand (SM) Brown/tan, fine grained, loose, trace clay	2 / -4		
				Sand (SP) White/tan, fine grained, loose, moist	4 / -5		0.0 ppm
5	DP-1			**No recovery**	5 / -7		
				Sand (SP) White/tan, fine grained, medium dense, wet	7 / -10		0.0 ppm
							0.0 ppm
10	DP-2			**Silty sand (SM)** Tan, fine grained, medium dense, wet	10 / -12		0.0 ppm
				Sand (SP) White/tan, fine grained, medium dense, wet	12 / -15		0.0 ppm
15				Terminate boring at 15 ft	15		
20							

Well Number: IR15-MW03

Client: NAVFAC
Project: Site 15
Location: MCB CamLej
Project Number: 405353

Driller: Probe Technology
Drilling Method: DPT with 4.25-in HSA
Sampling Method: macro-core
Logged by: D. Brown
Start/Finish Date: 11/9/10

Depth (ft)	Sample Info: Sample #	Sample Info: STP (6"-6"-6")	Soil Log	Soil Description	Depth / Elev	Well Drawing	Well Construction Notes
				Ground Surface	0		
0	HA-1			**Silty Sand (SM)** Brown, fine grained, loose, moist, trace clay	0		PID readings 0.0 ppm 0.0 ppm
				No recovery	-5 5		
5	DP-1			**Sand (SP)** White, fine grained, loose, wet	-7		
				No recovery	7 -8		0.0 ppm
				Sand (SP) White, fine grained, loose, wet	8 -9		0.0 ppm
				Sandy clay (CL) Gray, fine grained, stiff, moist	9 -10		
10	DP-2			**No recovery**	10 -11		0.0 ppm
				Clayey sand (SC) Gray, fine grained, loose to medium dense, wet	11 -14		0.0 ppm
				Sandy Clay (CL) White/gray, moist, medium stiff	14 -15		
15				Terminate boring at 15 ft	15		
20							

Well Number: IR15-MW04

Client: NAVFAC
Project: Site 15
Location: MCB CamLej
Project Number: 405353

Driller: Probe Technology
Drilling Method: DPT with 4.25-in HSA
Sampling Method: macro-core
Logged by: B. Propst
Start/Finish Date: 4/4/11

Depth (ft)	Sample Info: Sample #	Sample Info: STP (6"-6"-6")	Soil Log	Soil Description	Depth / Elev	Well Drawing	Well Construction Notes
				Ground Surface	0		
0				**Silty Sand (SM)** Gray, fine grained, loose, dry	0 -2		PID readings 0.0 ppm
	HA-1			**Silty sandy clay (CL)** Gray,fine grained, hard, dry	2 -3		
				Silty sand (SM) Tan, fine grained, medium dense to loose, damp	3 -6		0.0 ppm
5				**No recovery**	6		
	DP-1						0.0 ppm 0.0 ppm
10					-11		
	DP-2			**Sand (SP)** Tan and yellow-orange, fine grained, medium dense, wet	11		0.0 ppm 0.0 ppm
15				Terminate boring at 15 ft	-15 15		
20							

Well Number: IR15-MW05

Client: NAVFAC
Project: Site 15
Location: MCB CamLej
Project Number: 405353

Driller: Probe Technology
Drilling Method: DPT with 4.25-in HSA
Sampling Method: macro-core
Logged by: B. Propst
Start/Finish Date: 4/4/11

Depth (ft)	Sample Info: Sample #	Sample Info: STP (6"-6"-6")	Soil Log	Soil Description	Depth / Elev	Well Drawing	Well Construction Notes
				Ground Surface	0		
0				**Silty Sand (SM)** Yellow-orange, fine grained, loose becoming medium dense, dry	0		PID readings
	HA-1						0.0 ppm
				Sandy clay (CL) Tan, fine grained, hard, dry	-3 3		
							0.0 ppm
				Silty sand (SM) Same as 0-2.5	-5 5		
5				**No recovery**	-6		
				Sand (SP) Tan and yellow-orange, fine grained, loose/medium dense, wet	6		0.0 ppm
	DP-1						
							0.0 ppm
10							
							0.0 ppm
	DP-2						
							0.0 ppm
					-15		
15				**Sandy clay (CL)** Light gray, fine grained, hard, dry	15		
				Terminate boring at 15 ft			
20							

Well Number: IR15-MW06

Client: NAVFAC
Project: Site 15
Location: MCB CamLej
Project Number: 405353

Driller: Probe Technology
Drilling Method: DPT with 4.25-in HSA
Sampling Method: macro-core
Logged by: B. Propst
Start/Finish Date: 4/4/11

Depth (ft)	Sample Info: Sample #	Sample Info: STP (6"-6"-6")	Soil Log	Soil Description	Depth / Elev	Well Drawing	Well Construction Notes
				Ground Surface	0		
0	HA-1	NA		**Silty sand and clay (SM/CL)** Tan/yellow-orange, loose, dry to damp	0 -4		PID readings 0.0 ppm
5				**Sitly sand (SM)** Yellow-orange, fine grained, loose, moist	4 -6		0.0 ppm
	DP-1	NA		**Sandy clay (CL)** Light gray, fine grained, hard, dry	6 -8		0.0 ppm
10	DP-2	NA		**Sand (SP)** Light gray/yellow-orange, fine grained, loose, wet	8 -15		0.0 ppm 0.0 ppm 0.0 ppm
15				Terminate boring at 15 ft	15		
20							

PROJECT NUMBER	WELL NUMBER		
405353	IR15-MW01	SHEET 1	OF 1

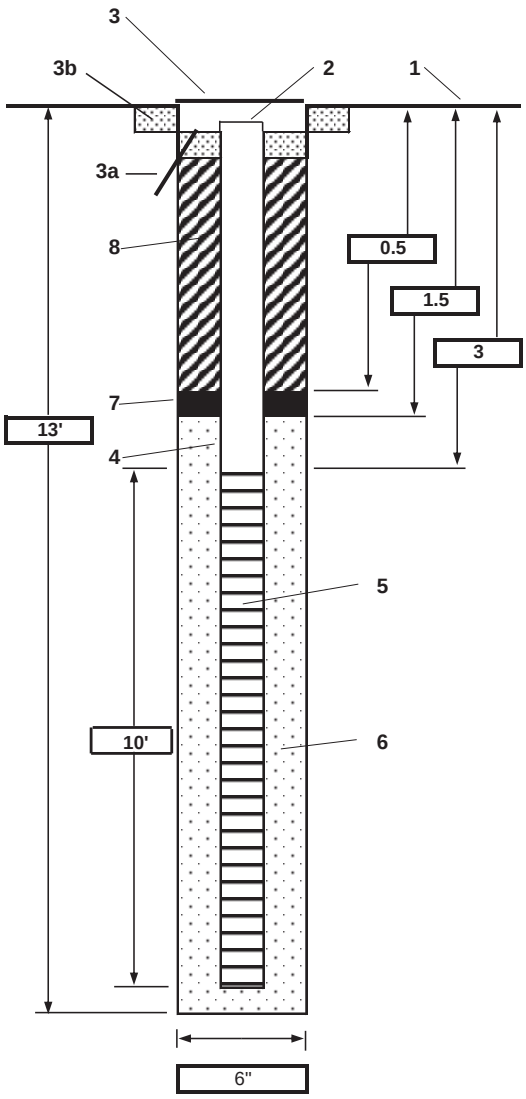
WELL COMPLETION DIAGRAM

PROJECT : Site 15 LOCATION : MCB CamLej

DRILLING CONTRACTOR : Probe Technology

DRILLING METHOD AND EQUIPMENT USED : DPT rig with 4.25-inch hollow stem augers

WATER LEVELS : START : 11/8/2010 LOGGER : D. Brown



1- Ground elevation at well: 12.84 ft

2- Top of casing elevation: 12.51 ft

3- Wellhead protection cover type:
- a) drain tube? NA
- b) concrete pad dimensions 2' x 2'

4- Dia./type of well casing: 2-inch Sch 40 PVC

5- Type/slot size of screen: 0.01 inch slot Sch 40 PVC

6- Type screen filter: #2 sand
- a) Quantity used: 4 0.5 ft^3 bags

7- Type of seal: bentonite pellets
- a) Quantity used: 1/4 bag

8- Grout
- a) Grout mix used: Concrete
- b) Method of placement: for well pad completion
- c) Vol. of well casing grout:

Development method: surge and pump

Development time:

Estimated purge volume:

Comments:

PROJECT NUMBER	WELL NUMBER		
405353	IR15-MW02	SHEET 1	OF 1

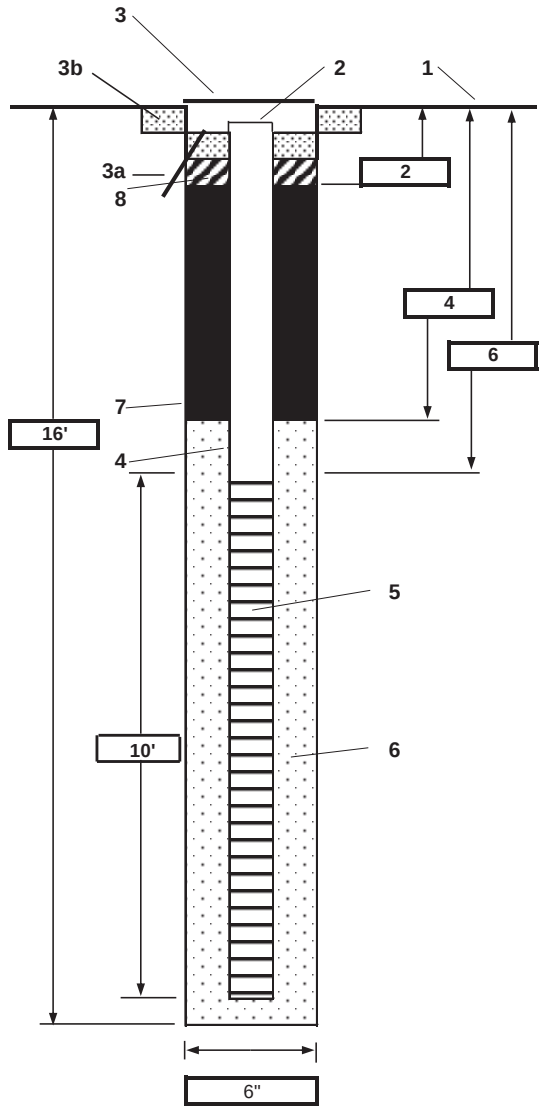
WELL COMPLETION DIAGRAM

PROJECT : Site 15 LOCATION : MCB CamLej

DRILLING CONTRACTOR : Probe Technology

DRILLING METHOD AND EQUIPMENT USED : DPT rig with 4.25-inch hollow stem augers

WATER LEVELS : START : 11/9/2010 LOGGER : D. Brown



1-	Ground elevation at well	13.44 ft
2-	Top of casing elevation	12.83 ft
3-	Wellhead protection cover type	
	a) drain tube?	NA
	b) concrete pad dimensions	2' x 2'
4-	Dia./type of well casing	2-inch Sch 40 PVC
5-	Type/slot size of screen	0.01 inch slot Sch 40 PVC
6-	Type screen filter	#2 sand
	a) Quantity used	4 0.5 ft^3 bags
7-	Type of seal	bentonite pellets
	a) Quantity used	1/4 bag
8-	Grout	
	a) Grout mix used	Concrete
	b) Method of placement	for well pad completion
	c) Vol. of well casing grout	
	Development method	surge and pump
	Development time	
	Estimated purge volume	
	Comments:	

PROJECT NUMBER	WELL NUMBER		
405353	IR15-MW03	SHEET 1	OF 1

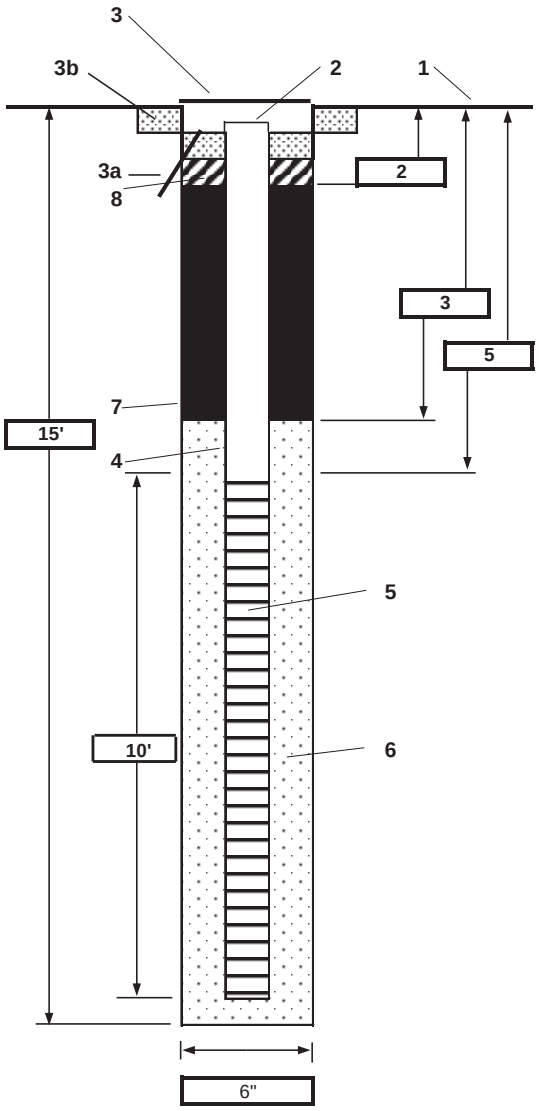
WELL COMPLETION DIAGRAM

PROJECT : Site 15 LOCATION : MCB CamLej

DRILLING CONTRACTOR : Probe Technology

DRILLING METHOD AND EQUIPMENT USED : DPT rig with 4.25-inch hollow stem augers

WATER LEVELS : START : 11/9/2010 LOGGER : D. Brown



1- Ground elevation at well: 14.95 ft

2- Top of casing elevation: 14.35 ft

3- Wellhead protection cover type:
- a) drain tube? NA
- b) concrete pad dimensions 2' x 2'

4- Dia./type of well casing: 2-inch Sch 40 PVC

5- Type/slot size of screen: 0.01 inch slot Sch 40 PVC

6- Type screen filter: #2 sand
- a) Quantity used: 4 0.5 ft^3 bags

7- Type of seal: bentonite pellets
- a) Quantity used: 1/4 bag

8- Grout
- a) Grout mix used: Concrete
- b) Method of placement: for well pad completion
- c) Vol. of well casing grout:

Development method: surge and pump

Development time:

Estimated purge volume:

Comments:

PROJECT NUMBER	WELL NUMBER		
405353	IR15-MW04	SHEET 1	OF 1

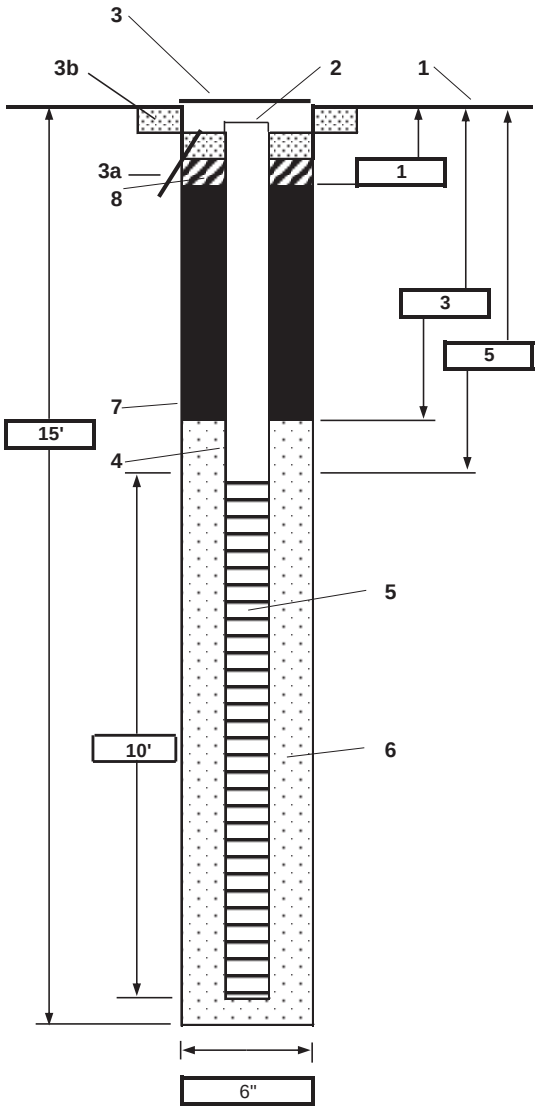
WELL COMPLETION DIAGRAM

PROJECT : Site 15 LOCATION : MCB CamLej

DRILLING CONTRACTOR : Probe Technology

DRILLING METHOD AND EQUIPMENT USED : DPT rig with 4.25-inch hollow stem augers

WATER LEVELS : START : 4/4/2011 LOGGER : B. Propst



1- Ground elevation at well: 14.34 ft

2- Top of casing elevation: 16.74 ft

3- Wellhead protection cover type:
- a) drain tube? NA
- b) concrete pad dimensions 2' x 2'

4- Dia./type of well casing: 2-inch Sch 40 PVC

5- Type/slot size of screen: 0.01 inch slot Sch 40 PVC

6- Type screen filter: #2 sand
- a) Quantity used: 4 0.5 ft^3 bags

7- Type of seal: bentonite pellets
- a) Quantity used: 1/4 bag

8- Grout
- a) Grout mix used: Concrete
- b) Method of placement: for well pad completion
- c) Vol. of well casing grout:

Development method: surge and pump

Development time:

Estimated purge volume:

Comments:

PROJECT NUMBER	WELL NUMBER		
405353	IR15-MW05	SHEET 1	OF 1

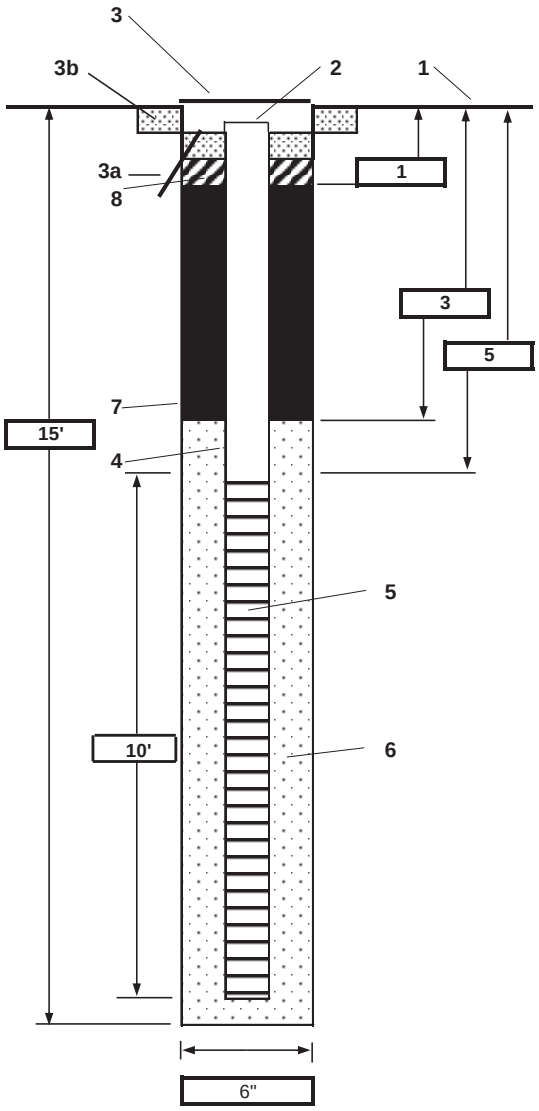
WELL COMPLETION DIAGRAM

PROJECT : Site 15 LOCATION : MCB CamLej

DRILLING CONTRACTOR : Probe Technology

DRILLING METHOD AND EQUIPMENT USED : DPT rig with 4.25-inch hollow stem augers

WATER LEVELS : START : 4/4/2011 LOGGER : B. Propst



1- Ground elevation at well: 12.76 ft

2- Top of casing elevation: 15.20 ft

3- Wellhead protection cover type:
- a) drain tube? NA
- b) concrete pad dimensions 2' x 2'

4- Dia./type of well casing: 2-inch Sch 40 PVC

5- Type/slot size of screen: 0.01 inch slot Sch 40 PVC

6- Type screen filter: #2 sand
- a) Quantity used: 4 0.5 ft^3 bags

7- Type of seal: bentonite pellets
- a) Quantity used: 1/4 bag

8- Grout
- a) Grout mix used: Concrete
- b) Method of placement: for well pad completion
- c) Vol. of well casing grout:

Development method: surge and pump

Development time:

Estimated purge volume:

Comments:

PROJECT NUMBER	WELL NUMBER		
405353	IR15-MW06	SHEET 1	OF 1

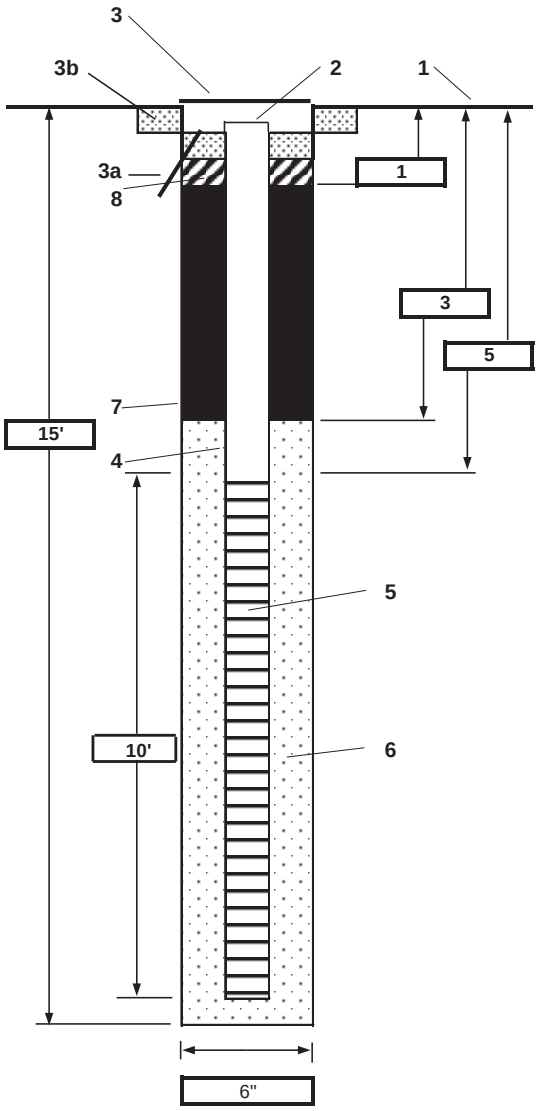
WELL COMPLETION DIAGRAM

PROJECT : Site 15 LOCATION : MCB CamLej

DRILLING CONTRACTOR : Probe Technology

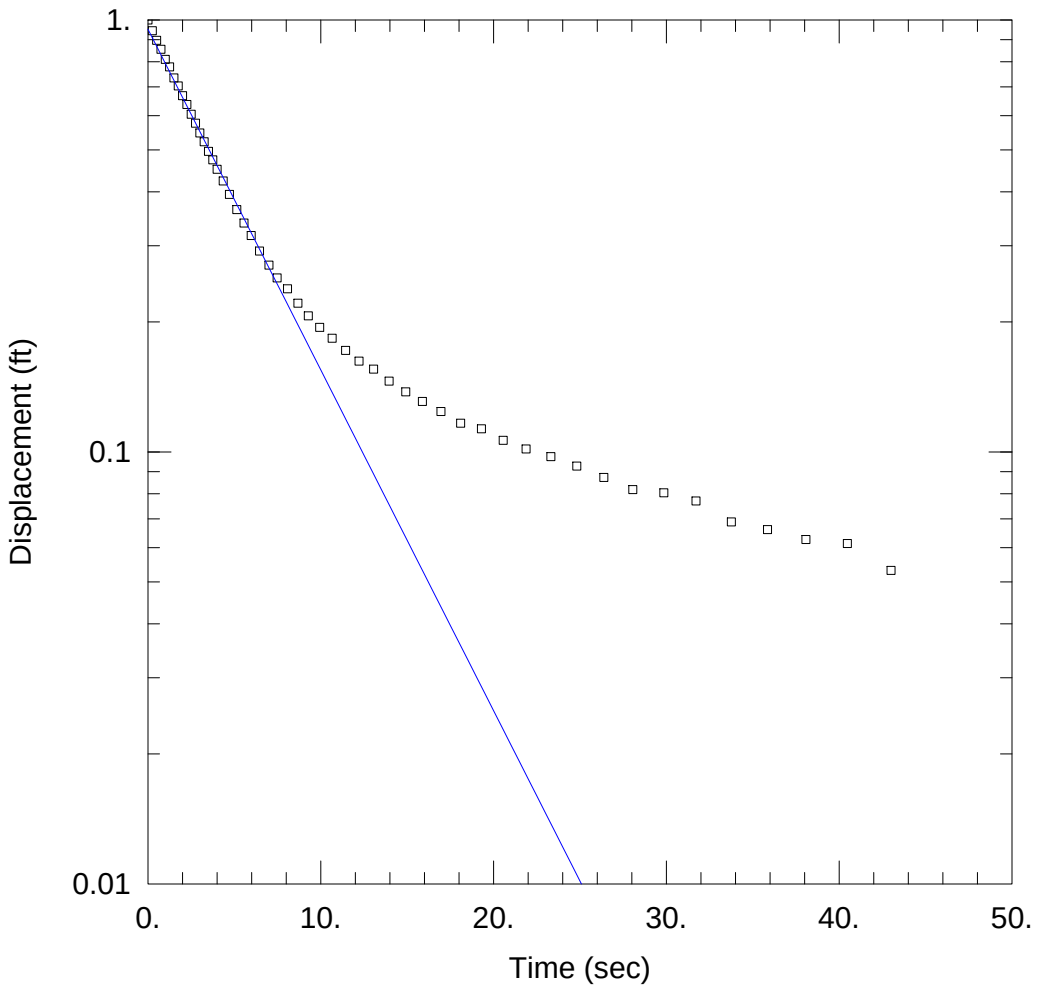
DRILLING METHOD AND EQUIPMENT USED : DPT rig with 4.25-inch hollow stem augers

WATER LEVELS : START : 4/5/2011 LOGGER : B. Propst



1-	Ground elevation at well	13.07 ft
2-	Top of casing elevation	15.76 ft
3-	Wellhead protection cover type	
	a) drain tube?	NA
	b) concrete pad dimensions	2' x 2'
4-	Dia./type of well casing	2-inch Sch 40 PVC
5-	Type/slot size of screen	0.01 inch slot Sch 40 PVC
6-	Type screen filter	#2 sand
	a) Quantity used	4 0.5 ft^3 bags
7-	Type of seal	bentonite pellets
	a) Quantity used	1/4 bag
8-	Grout	
	a) Grout mix used	Concrete
	b) Method of placement	for well pad completion
	c) Vol. of well casing grout	
	Development method	surge and pump
	Development time	
	Estimated purge volume	
	Comments:	

Appendix C
Slug Test Analyses



WELL TEST ANALYSIS

Data Set: \\tarheel\Proj\EBL\Navy Clean\Site 15\Slug Test Data\Aqtesolv Files\MW01-1.aqt
Date: 07/07/11 Time: 12:12:05

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

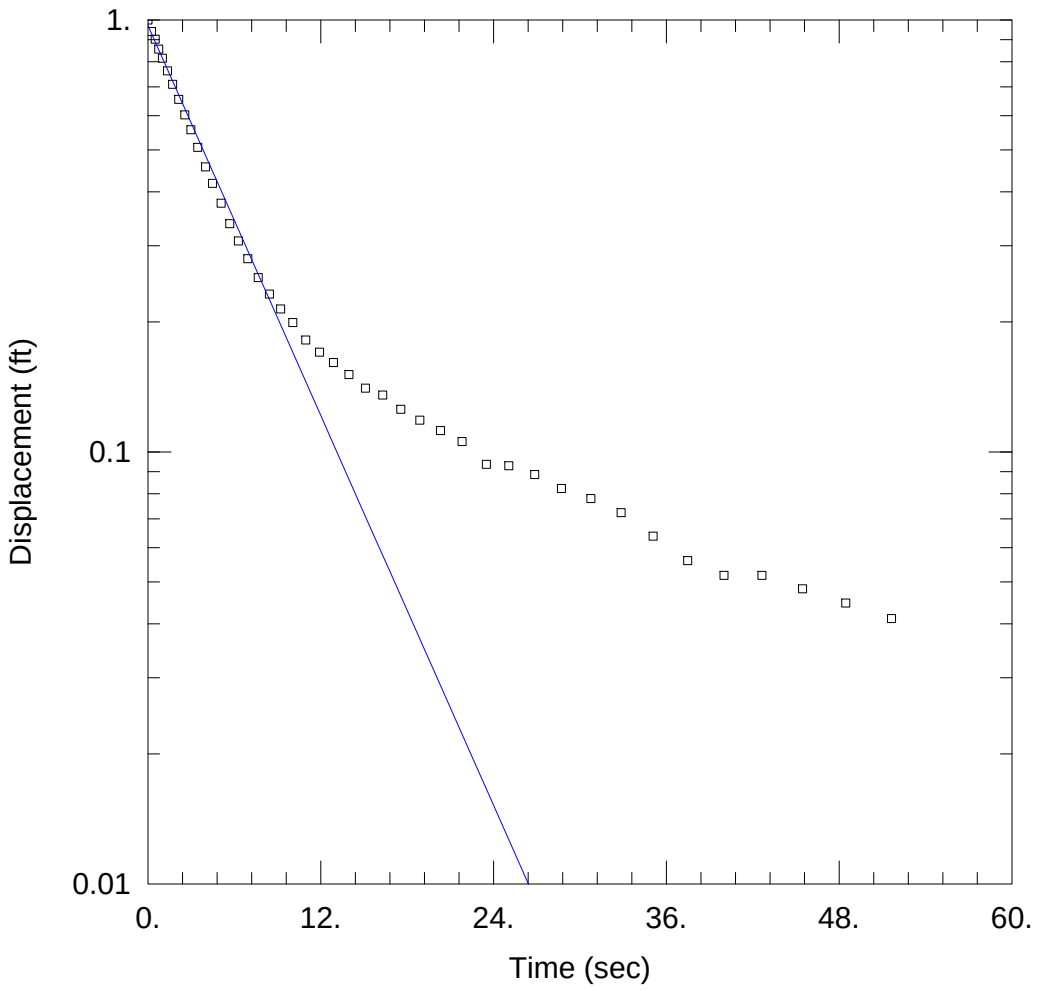
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.52 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 11.58 ft/day
y0 = 0.9515 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW01-2.aqt
Date: 07/07/11 Time: 12:12:17

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

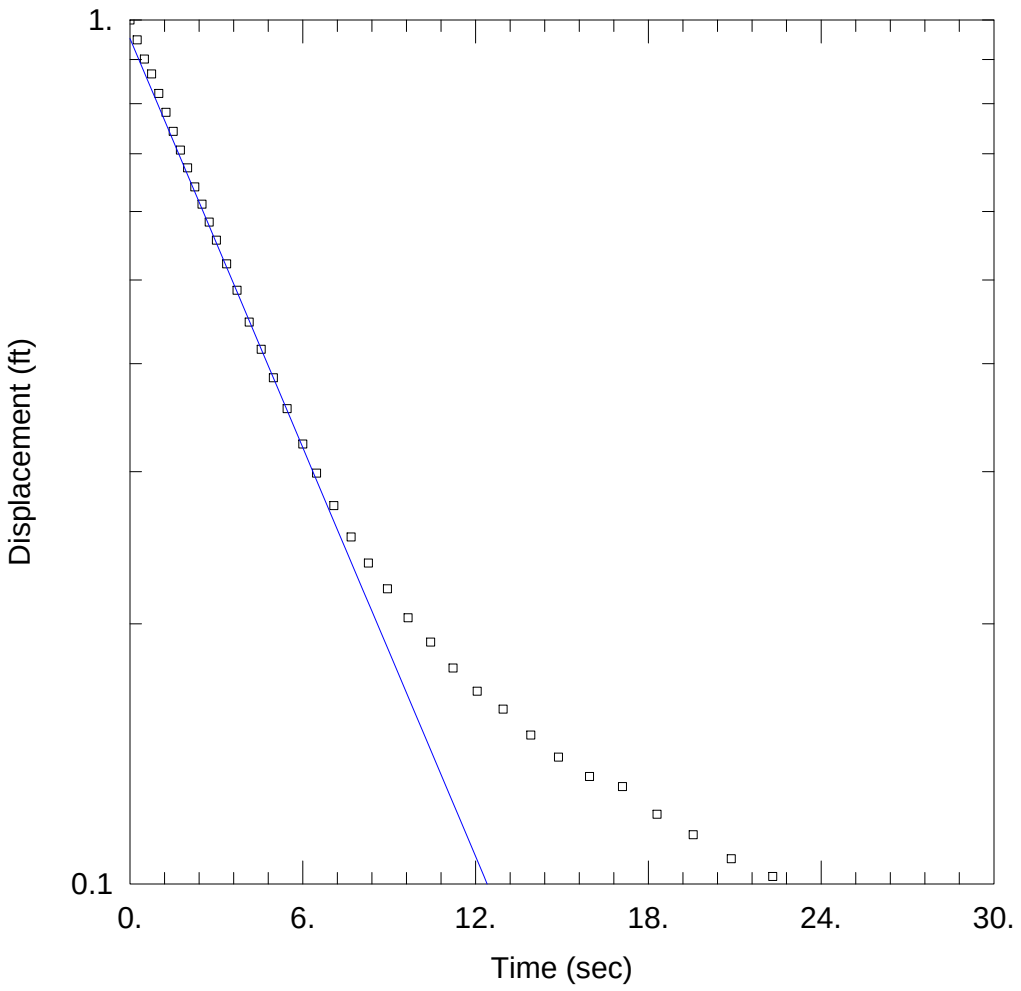
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.52 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 11.05 ft/day
y0 = 0.9704 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW01-3.aqt
Date: 07/07/11 Time: 12:12:27

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

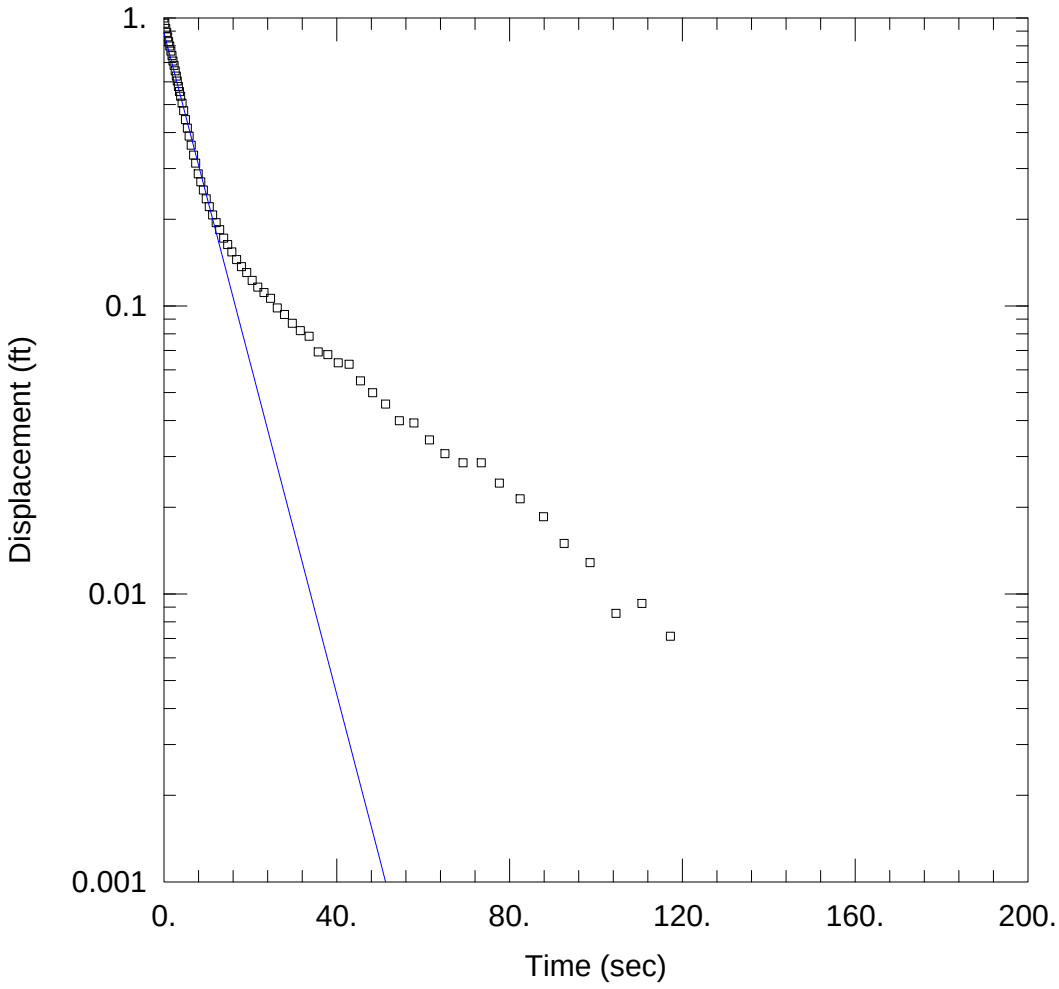
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.52 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 11.58 ft/day
y0 = 0.9515 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW02-1.aqt
Date: 07/07/11 Time: 12:13:17

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

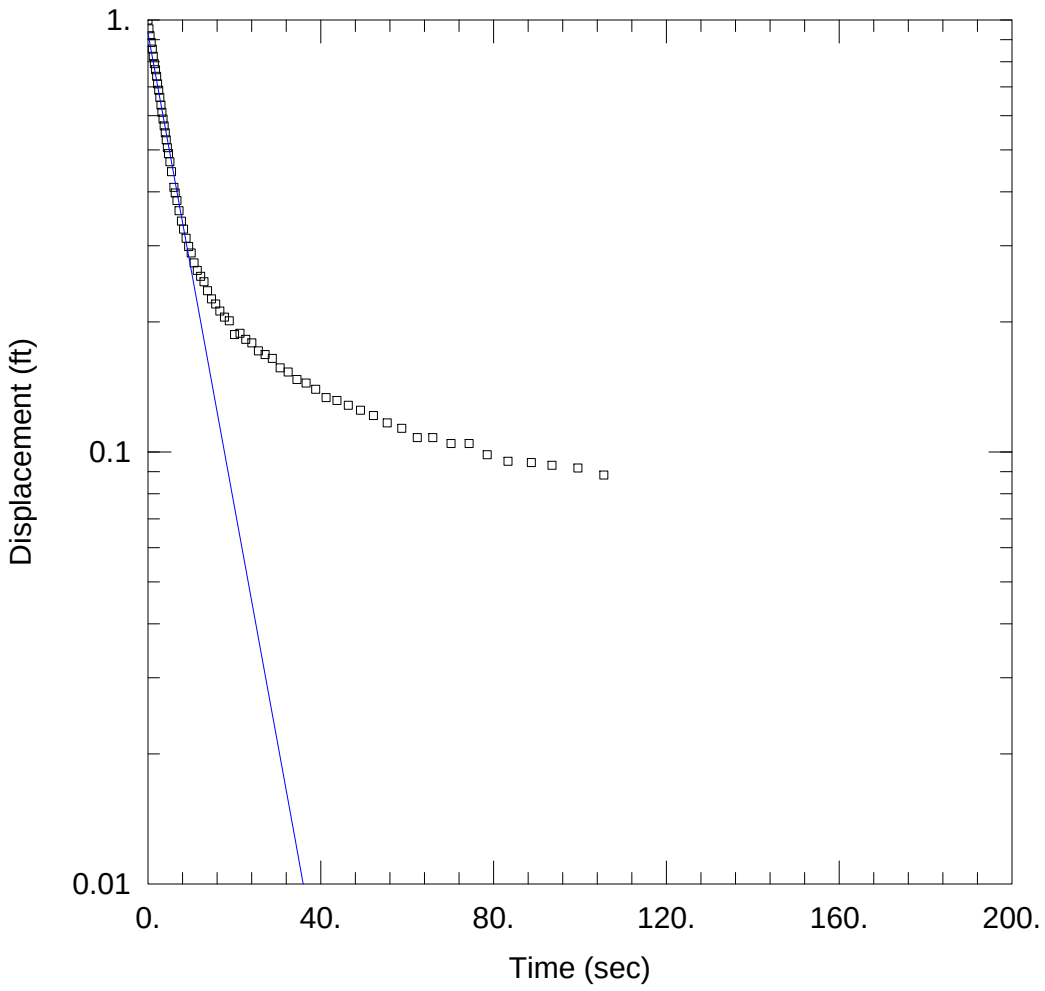
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.86 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 8.436 ft/day
y0 = 0.8877 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW02-2.aqt
Date: 07/07/11 Time: 12:13:06

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

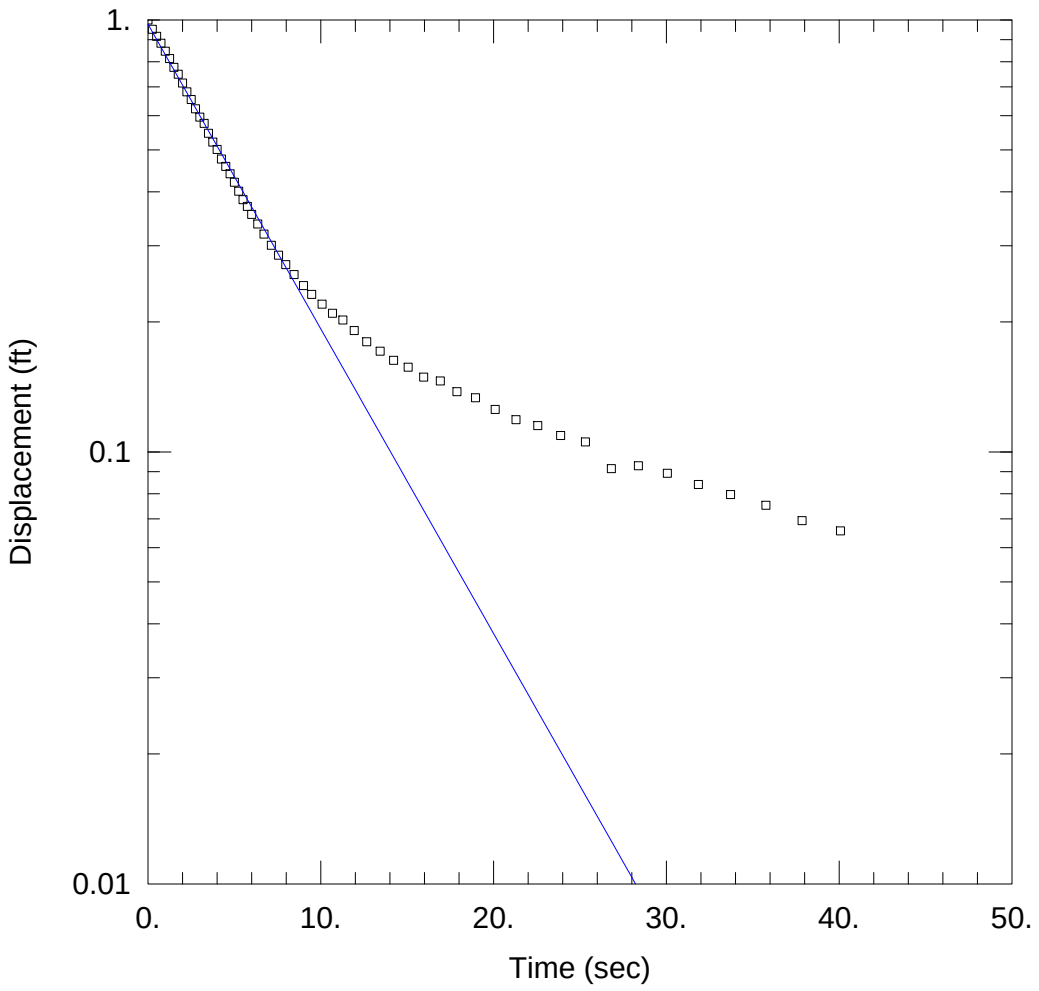
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.86 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 8.044 ft/day
y0 = 0.9314 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW02-3.aqt
Date: 07/07/11 Time: 12:12:54

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

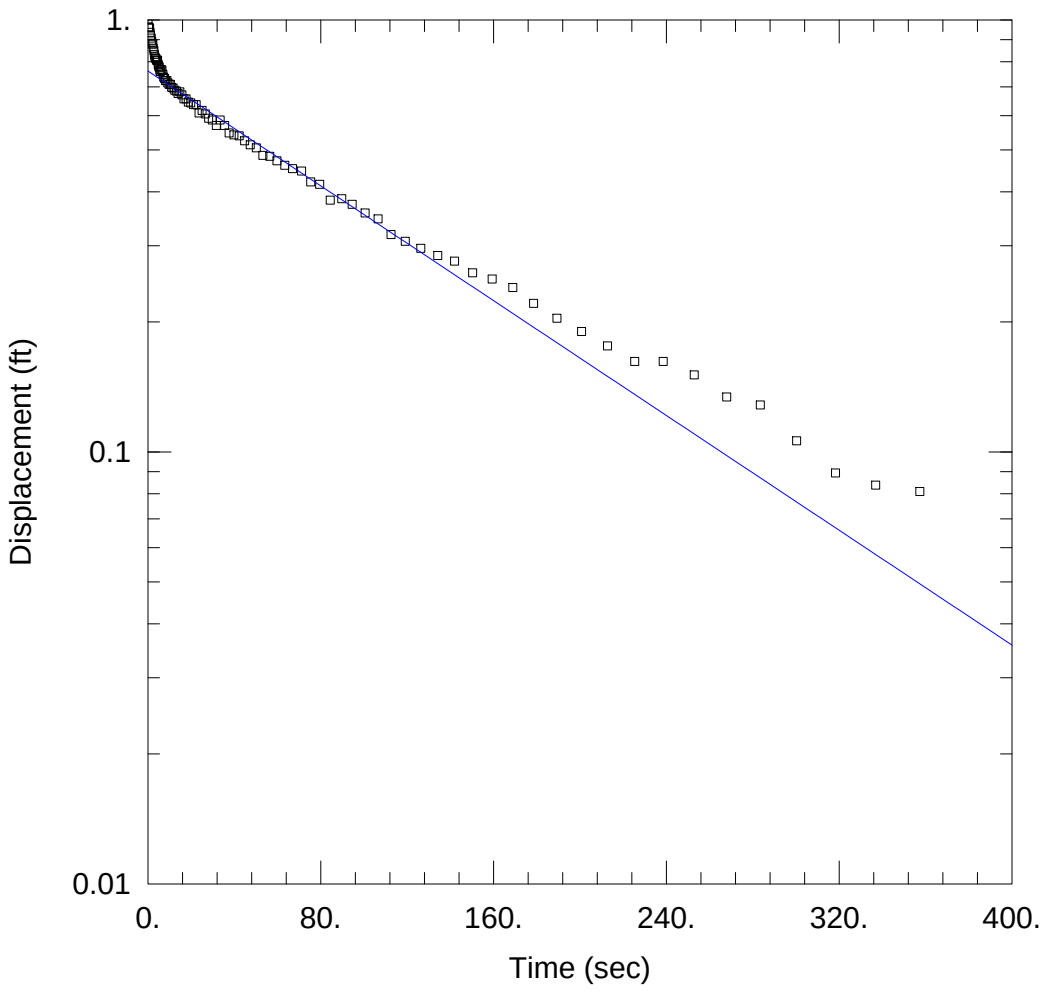
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 7.86 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 10.36 ft/day
y0 = 0.9773 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW03-1.aqt
Date: 07/07/11 Time: 12:13:31

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

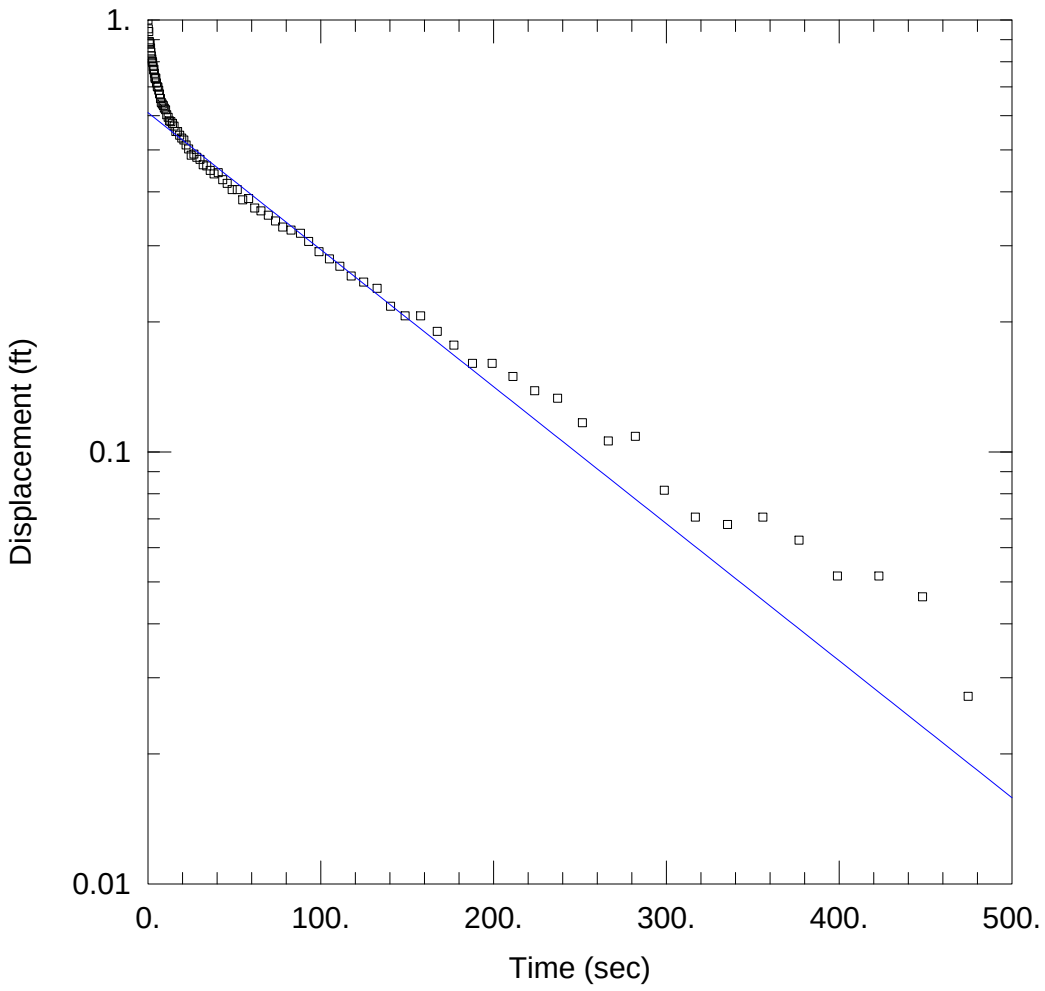
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 3.67 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4878 ft/day
y0 = 0.7614 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW03-2.aqt
Date: 07/07/11 Time: 12:13:51

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

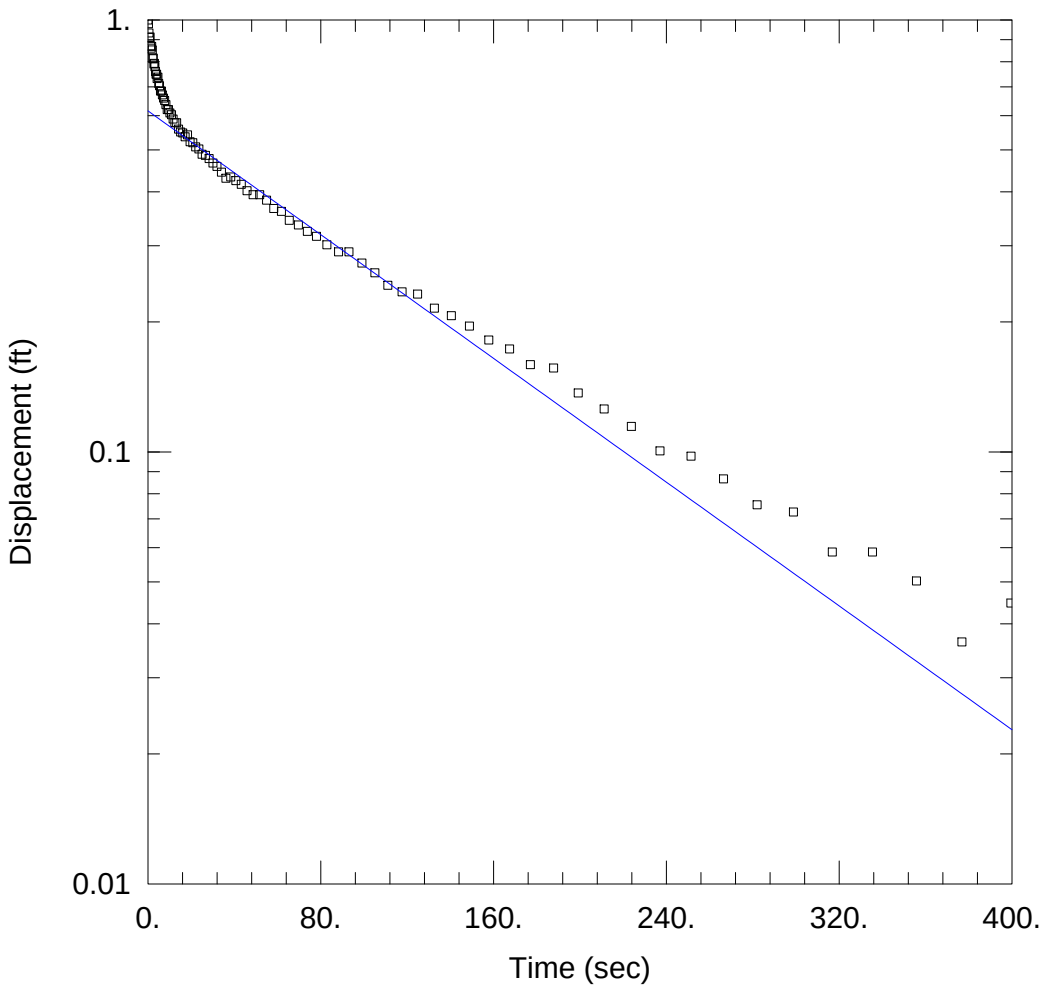
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 3.67 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.4658 ft/day
y0 = 0.61 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW03-3.aqt
Date: 07/07/11 Time: 12:14:27

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

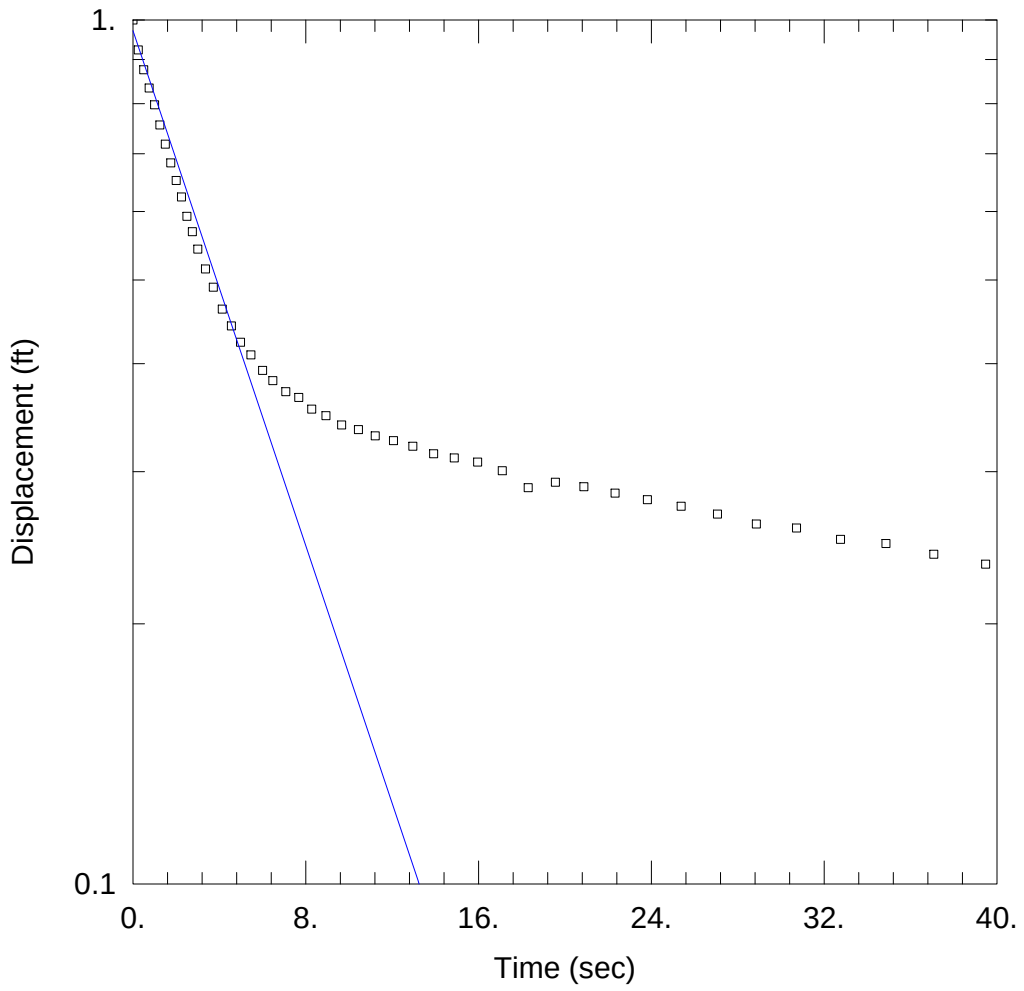
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 3.67 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.5259 ft/day
y0 = 0.6157 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW04-1.aqt
Date: 07/07/11 Time: 12:14:51

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

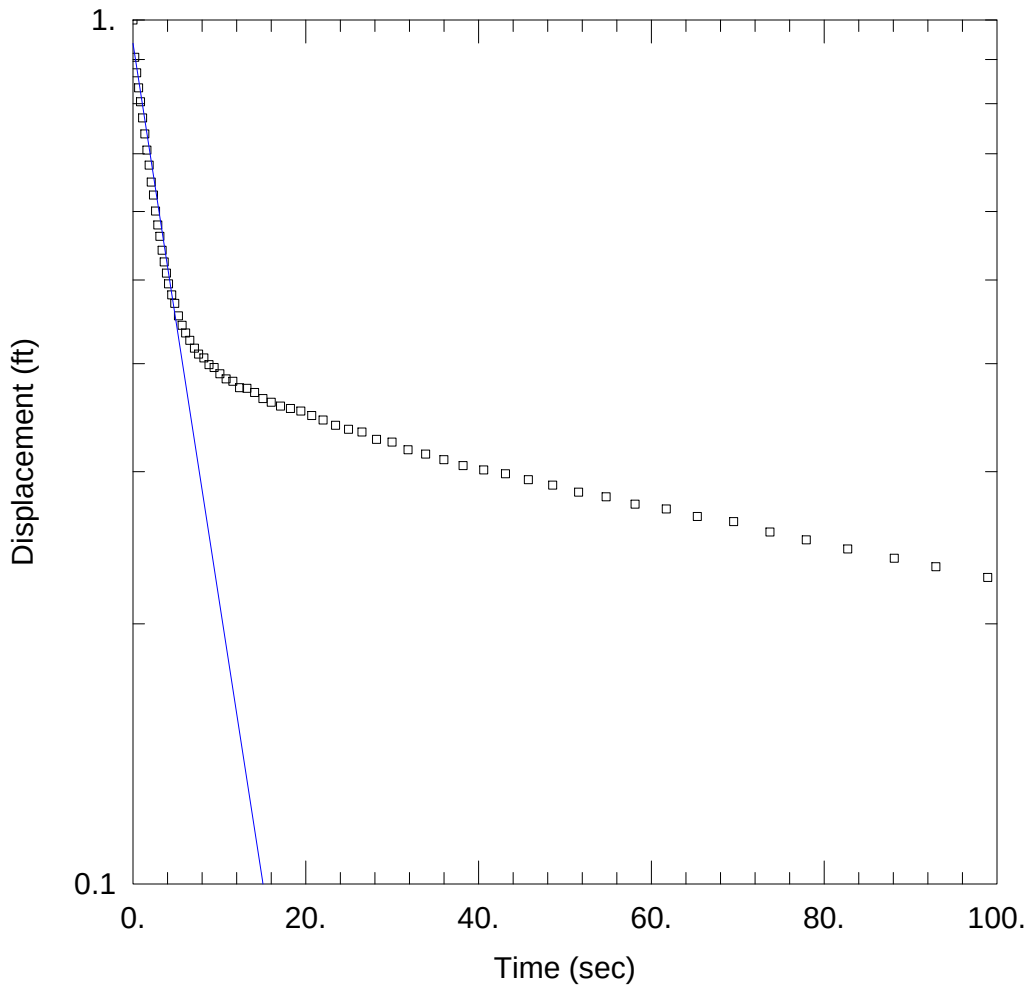
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4)

Initial Displacement: 1. ft
Static Water Column Height: 6.01 ft
Total Well Penetration Depth: 10. ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 10.94 ft/day
y0 = 0.9716 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW04-2.aqt
Date: 07/07/11 Time: 12:15:04

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

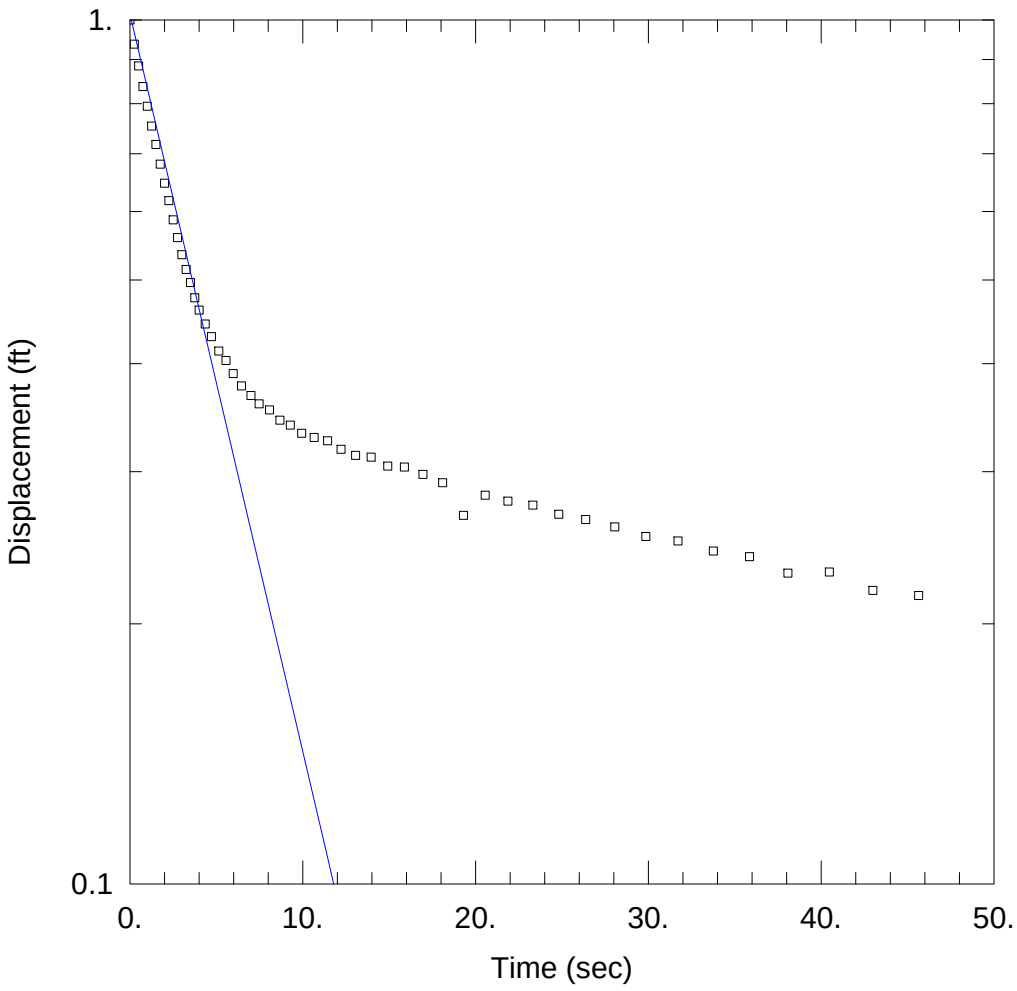
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4)

Initial Displacement: 1. ft
Static Water Column Height: 6.01 ft
Total Well Penetration Depth: 10. ft
Screen Length: 10. ft
Casing Radius: 0.083 ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.494 ft/day
y0 = 0.9396 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW04-3.aqt
Date: 07/07/11 Time: 12:15:18

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

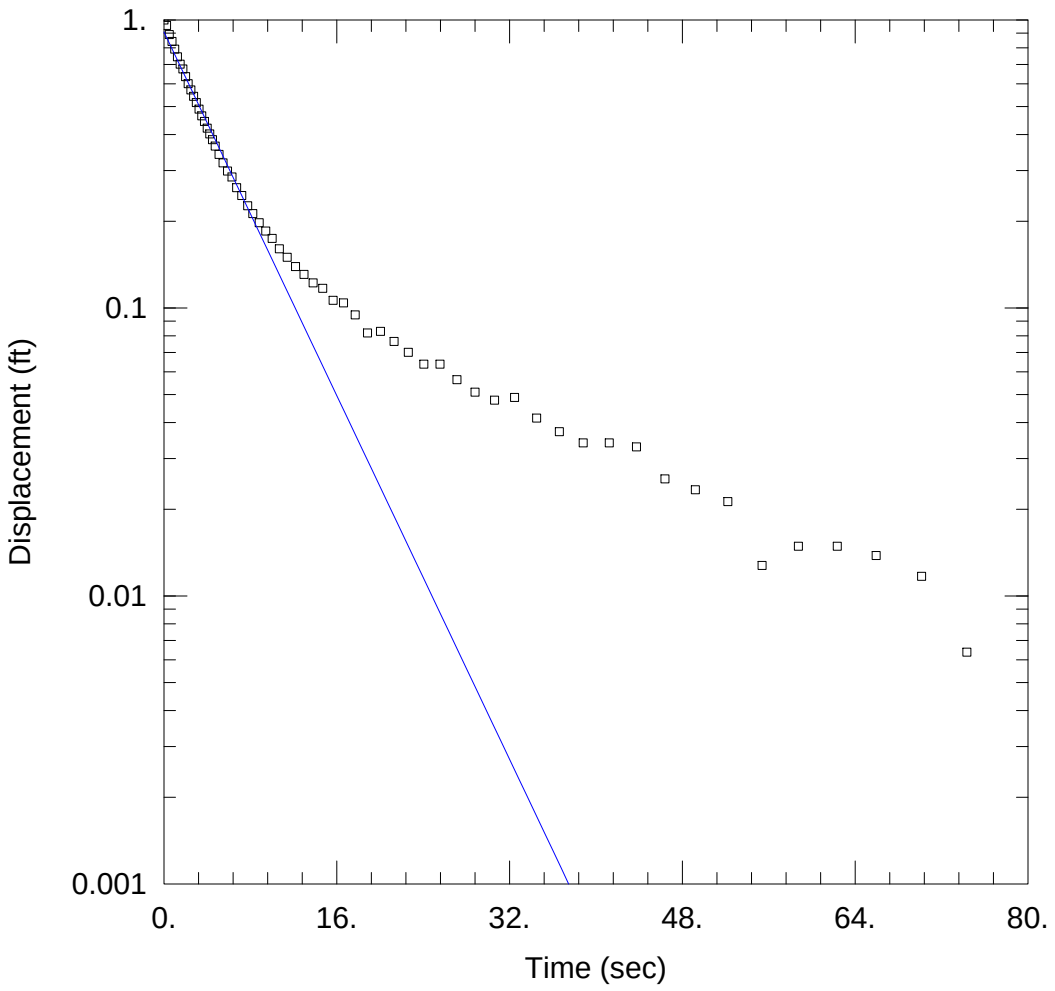
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.01 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 12.53 ft/day
y0 = 1.016 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW05-1.aqt
Date: 07/07/11 Time: 12:15:32

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

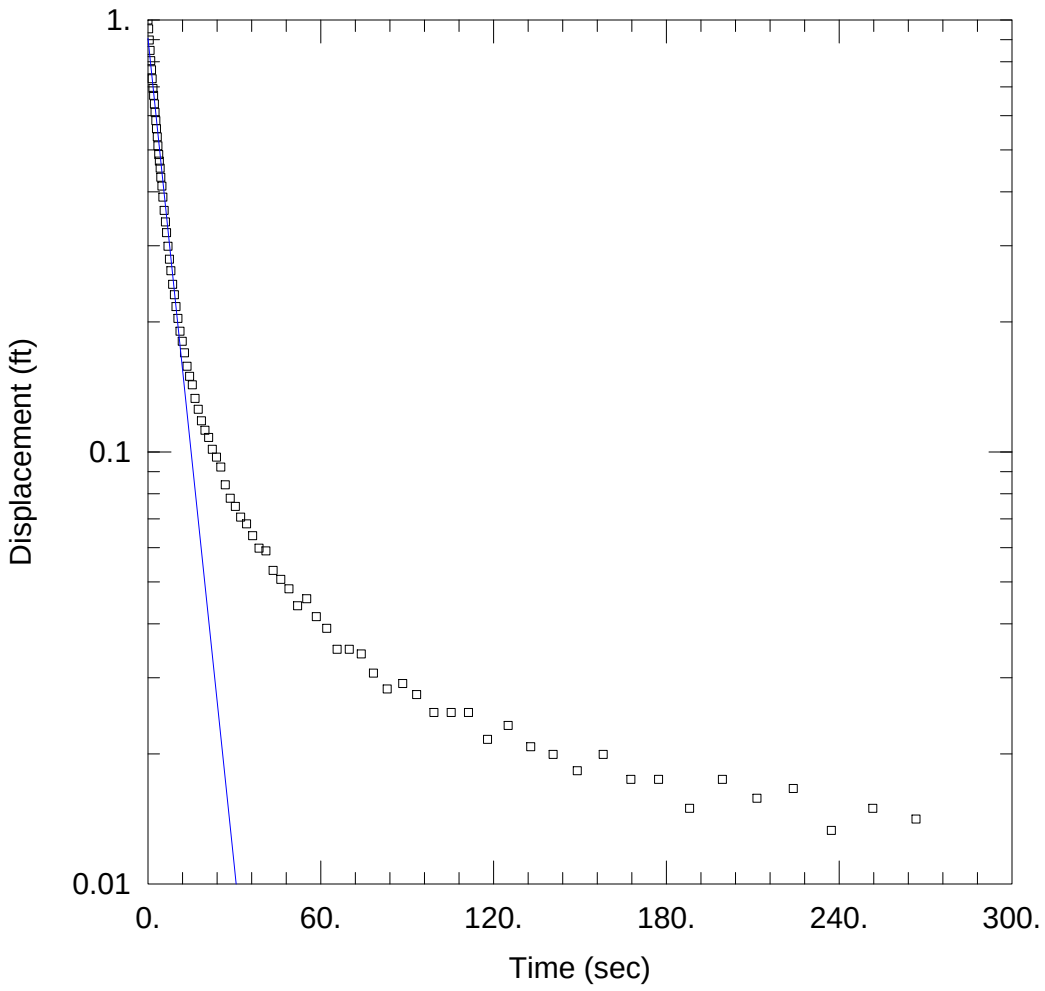
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.97 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 11.59 ft/day
y0 = 0.9085 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW05-2.aqt
Date: 07/07/11 Time: 12:15:45

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

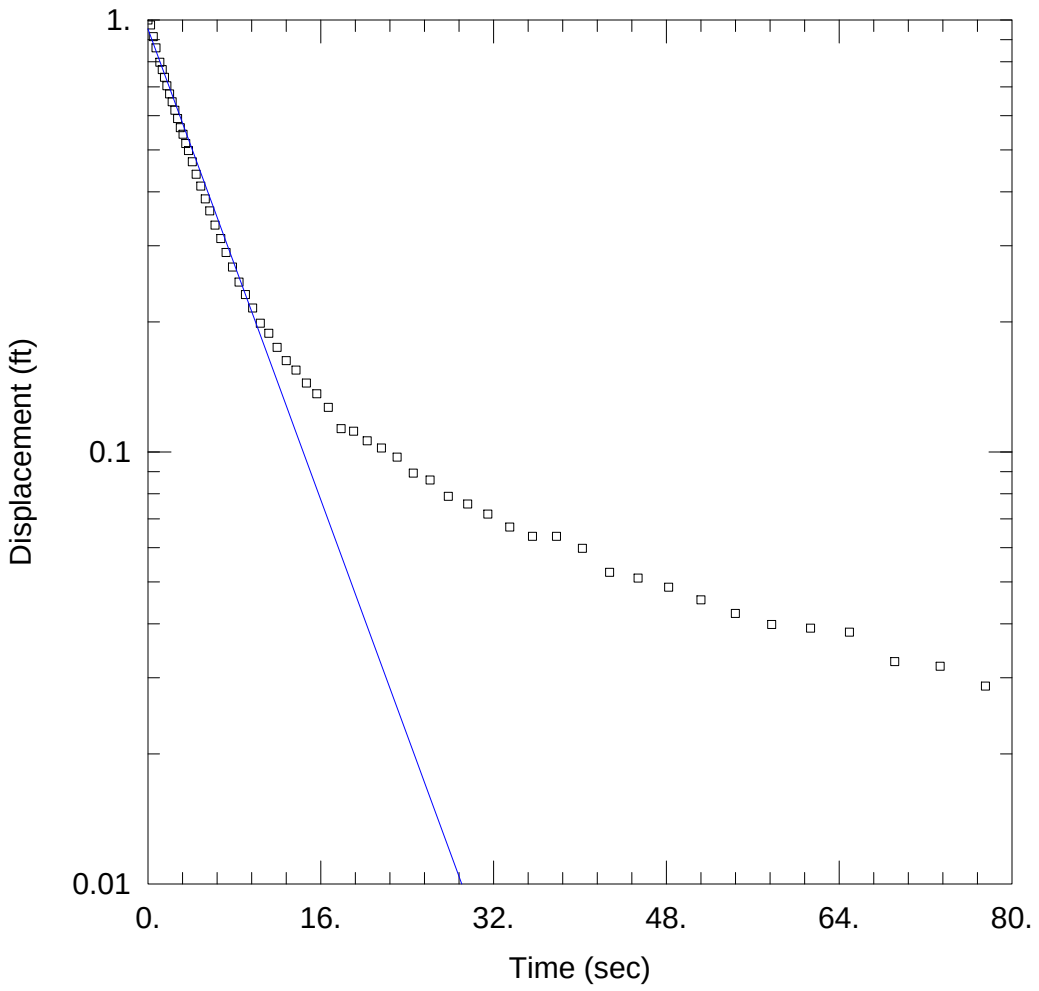
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.97 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.385 ft/day
y0 = 0.9058 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW05-3.aqt
Date: 07/07/11 Time: 12:15:58

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

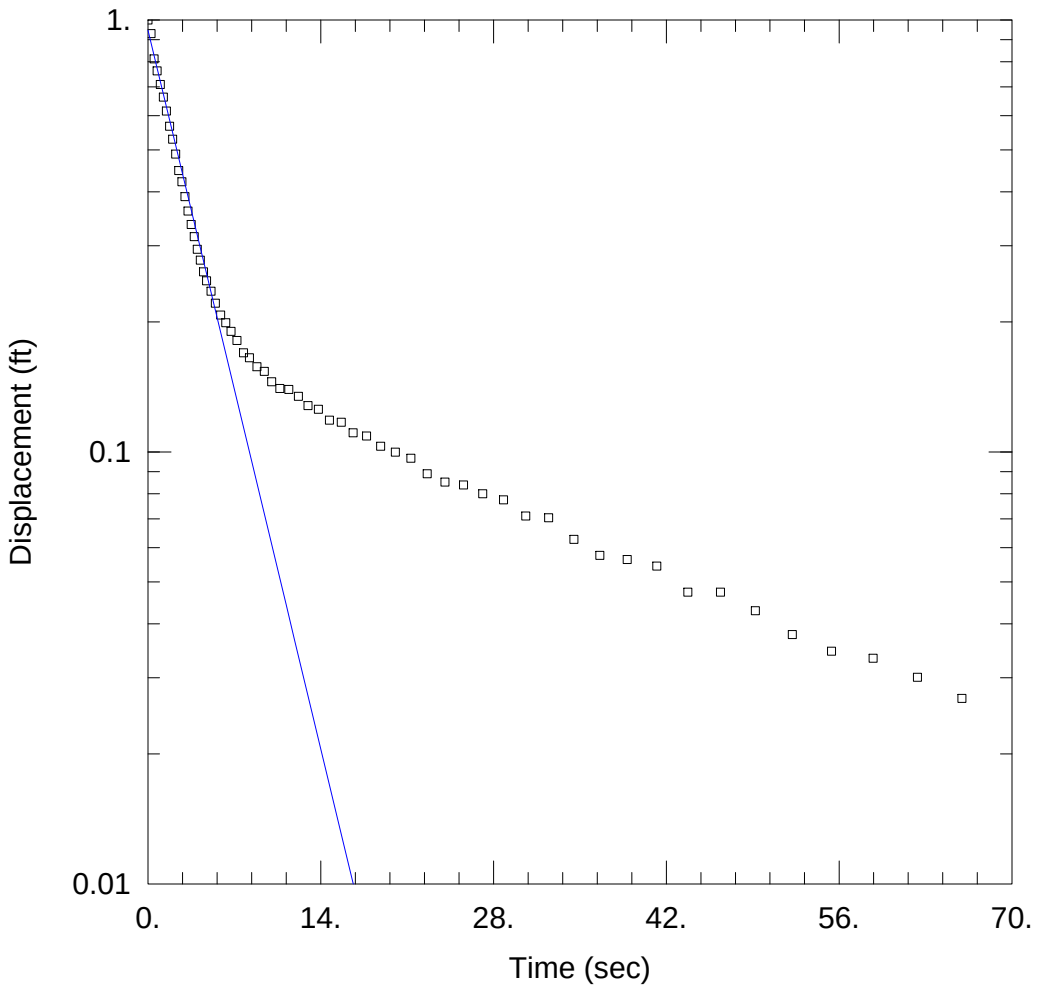
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.97 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 10. ft/day
y0 = 0.9526 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW06-1.aqt
Date: 07/07/11 Time: 12:16:13

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

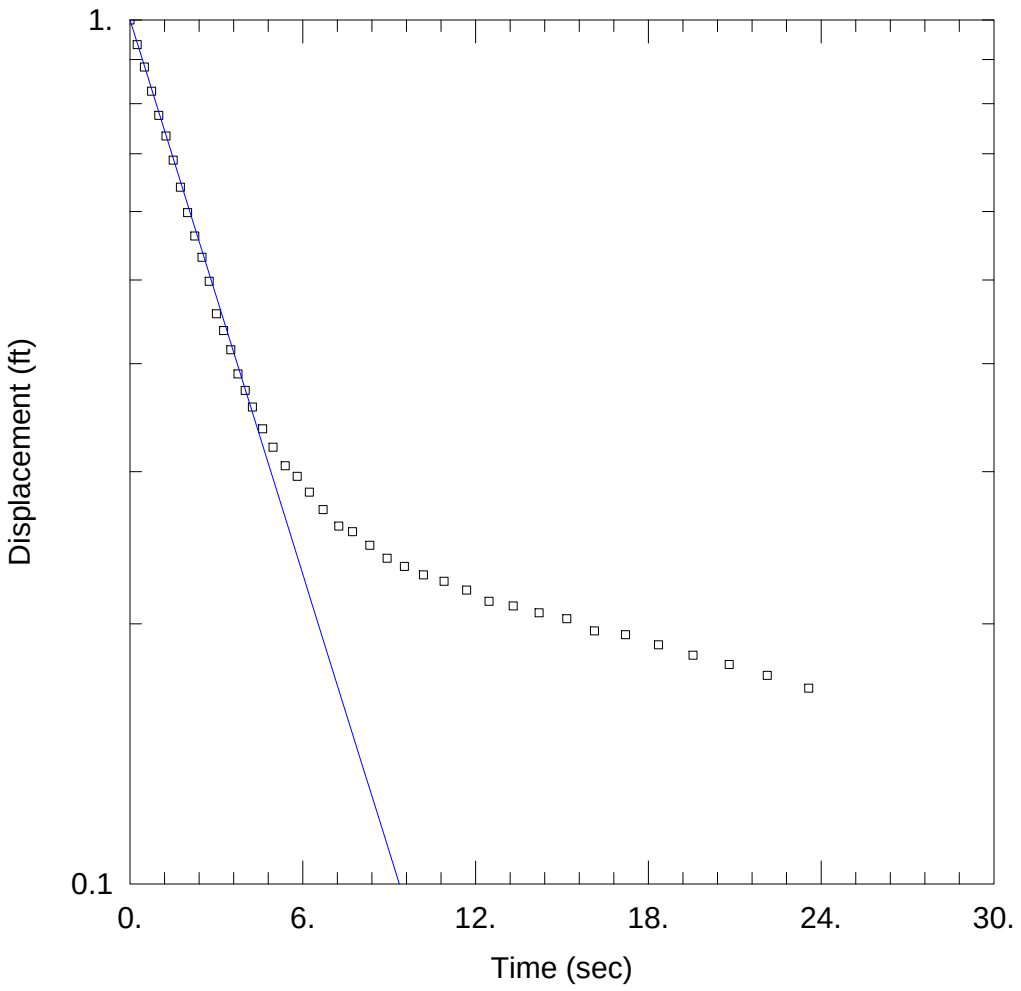
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.94 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 17.44 ft/day
y0 = 0.9464 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW06-2.aqt
Date: 07/07/11 Time: 12:16:26

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

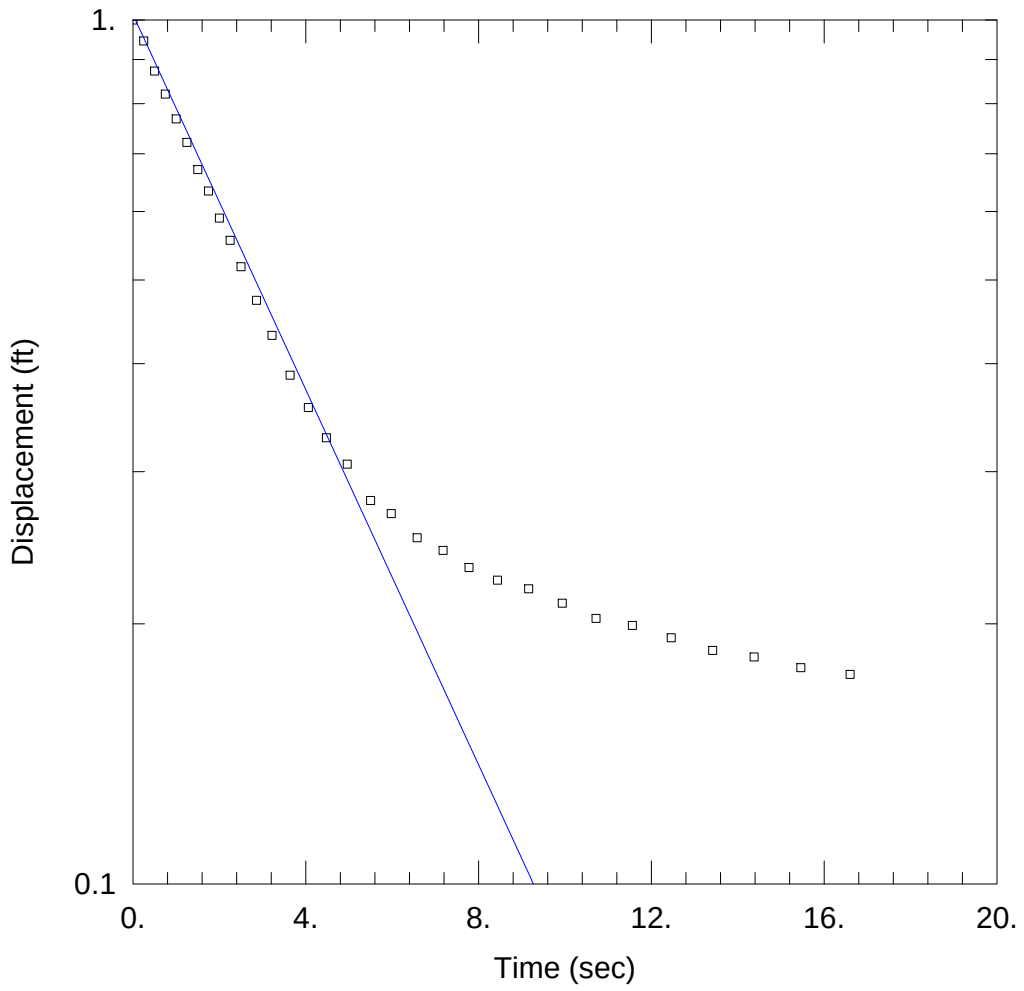
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.94 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 15.71 ft/day
y0 = 1.001 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\MW06-3.aqt
Date: 07/07/11 Time: 12:16:38

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

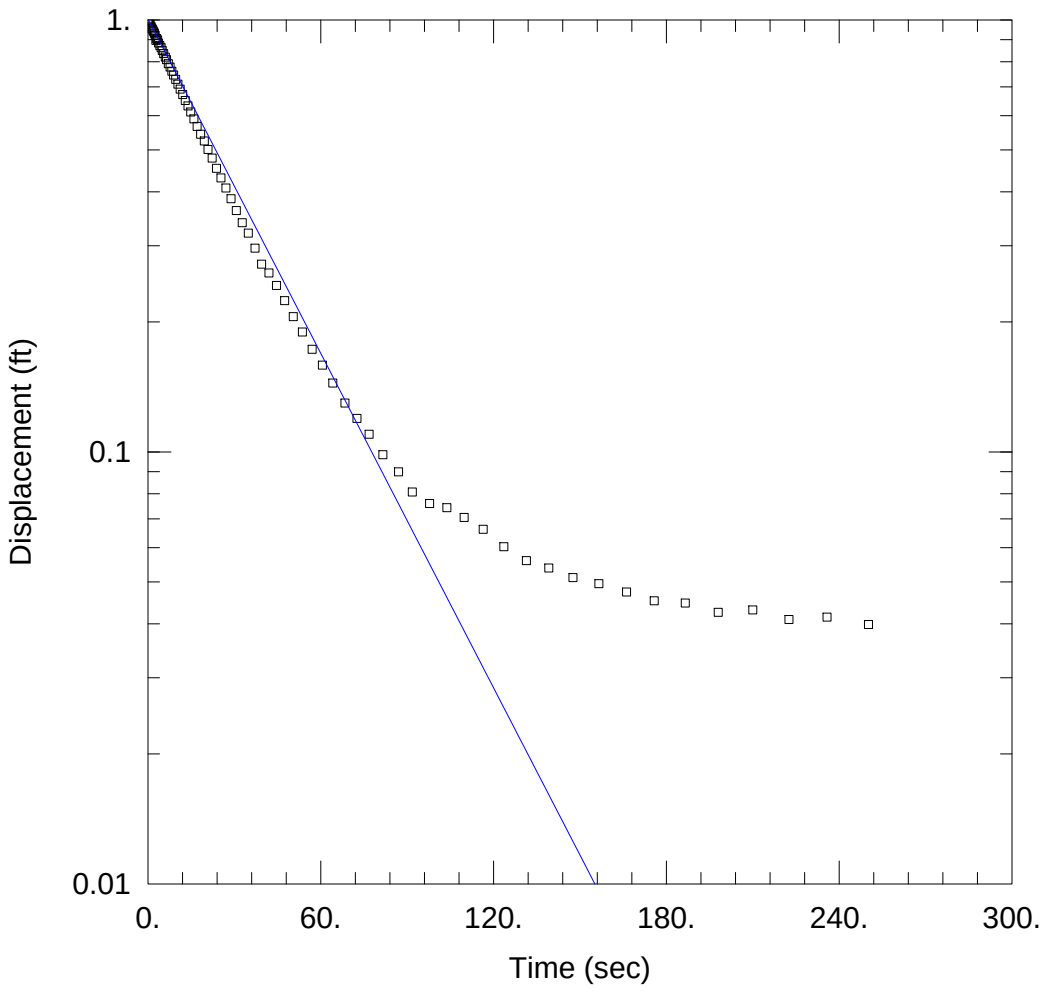
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-6)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.94 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 15.94 ft/day
y0 = 1.014 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\SWMU46-MW01-1.aqt
Date: 07/07/11 Time: 12:16:54

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

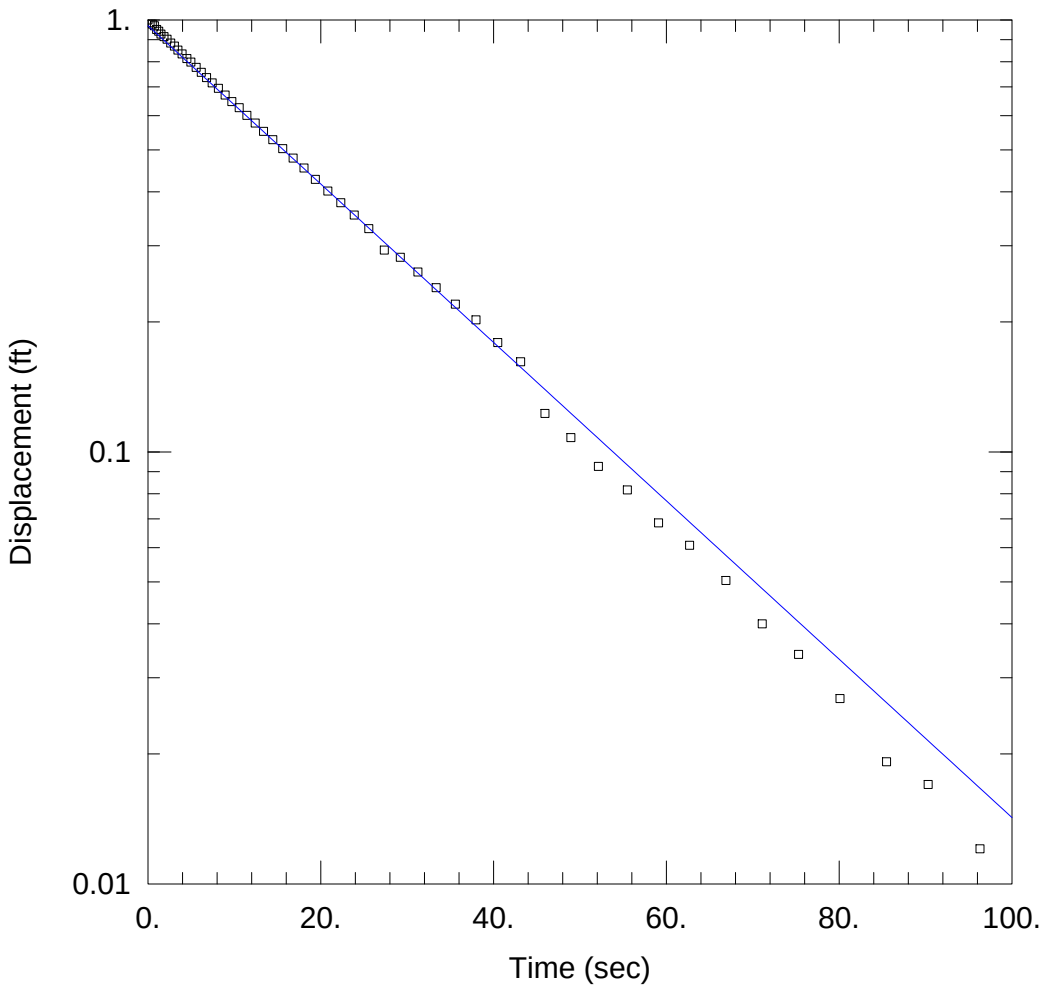
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (SWMU46-MW1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.34 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.895 ft/day
y0 = 1.005 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\SWMU46-MW01-2.aqt
Date: 07/07/11 Time: 12:17:12

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

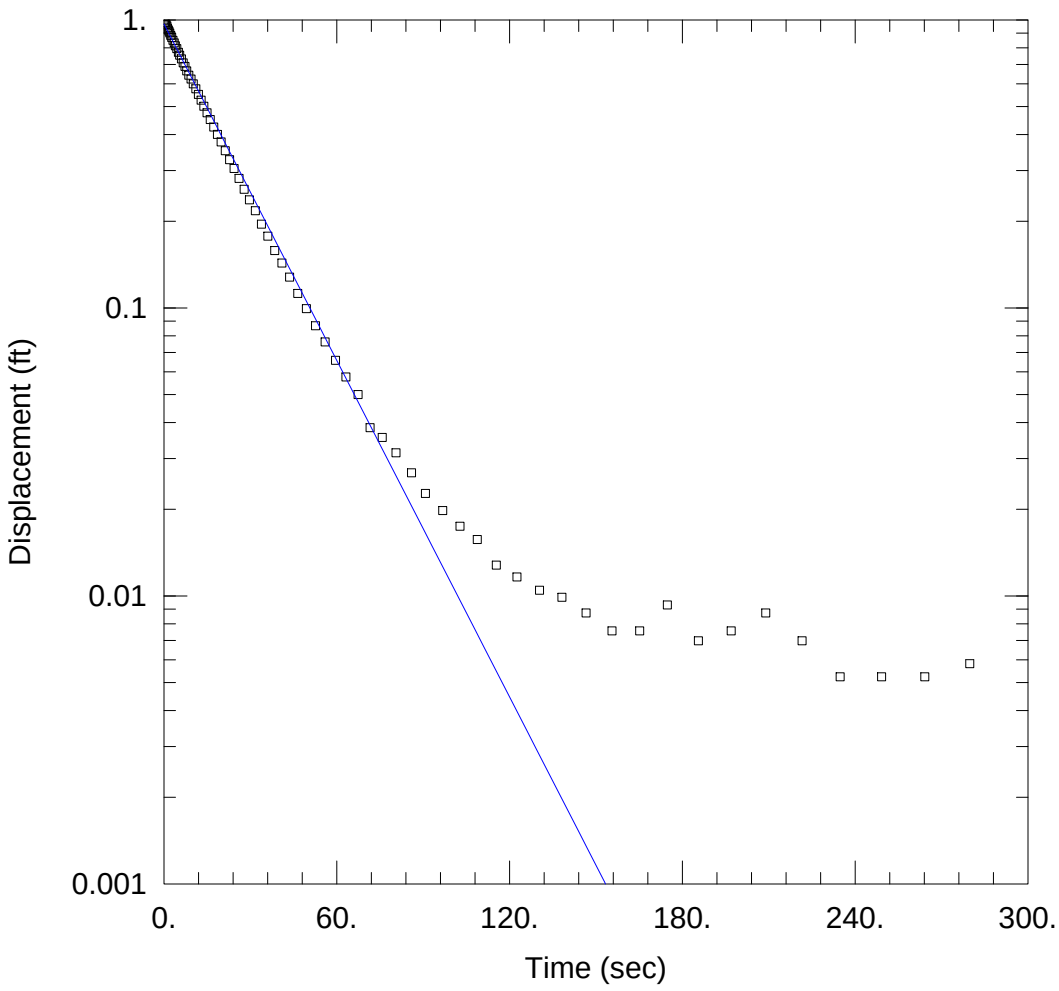
Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (SWMU46-MW1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.34 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.692 ft/day
y0 = 0.9697 ft



WELL TEST ANALYSIS

Data Set: C:\Users\JAlbano\Documents\Site 15\SWMU46-MW01-3.aqt
Date: 07/07/11 Time: 12:17:30

PROJECT INFORMATION

Company: CH2M HILL
Client: Navy
Location: MCB CamLej

AQUIFER DATA

Saturated Thickness: 50. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (SWMU46-MW1)

Initial Displacement: 1. ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.34 ft
Screen Length: 10. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.86 ft/day
y0 = 0.9685 ft

Appendix D
Analytical Results

APPENDIX D

Raw Analytical Data Tables- Groundwater

Site 15 ESI Report

MCB Cam Lej; North Carolina

Sample ID	IR15-GW01-10D	IR15-GW02-10D	IR15-GW02D-10D	IR15-GW03-10D	IR15-GW04-11B	IR15-GW04D-11B	IR15-GW05-11B	IR15-GW06-11B
Sample Date	11/10/10	11/11/10	11/11/10	11/11/10	4/6/11	4/6/11	4/7/11	4/7/11
Chemical Name								
Volatile Organic Compounds (UG/L)								
1,1,1-Trichloroethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	NA	0.25 U	0.25 U	0.25 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloroethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	NA	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2-Dichlorobenzene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
1,4-Dichlorobenzene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	NA	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Hexanone	NA	1 U	1 U	1 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Methyl-2-pentanone	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Acetone	NA	5 U	5 U	5 U	2.7 J	3.4 J	3.6 J	5 J
Benzene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
Bromomethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon disulfide	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,3-Dichloropropene	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Cyclohexane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromochloromethane	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
Dichlorodifluoromethane (Freon-12)	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
Isopropylbenzene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl acetate	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylcyclohexane	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methylene chloride	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl-tert-butyl ether (MTBE)	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Tetrachloroethene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	NA	0.5 U	0.5 U	0.5 U	0.06 J	0.1 U	0.1 U	0.1 U
trans-1,2-Dichloroethene	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
trans-1,3-Dichloropropene	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
Trichloroethene	NA	0.25 U	0.25 U	0.25 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (Freon-11)	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	NA	0.25 U	0.25 U	0.25 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, total	NA	1 U	1 U	1 U	0.75 U	0.75 U	0.75 U	0.75 U

APPENDIX D

Raw Analytical Data Tables- Groundwater

Site 15 ESI Report

MCB Cam Lej; North Carolina

Sample ID	IR15-GW01-10D	IR15-GW02-10D	IR15-GW02D-10D	IR15-GW03-10D	IR15-GW04-11B	IR15-GW04D-11B	IR15-GW05-11B	IR15-GW06-11B
Sample Date	11/10/10	11/11/10	11/11/10	11/11/10	4/6/11	4/6/11	4/7/11	4/7/11
Chemical Name								
Semivolatile Organic Compounds (UG/L)								
1,1-Biphenyl	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,2'-Oxybis(1-chloropropane)	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
2,4,5-Trichlorophenol	NA	0.1 U	0.1 U	0.1 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4,6-Trichlorophenol	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-Dichlorophenol	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
2,4-Dimethylphenol	NA	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U
2,4-Dinitrophenol	NA	0.5 U	0.5 U	0.5 U	1 U	1 U	1 U	1 U
2,4-Dinitrotoluene	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
2,6-Dinitrotoluene	NA	0.1 U	0.1 U	0.1 U	0.25 U	0.25 U	0.25 U	0.25 U
2-Chloronaphthalene	NA	0.1 U	0.1 U	0.1 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Chlorophenol	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylnaphthalene	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Methylphenol	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
2-Nitroaniline	NA	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Nitrophenol	NA	10 U	10 U	10 U	0.5 U	0.5 U	0.5 U	0.5 U
3,3'-Dichlorobenzidine	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
3-Nitroaniline	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4,6-Dinitro-2-methylphenol	NA	0.05 U	0.05 U	0.05 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Bromophenyl-phenylether	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
4-Chloro-3-methylphenol	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Chloroaniline	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Chlorophenyl-phenylether	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
4-Methylphenol	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
4-Nitroaniline	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Nitrophenol	NA	0.05 U	0.05 U	0.05 U	2 U	2 U	2 U	2 U
Acenaphthene	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Acenaphthylene	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Acetophenone	NA	0.05 U	0.05 U	0.05 U	0.5 U	0.5 U	0.5 U	0.5 U
Anthracene	NA	0.5 U	0.5 U	0.5 U	0.041 J	0.05 U	0.05 U	0.05 U
Atrazine	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Benzaldehyde	NA	0.05 U	0.05 U	0.05 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzo(a)anthracene	NA	0.05 U	0.05 U	0.05 U	0.12 J	0.041 J	0.1 U	0.1 U
Benzo(a)pyrene	NA	0.05 U	0.05 U	0.05 U	0.072 J	0.1 U	0.1 U	0.1 U
Benzo(b)fluoranthene	NA	0.1 U	0.1 U	0.1 U	0.072 J	0.1 U	0.1 U	0.1 U
Benzo(g,h,i)perylene	NA	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
Benzo(k)fluoranthene	NA	0.1 U	0.1 U	0.1 U	0.093 J	0.1 U	0.1 U	0.1 U
bis(2-Chloroethoxy)methane	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-Chloroethyl)ether	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
bis(2-Ethylhexyl)phthalate	NA	0.77 U	0.64 U	0.65 U	0.5 U	0.5 U	0.25 J	0.33 J
Butylbenzylphthalate	NA	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
Caprolactam	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbazole	NA	0.25 U	0.25 U	0.25 U	0.13 J	0.092 J	0.1 U	0.1 U
Chrysene	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Dibenz(a,h)anthracene	NA	0.1 U	0.1 U	0.1 U	0.25 U	0.25 U	0.25 U	0.25 U
Dibenzofuran	NA	0.25 U	0.25 U	0.25 U	0.1 U	0.1 U	0.1 U	0.1 U
Diethylphthalate	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Dimethyl phthalate	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Di-n-butylphthalate	NA	1 U	1 U	1 U	0.5 U	0.5 U	0.23 J	0.5 U
Di-n-octylphthalate	NA	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
Fluoranthene	NA	0.05 U	0.05 U	0.05 U	0.072 J	0.1 U	0.1 U	0.1 U
Fluorene	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Hexachlorobenzene	NA	0.25 U	0.25 U	0.25 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U

Sample ID	IR15-GW01-10D	IR15-GW02-10D	IR15-GW02D-10D	IR15-GW03-10D	IR15-GW04-11B	IR15-GW04D-11B	IR15-GW05-11B	IR15-GW06-11B
Sample Date	11/10/10	11/11/10	11/11/10	11/11/10	4/6/11	4/6/11	4/7/11	4/7/11
Chemical Name								
Hexachlorocyclopentadiene	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
Hexachloroethane	NA	0.5 U	0.5 U	0.5 U	0.25 U	0.25 U	0.25 U	0.25 U
Indeno(1,2,3-cd)pyrene	NA	0.1 U	0.1 U	0.1 U	0.25 U	0.25 U	0.25 U	0.25 U
Isophorone	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Naphthalene	NA	0.05 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U
Nitrobenzene	NA	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Nitroso-di-n-propylamine	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
n-Nitrosodiphenylamine	NA	0.5 U	0.5 U	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U
Pentachlorophenol	NA	0.1 U	0.1 U	0.1 U	0.25 U	0.25 U	0.25 U	0.25 U
Phenanthrene	NA	0.05 U	0.05 U	0.05 U	0.072 J	0.1 U	0.051 J	0.1 U
Phenol	NA	0.5 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U
Pyrene	NA	0.1 U	0.1 U	0.1 U	0.062 J	0.1 U	0.1 U	0.1 U
Pesticide/Polychlorinated Biphenyls (UG/L)								
4,4'-DDD	NA	0.0016 U	0.0016 U	0.0016 U	0.012	0.013	0.0008 U	0.0008 U
4,4'-DDE	NA	0.0016 U	0.0016 U	0.0016 U	0.0036 J	0.0037 J	0.0008 U	8.10E-04 J
4,4'-DDT	NA	0.0016 U	0.0016 U	0.0016 U	8.10E-04 J	1.00E-03 J	0.0008 U	0.0008 U
Aldrin	NA	0.0016 U	0.0016 U	0.0016 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
alpha-BHC	NA	0.0016 U	0.0016 U	0.0016 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
alpha-Chlordane	NA	0.0016 U	0.0016 U	0.0016 U	0.012	0.012	0.0008 U	0.0008 U
Aroclor-1016	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
Aroclor-1221	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
Aroclor-1232	NA	0.04 U	0.04 U	0.04 U	0.08 U	0.08 U	0.08 U	0.08 U
Aroclor-1242	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
Aroclor-1248	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
Aroclor-1254	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
Aroclor-1260	NA	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
beta-BHC	NA	0.008 U	0.008 U	0.008 U	0.0032 U	0.0032 U	0.0032 U	0.0032 U
delta-BHC	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Dieldrin	NA	8.00E-04 U	8.00E-04 U	8.00E-04 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Endosulfan I	NA	4.00E-04 J	8.00E-04 U	8.00E-04 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Endosulfan II	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Endosulfan sulfate	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Endrin	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Endrin aldehyde	NA	0.008 U	0.008 U	0.008 U	0.0032 U	0.0032 U	0.0032 U	0.0032 U
Endrin ketone	NA	0.016 U	0.016 U	0.016 U	0.0032 U	0.0032 U	0.0032 U	0.0032 U
gamma-BHC (Lindane)	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
gamma-Chlordane	NA	0.008 U	0.008 U	0.008 U	0.0069 J	0.0072 J	0.0008 U	0.0008 U
Heptachlor	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Heptachlor epoxide	NA	0.0016 U	0.0016 U	0.0016 U	0.0038 J	0.0039 J	0.0008 U	8.10E-04 J
Methoxychlor	NA	0.008 U	0.008 U	0.008 U	0.0008 U	0.0008 U	0.0008 U	0.0008 U
Toxaphene	NA	2.00E-04 U	2.00E-04 U	2.00E-04 U	0.02 U	0.02 U	0.02 U	0.02 U
Total Metals (UG/L)								
Aluminum	NA	2,000	2,400	890	450	430	1,900	450
Antimony	NA	1 U	1 U	2.1	0.62 J	0.5 U	0.5 U	0.5 U
Arsenic	NA	1 U	1.3 U	1.2 U	0.32 J	0.27 J	0.64 J	0.35 J
Barium	NA	88	88	27	46	45	58	34
Beryllium	NA	1 U	1 U	1 U	0.4 U	0.4 U	0.4 U	0.4 U
Cadmium	NA	0.2 U	0.2 U	0.063 J	0.044 J	0.1 U	0.058 J	0.1 U
Calcium	NA	2,200	2,500	49,000	23,000	24,000	800	17,000
Chromium	2.3	2.6	2.6	0.95 J	2.1	0.86 J	3.5	0.95 J
Chromium (hexavalent)	1.1 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cobalt	NA	0.99 J	0.99 J	0.88 J	0.58 J	0.52 J	1	0.63 J
Copper	NA	1	0.95 J	1	2.9	0.93 J	1.4	0.39 J
Iron	NA	580	620	4,000	240	240	1,600	230
Lead	NA	1.1	1.5	0.5 U	0.79 J	0.57 J	1.3	0.47 J
Magnesium	NA	4,200	4,700	6,200	4,600	4,700	2,300	3,400
Manganese	NA	15	14	68	23	22	11	17

Sample ID	IR15-GW01-10D	IR15-GW02-10D	IR15-GW02D-10D	IR15-GW03-10D	IR15-GW04-11B	IR15-GW04D-11B	IR15-GW05-11B	IR15-GW06-11B
Sample Date	11/10/10	11/11/10	11/11/10	11/11/10	4/6/11	4/6/11	4/7/11	4/7/11
Chemical Name								
Mercury	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	NA	1.5	1.3	1.1 U	2.6	0.87 J	1.1	0.88 J
Potassium	NA	2,000	2,200	1,700	5,800	6,000	1,000	1,800
Selenium	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Silver	NA	0.086 J	0.2 U	0.066 J	0.1 U	0.1 U	0.1 U	0.1 U
Sodium	NA	14,000	15,000	6,800	6,200	6,500	6,800	5,700
Thallium	NA	0.2 U	0.2 U	0.069 J	0.04 J	0.036 J	0.033 J	0.028 J
Vanadium	NA	2	2	1.3	0.87 J	0.99 J	3.1	0.74 J
Zinc	NA	13	13	8.4 J	14	10	8 J	7.5 J
Dissolved Metals (UG/L)								
Aluminum	NA	300	330	520	100 U	100 U	39 J	100 U
Antimony	NA	1 U	1 U	1 U	0.28 J	0.5 U	0.5 U	0.5 U
Arsenic	NA	1 U	1 U	1.3 J	0.25 J	0.2 J	0.32 J	0.23 J
Barium	NA	81	90	28	43	43	50	35
Beryllium	NA	1 U	1 U	1 U	0.4 U	0.4 U	0.4 U	0.4 U
Cadmium	NA	0.078 J	0.2 U	0.2 U	0.1 U	0.1 U	0.1 U	0.1 U
Calcium	NA	2,400	2,400	46,000	24,000	22,000	690	18,000
Chromium	NA	0.73 J	0.63 J	1 U	0.38 J	0.64 J	0.77 J	0.32 J
Cobalt	NA	0.92 J	0.93 J	0.95 J	0.49 J	0.51 J	0.9 J	0.63 J
Copper	NA	1.5 J	0.89 J	1.2	0.82 J	0.76 J	0.86 J	1.2
Iron	NA	47	46	4,300	14 J	11 J	870	19 J
Lead	NA	0.28 J	0.5 U	0.5 U	0.18 J	0.17 J	0.5 U	0.5 U
Magnesium	NA	4,500	4,200	6,200	4,800	4,300	2,100	3,500
Manganese	NA	12	14	67	20	20	9.2	17
Mercury	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Nickel	NA	1.6	1.2	1.3	0.85 J	0.78 J	1.1	1.8
Potassium	NA	2,100	2,100	1,700	5,700	5,200	900	1,800
Selenium	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Silver	NA	0.12 J	0.2 U	0.07 J	0.1 U	0.1 U	0.1 U	0.1 U
Sodium	NA	14,000	14,000	6,900	6,300	5,800	6,600	6,200
Thallium	NA	0.086 J	0.2 U	0.061 J	0.041 J	0.035 J	0.1 U	0.1 U
Vanadium	NA	1 U	1 U	0.88 J	0.17 J	0.23 J	0.2 J	0.071 J
Zinc	NA	15	14	6.2 U	6.8 J	8.1 J	4 U	21

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Notes:

J - Analyte present. Value may or may not be accurate or precise

U - The material was analyzed for, but not detected

UG/L - Micrograms per liter

APPENDIX D

Raw Analytical Data Tables- Subsurface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-IS14	IR15-IS15	IR15-IS16	IR15-IS17	IR15-IS18	IR15-IS19	IR15-MW02		IR15-MW03
Sample ID	IR15-SB11-1-5-10D	IR15-SB12-1-5-10D	IR15-SB13-1-5-10D	IR15-SB14-1-3-10D	IR15-SB15-1-3-10D	IR15-SB16-1-4-10D	IR15-SB17-1-4-10D	IR15-SB18-1-4-10D	IR15-SB19-1-5-10D	IR15-SB20-1-5-10D	IR15-SB20D-1-5-10D	IR15-SB21-1-4-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name												
Volatile Organic Compounds (µg/kg)												
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
1,1-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
1,2-Dibromo-3-chloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
1,2-Dibromoethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
1,2-Dichloropropane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1 U	1.1 U	11 J
2-Hexanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
4-Methyl-2-pentanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.6 R	5.6 R	94 J
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	0.25 J
Bromodichloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Bromoform	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Bromomethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
Carbon disulfide	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.25 J	0.5 J
Carbon tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
Chloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
Chloroform	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	0.11 UJ
Chloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
cis-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Cyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	0.11 UJ
Dibromochloromethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
Isopropylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.28 U	0.28 U	0.27 UJ
Methyl acetate	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1 U	1.1 U	1.1 UJ
Methylcyclohexane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Methylene chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.8 U	2.8 U	2.7 UJ
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Styrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Tetrachloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	1.1 J
trans-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
trans-1,3-Dichloropropene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.22 U	0.22 U	0.22 UJ
Trichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
Trichlorofluoromethane (Freon-11)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.11 U	0.11 U	0.11 UJ
Vinyl chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.56 U	0.56 U	0.55 UJ
Xylene, total	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1 U	1.1 U	1.1 UJ
Semivolatile Organic Compounds (µg/kg)												
1,1-Biphenyl	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
2,4-Dichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	9.9 U
2,4-Dimethylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	190 U	190 U	200 U
2,4-Dinitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	190 U	190 U	200 U
2,4-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2-Chloronaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2-Chlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
2-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	9.9 U

APPENDIX D

Raw Analytical Data Tables- Subsurface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-IS14	IR15-IS15	IR15-IS16	IR15-IS17	IR15-IS18	IR15-IS19	IR15-MW02		IR15-MW03
Sample ID	IR15-SB11-1-5-10D	IR15-SB12-1-5-10D	IR15-SB13-1-5-10D	IR15-SB14-1-3-10D	IR15-SB15-1-3-10D	IR15-SB16-1-4-10D	IR15-SB17-1-4-10D	IR15-SB18-1-4-10D	IR15-SB19-1-5-10D	IR15-SB20-1-5-10D	IR15-SB20D-1-5-10D	IR15-SB21-1-4-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name												
3,3'-Dichlorobenzidine	NA	NA	NA	NA	NA	NA	NA	NA	NA	38 U	37 U	40 R
3-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
4,6-Dinitro-2-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
4-Bromophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
4-Chloro-3-methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	9.9 U
4-Chloroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	37 U	37 U	39 U
4-Chlorophenyl-phenylether	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	9.9 U
4-Nitroaniline	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	190 U	190 U	200 U
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	2.8 J
Acetophenone	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.1 J	19 U	1.6 J
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	4 J
Atrazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Benzaldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 UJ	3.7 UJ	10 J
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	32
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	30
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	7 U	5.2 U	67
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.4 U	3.7 U	7.6 UJ
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	26
bis(2-Chloroethoxy)methane	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
bis(2-Chloroethyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
bis(2-Chloroisopropyl)ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
bis(2-Ethylhexyl)phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 U	19 U	28 U
Butylbenzylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
Caprolactam	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	190 U	190 U	200 U
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	36 J
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.2 J
Dibenzofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Diethylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	9.9 U
Dimethyl phthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Di-n-butylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.4 U	9.3 U	18 J
Di-n-octylphthalate	NA	NA	NA	NA	NA	NA	NA	NA	NA	14 J	14 J	3.9 U
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	22 J
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Hexachlorocyclopentadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 R
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	9.6 UJ
Isophorone	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	2 U
n-Nitroso-di-n-propylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
n-Nitrosodiphenylamine	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Nitrobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	20 U
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Phenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.7 U	3.7 U	3.9 U
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	19 U	19 U	52
Pesticide/Polychlorinated Biphenyls (µg/kg)												
4,4'-DDD	NA	NA	NA	NA	NA	NA	32 J	0.19 U	1,500 J	0.15 U	0.15 U	29 J
4,4'-DDE	NA	NA	NA	NA	NA	NA	270 J	0.19 U	1,500 J	0.15 U	0.15 U	59 J
4,4'-DDT	NA	NA	NA	NA	NA	NA	630	0.19 U	31,000	0.15 U	0.15 U	5.8 J
Aldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
alpha-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
alpha-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	2.8 J
Aroclor-1016	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	14 U	15 U
Aroclor-1221	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	14 U	15 U
Aroclor-1232	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	14 U	15 U
Aroclor-1242	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	14 U	15 U
Aroclor-1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5 U	7.4 U	7.9 U
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	14 U	15 U
Aroclor-1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	15 U	14 U	15 U

APPENDIX D

Raw Analytical Data Tables- Subsurface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-IS14	IR15-IS15	IR15-IS16	IR15-IS17	IR15-IS18	IR15-IS19	IR15-MW02		IR15-MW03
Sample ID	IR15-SB11-1-5-10D	IR15-SB12-1-5-10D	IR15-SB13-1-5-10D	IR15-SB14-1-3-10D	IR15-SB15-1-3-10D	IR15-SB16-1-4-10D	IR15-SB17-1-4-10D	IR15-SB18-1-4-10D	IR15-SB19-1-5-10D	IR15-SB20-1-5-10D	IR15-SB20D-1-5-10D	IR15-SB21-1-4-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name												
beta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 U	1.5 U	1.6 U
delta-BHC	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	2.5 J
Endosulfan I	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
Endosulfan sulfate	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
Endrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
Endrin aldehyde	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 U	1.4 U	1.5 U
Endrin ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5 U	1.4 U	3.8 J
gamma-BHC (Lindane)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	1.5 J
Heptachlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.15 U	0.16 U
Heptachlor epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U	0.14 U	0.15 U
Methoxychlor	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.34 U	0.33 U	0.36 U
Toxaphene	NA	NA	NA	NA	NA	NA	NA	NA	NA	37 U	37 U	39 U
Total Metals (mg/kg)												
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,100	3,600	4,000
Antimony	2.5	0.093 J	0.27	NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.43
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.81	0.72	1.2
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.3 U	4.9 U	19 U
Beryllium	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.038 J	0.056 J	0.066 J
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04 U	0.018 J	0.12
Calcium	NA	NA	NA	NA	NA	NA	NA	NA	NA	390	380	2,300
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.3	3.9	5.9
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.18	0.16	0.31
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.61 U	0.5 U	9
Iron	NA	NA	NA	14,000	30,000	20,000	NA	NA	NA	2,600	2,500	3,000 U
Lead	70	4.1	22	8.6	8	330	NA	NA	NA	3 U	2.9 U	36 J
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	160	140	160
Manganese	NA	NA	NA	NA	NA	NA	NA	NA	NA	2 U	1.8 U	18
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.017 U	0.016 U	0.047
Nickel	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.6 U	0.66 U	1.7 U
Potassium	NA	NA	NA	NA	NA	NA	NA	NA	NA	150	140	150
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.14 J
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.032 J	0.032 J	0.076 J
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	11 J	10 J	12 J
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.027 J	0.038 J	0.035 J
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.1	5.6	8
Zinc	110	4.5	22	6.7	6.2	260	NA	NA	NA	3.5 U	1.8 U	58 U
Wet Chemistry												
Chromium (hexavalent) (mg/kg)	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.37 J	0.24 J	0.23 J

Notes:

Shading indicates detections

NA - Not analyzed

J - Analyte present, value may or may not be accurate or precise

R - Unreliable Result

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

µg/kg - Micrograms per kilogram

APPENDIX D

Raw Analytical Data Tables- Surface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID	IR15-SS11-0-0_5-10D	IR15-SS12-0-0_5-10D	IR15-SS13-0-0_5-10D	IR15-SS20-0-0_5-10D	IR15-SS20D-0-0_5-10D	IR15-SS21-0-0_5-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name						
Volatile Organic Compounds (µg/kg)						
1,1,1-Trichloroethane	NA	NA	NA	0.24 U	28 U	0.22 U
1,1,2,2-Tetrachloroethane	NA	NA	NA	0.3 U	55 U	0.28 UJ
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	NA	NA	NA	0.24 U	28 U	0.22 U
1,1,2-Trichloroethane	NA	NA	NA	0.6 U	28 U	0.56 U
1,1-Dichloroethane	NA	NA	NA	0.24 U	28 U	0.22 U
1,1-Dichloroethene	NA	NA	NA	0.3 U	28 U	0.28 U
1,2,4-Trichlorobenzene	NA	NA	NA	0.6 U	28 U	0.56 UJ
1,2-Dibromo-3-chloropropane	NA	NA	NA	0.6 U	55 U	0.56 UJ
1,2-Dibromoethane	NA	NA	NA	0.6 U	28 U	0.56 U
1,2-Dichlorobenzene	NA	NA	NA	0.6 U	28 U	0.56 UJ
1,2-Dichloroethane	NA	NA	NA	0.24 U	28 U	0.22 U
1,2-Dichloropropane	NA	NA	NA	0.3 U	28 U	0.28 U
1,3-Dichlorobenzene	NA	NA	NA	0.6 U	28 U	0.56 UJ
1,4-Dichlorobenzene	NA	NA	NA	0.6 U	28 U	0.34 J
2-Butanone	NA	NA	NA	2.2 J	63 U	4.2 J
2-Hexanone	NA	NA	NA	0.6 U	55 U	0.56 U
4-Methyl-2-pentanone	NA	NA	NA	0.3 U	55 U	0.28 U
Acetone	NA	NA	NA	25 J	280 U	61 J
Benzene	NA	NA	NA	0.59 J	28 U	0.74 J
Bromodichloromethane	NA	NA	NA	0.24 U	28 U	0.22 U
Bromoform	NA	NA	NA	0.24 U	28 U	0.22 U
Bromomethane	NA	NA	NA	0.6 U	28 U	0.56 U
Carbon disulfide	NA	NA	NA	0.48 J	28 U	0.58 J
Carbon tetrachloride	NA	NA	NA	0.3 U	28 U	0.28 U
Chlorobenzene	NA	NA	NA	0.3 U	28 U	0.28 U
Chloroethane	NA	NA	NA	0.3 U	28 U	0.28 U
Chloroform	NA	NA	NA	0.12 U	28 U	0.11 U
Chloromethane	NA	NA	NA	0.6 U	55 U	0.56 U
cis-1,2-Dichloroethene	NA	NA	NA	0.3 U	28 U	0.28 U
cis-1,3-Dichloropropene	NA	NA	NA	0.24 U	28 U	0.22 U
Cyclohexane	NA	NA	NA	0.12 U	55 U	0.11 U
Dibromochloromethane	NA	NA	NA	0.6 U	28 U	0.56 U
Dichlorodifluoromethane (Freon-12)	NA	NA	NA	0.6 U	55 U	0.56 U
Ethylbenzene	NA	NA	NA	0.3 U	28 U	0.28 U
Isopropylbenzene	NA	NA	NA	0.3 U	28 U	0.28 UJ
Methyl acetate	NA	NA	NA	1.2 U	55 U	1.1 U
Methylcyclohexane	NA	NA	NA	0.31 J	28 U	0.22 U
Methylene chloride	NA	NA	NA	3 U	55 U	2.8 U
Methyl-tert-butyl ether (MTBE)	NA	NA	NA	0.24 U	55 U	0.22 U
Styrene	NA	NA	NA	0.24 U	28 U	0.22 U
Tetrachloroethene	NA	NA	NA	0.24 U	28 U	0.22 U
Toluene	NA	NA	NA	0.6 U	28 U	0.94 J
trans-1,2-Dichloroethene	NA	NA	NA	0.24 U	28 U	0.22 U

APPENDIX D

Raw Analytical Data Tables- Surface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID	IR15-SS11-0-0_5-10D	IR15-SS12-0-0_5-10D	IR15-SS13-0-0_5-10D	IR15-SS20-0-0_5-10D	IR15-SS20D-0-0_5-10D	IR15-SS21-0-0_5-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name						
trans-1,3-Dichloropropene	NA	NA	NA	0.24 U	28 U	0.22 U
Trichloroethene	NA	NA	NA	0.6 U	55 U	0.56 U
Trichlorofluoromethane (Freon-11)	NA	NA	NA	0.12 U	28 U	0.11 U
Vinyl chloride	NA	NA	NA	0.6 U	28 U	0.56 U
Xylene, total	NA	NA	NA	1.2 U	83 U	1.1 U
Semivolatile Organic Compounds (µg/kg)						
1,1-Biphenyl	NA	NA	NA	3.7 U	3.7 U	3.7 U
2,4,5-Trichlorophenol	NA	NA	NA	3.7 U	3.7 U	3.7 U
2,4,6-Trichlorophenol	NA	NA	NA	18 U	18 U	19 U
2,4-Dichlorophenol	NA	NA	NA	9.2 U	9.2 U	9.4 U
2,4-Dimethylphenol	NA	NA	NA	180 U	180 U	190 U
2,4-Dinitrophenol	NA	NA	NA	180 U	180 U	190 U
2,4-Dinitrotoluene	NA	NA	NA	18 U	18 U	19 U
2,6-Dinitrotoluene	NA	NA	NA	3.7 U	3.7 U	3.7 U
2-Chloronaphthalene	NA	NA	NA	3.7 U	3.7 U	3.7 U
2-Chlorophenol	NA	NA	NA	3.7 U	3.7 U	3.7 U
2-Methylnaphthalene	NA	NA	NA	3.7 U	3.7 U	3.7 U
2-Methylphenol	NA	NA	NA	3.7 U	3.7 U	3.7 U
2-Nitroaniline	NA	NA	NA	3.7 U	3.7 U	3.7 U
2-Nitrophenol	NA	NA	NA	9.2 U	9.2 U	9.4 U
3,3'-Dichlorobenzidine	NA	NA	NA	37 U	37 U	38 U
3-Nitroaniline	NA	NA	NA	18 U	18 U	19 U
4,6-Dinitro-2-methylphenol	NA	NA	NA	18 U	18 U	19 U
4-Bromophenyl-phenylether	NA	NA	NA	3.7 U	3.7 U	3.7 U
4-Chloro-3-methylphenol	NA	NA	NA	9.2 U	9.2 U	9.4 U
4-Chloroaniline	NA	NA	NA	37 U	37 U	37 U
4-Chlorophenyl-phenylether	NA	NA	NA	3.7 U	3.7 U	3.7 U
4-Methylphenol	NA	NA	NA	9.2 U	9.2 U	9.4 U
4-Nitroaniline	NA	NA	NA	18 U	18 U	19 U
4-Nitrophenol	NA	NA	NA	180 U	180 U	190 U
Acenaphthene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Acenaphthylene	NA	NA	NA	3.7 J	3.4 J	3.7 U
Acetophenone	NA	NA	NA	1.1 J	18 U	1.9 J
Anthracene	NA	NA	NA	6.6 J	6.7 J	3.7 U
Atrazine	NA	NA	NA	3.7 U	3.7 U	3.7 U
Benzaldehyde	NA	NA	NA	3.7 J	3.4 J	3.8 J
Benzo(a)anthracene	NA	NA	NA	32	20	19 U
Benzo(a)pyrene	NA	NA	NA	160	140	9.9 U
Benzo(b)fluoranthene	NA	NA	NA	290	240	17 J
Benzo(g,h,i)perylene	NA	NA	NA	330	270	9.5 U
Benzo(k)fluoranthene	NA	NA	NA	100	90	5.7 U
bis(2-Chloroethoxy)methane	NA	NA	NA	3.7 U	3.7 U	3.7 U
bis(2-Chloroethyl)ether	NA	NA	NA	3.7 U	3.7 U	3.7 U
bis(2-Chloroisopropyl)ether	NA	NA	NA	3.7 U	3.7 U	3.7 U

APPENDIX D

Raw Analytical Data Tables- Surface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID	IR15-SS11-0-0_5-10D	IR15-SS12-0-0_5-10D	IR15-SS13-0-0_5-10D	IR15-SS20-0-0_5-10D	IR15-SS20D-0-0_5-10D	IR15-SS21-0-0_5-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name						
bis(2-Ethylhexyl)phthalate	NA	NA	NA	24 U	23 U	82 U
Butylbenzylphthalate	NA	NA	NA	18 U	18 U	19 U
Caprolactam	NA	NA	NA	18 U	18 U	19 U
Carbazole	NA	NA	NA	180 U	180 U	190 U
Chrysene	NA	NA	NA	80	70	19 U
Dibenz(a,h)anthracene	NA	NA	NA	59	50	3.4 J
Dibenzofuran	NA	NA	NA	3.7 U	3.7 U	3.7 U
Diethylphthalate	NA	NA	NA	9.2 U	9.2 U	9.4 U
Dimethyl phthalate	NA	NA	NA	3.7 U	3.7 U	3.7 U
Di-n-butylphthalate	NA	NA	NA	9.2 U	9.2 U	9.4 U
Di-n-octylphthalate	NA	NA	NA	15 J	16 J	16 J
Fluoranthene	NA	NA	NA	6.9 U	6 U	3.7 UJ
Fluorene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Hexachlorobenzene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Hexachlorobutadiene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Hexachlorocyclopentadiene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Hexachloroethane	NA	NA	NA	3.7 U	3.7 U	3.7 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	240	210	7.6 U
Isophorone	NA	NA	NA	18 U	18 U	19 U
Naphthalene	NA	NA	NA	1.8 U	1.8 U	1.9 U
n-Nitroso-di-n-propylamine	NA	NA	NA	3.7 U	3.7 U	3.7 U
n-Nitrosodiphenylamine	NA	NA	NA	3.7 U	3.7 U	3.7 U
Nitrobenzene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Pentachlorophenol	NA	NA	NA	18 U	18 U	19 U
Phenanthrene	NA	NA	NA	3.7 U	3.7 U	3.7 U
Phenol	NA	NA	NA	3.6 U	3.6 U	3.7 U
Pyrene	NA	NA	NA	27	16 J	19 U
Pesticide/Polychlorinated Biphenyls (µg/kg)						
4,4'-DDD	0.18 U	0.15 U	0.15 U	0.41 J	0.53 J	0.15 U
4,4'-DDE	0.18 U	2.7 J	2.8 J	5 J	6.9 J	6.8 J
4,4'-DDT	39	1.5 J	1.4 J	4.4 J	8.1 J	4.8 J
Aldrin	NA	NA	NA	0.15 U	0.15 U	0.15 U
alpha-BHC	NA	NA	NA	0.15 U	0.15 U	0.15 U
alpha-Chlordane	NA	NA	NA	0.15 U	0.15 U	0.15 U
Aroclor-1016	NA	NA	NA	14 U	14 U	15 U
Aroclor-1221	NA	NA	NA	14 U	14 U	15 U
Aroclor-1232	NA	NA	NA	14 U	14 U	15 U
Aroclor-1242	NA	NA	NA	14 U	14 U	15 U
Aroclor-1248	NA	NA	NA	7.4 U	7.4 U	7.5 U
Aroclor-1254	360	260	15 U	14 U	14 U	120
Aroclor-1260	NA	NA	NA	14 U	14 U	15 U
beta-BHC	NA	NA	NA	1.5 U	1.5 U	1.5 U
delta-BHC	NA	NA	NA	0.15 U	0.15 U	0.15 U
Dieldrin	NA	NA	NA	0.15 U	0.15 U	0.15 U

APPENDIX D

Raw Analytical Data Tables- Surface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID	IR15-SS11-0-0_5-10D	IR15-SS12-0-0_5-10D	IR15-SS13-0-0_5-10D	IR15-SS20-0-0_5-10D	IR15-SS20D-0-0_5-10D	IR15-SS21-0-0_5-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name						
Endosulfan I	NA	NA	NA	0.15 U	0.15 U	0.15 U
Endosulfan II	NA	NA	NA	0.15 U	0.15 U	0.15 U
Endosulfan sulfate	NA	NA	NA	0.15 U	0.15 U	0.15 U
Endrin	NA	NA	NA	0.15 U	0.15 U	0.83 J
Endrin aldehyde	NA	NA	NA	1.4 U	1.4 U	1.5 U
Endrin ketone	NA	NA	NA	1.4 U	1.4 U	1.5 U
gamma-BHC (Lindane)	NA	NA	NA	0.15 U	0.15 U	0.15 U
gamma-Chlordane	NA	NA	NA	0.15 U	0.15 U	0.15 U
Heptachlor	NA	NA	NA	0.15 U	0.15 U	0.15 U
Heptachlor epoxide	NA	NA	NA	0.14 U	0.14 U	0.15 U
Methoxychlor	NA	NA	NA	0.33 U	0.33 U	0.34 U
Toxaphene	NA	NA	NA	37 U	37 U	37 U
Dioxin/Furans (pg/g)						
1,2,3,4,6,7,8-Heptachlorodibenzofuran	95 U	63 U	NA	NA	NA	17 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	140	110 U	NA	NA	NA	38 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	3.7	2.2 J	NA	NA	NA	0.83 U
1,2,3,4,7,8-Hexachlorodibenzofuran	6.9 U	10	NA	NA	NA	1.2 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	4.8 U	3 U	NA	NA	NA	1.2 J
1,2,3,6,7,8-Hexachlorodibenzofuran	8.7 U	5.5 U	NA	NA	NA	1.4 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	6.8	4.9 U	NA	NA	NA	1.8 J
1,2,3,7,8,9-Hexachlorodibenzofuran	0.61 U	0.84 U	NA	NA	NA	0.19 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	3.6 U	3.7 U	NA	NA	NA	1.4 U
1,2,3,7,8-Pentachlorodibenzofuran	1 U	0.58 U	NA	NA	NA	0.3 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.96 U	0.89 U	NA	NA	NA	0.46 U
2,3,4,6,7,8-Hexachlorodibenzofuran	2.1 J	1.9 J	NA	NA	NA	0.61 U
2,3,4,7,8-Pentachlorodibenzofuran	3.5 U	0.57 U	NA	NA	NA	0.51 U
2,3,7,8-TCDD (dioxin)	0.15 U	0.33 U	NA	NA	NA	0.15 U
2,3,7,8-Tetrachlorodibenzofuran	3	2 U	NA	NA	NA	1.1
Octachlorodibenzofuran	96	74	NA	NA	NA	20
Octachlorodibenzo-p-dioxin	1,400	2,300	NA	NA	NA	950
Total heptachlorodibenzofuran	99	130	NA	NA	NA	29
Total heptachlorodibenzo-p-dioxin	260	230	NA	NA	NA	85
Total hexachlorodibenzofuran	120	69	NA	NA	NA	7.2
Total hexachlorodibenzo-p-dioxin	58	39	NA	NA	NA	4.7
Total pentachlorodibenzofuran	23	99	NA	NA	NA	5.3
Total pentachlorodibenzo-p-dioxin	8.9 U	1.4	NA	NA	NA	4.4 U
Total tetrachlorodibenzofuran	15	4.3	NA	NA	NA	1.1
Total tetrachlorodibenzo-p-dioxin	1.8	3.8	NA	NA	NA	5 U
Toxic Equivalents (Total TEQ)	3.5	3	NA	NA	NA	NA
Total Metals (mg/kg)						
Aluminum	NA	NA	NA	4,100	4,300	3,000
Antimony	NA	NA	NA	0.32	0.33	0.52
Arsenic	NA	NA	NA	0.83	1.1	0.8

APPENDIX D

Raw Analytical Data Tables- Surface Soil

Site 15 ESI Report

MCB Cam Lej; North Carolina

Station ID	IR15-IS11	IR15-IS12	IR15-IS13	IR15-MW02		IR15-MW03
Sample ID	IR15-SS11-0-0_5-10D	IR15-SS12-0-0_5-10D	IR15-SS13-0-0_5-10D	IR15-SS20-0-0_5-10D	IR15-SS20D-0-0_5-10D	IR15-SS21-0-0_5-10D
Sample Date	11/10/10	11/10/10	11/10/10	11/09/10	11/09/10	11/09/10
Chemical Name						
Barium	NA	NA	NA	14	15	13
Beryllium	NA	NA	NA	0.063 J	0.066 J	0.062 J
Cadmium	NA	NA	NA	0.12	0.12	0.2
Calcium	NA	NA	NA	4,100	5,100	7,600
Chromium	NA	NA	NA	6.6	4.7	4.1
Cobalt	NA	NA	NA	0.22	0.28	0.29
Copper	NA	NA	NA	6.8	7	16
Iron	NA	NA	NA	2,700	2,700	2,500
Lead	NA	NA	NA	39 J	49 J	30 J
Magnesium	NA	NA	NA	200	220	170
Manganese	NA	NA	NA	15 J	160 J	15
Mercury	1.2	0.51	0.017 U	0.035 J	0.033 J	0.12
Nickel	NA	NA	NA	1.2	1.3	1.6
Potassium	NA	NA	NA	130	140	120
Selenium	NA	NA	NA	0.2 J	0.19 J	0.18 J
Silver	NA	NA	NA	0.057 J	0.045 J	0.13
Sodium	NA	NA	NA	21 J	22 J	10 J
Thallium	NA	NA	NA	0.036 J	0.036 J	0.027 J
Vanadium	NA	NA	NA	6.1	6.9	5.1
Zinc	NA	NA	NA	32 J	150 J	46 J
Wet Chemistry						
Chromium (hexavalent) (mg/kg)	NA	NA	NA	0.58 J	0.39 J	0.46 J

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Notes:

Shading indicates detections

NA - Not analyzed

J - Analyte present, value may or may not be accurate or precise

U - The material was analyzed for, but not detected

UJ - Analyte not detected, quantitation limit may be inaccurate

mg/kg - Milligrams per kilogram

pg/g - Picograms per gram

µg/kg - Micrograms per kilogram

Appendix E
Human Health Risk Assessment

Appendix E-1
Screening

APPENDIX E-1

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Surface Soil	71-55-6	1,1,1-Trichloroethane	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	6.4E+02 NS	1.2E+00	NCSSL	NO	DLBSL
	79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	5.6E-01 C	1.2E-03	NCSSL	NO	DLBSL
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane(Freon-113)	ND	ND	MG/KG		0/14	0.0056 - 0.28	2.8E-01	N/A	9.1E+02 NS	9.2E+03	NCSSL	NO	DLBSL
	79-00-5	1,1,2-Trichloroethane	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	1.6E-01 C**	N/A		NO	DLBSL
	75-34-3	1,1-Dichloroethane	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	3.3E+00 C	3.0E-02	NCSSL	NO	DLBSL
	75-35-4	1,1-Dichloroethene	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	2.4E+01 N	4.6E-02	NCSSL	NO	DLBSL
	120-82-1	1,2,4-Trichlorobenzene	ND	ND	MG/KG		0/14	0.0022 - 0.11	1.1E-01	N/A	6.2E+00 C**	2.2E+00	NCSSL	NO	DLBSL
	96-12-8	1,2-Dibromo-3-chloropropane	ND	ND	MG/KG		0/14	0.0056 - 0.28	2.8E-01	N/A	5.4E-03 C	2.5E-04	NCSSL	YES	DLASL
	106-93-4	1,2-Dibromoethane	ND	ND	MG/KG		0/14	0.0034 - 0.055	5.5E-02	N/A	3.4E-02 C	9.7E-05	NCSSL	YES	DLASL
	95-50-1	1,2-Dichlorobenzene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	1.9E+02 N	2.4E-01	NCSSL	NO	DLBSL
	107-06-2	1,2-Dichloroethane	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	4.3E-01 C	2.0E-03	NCSSL	NO	DLBSL
	78-87-5	1,2-Dichloropropane	ND	ND	MG/KG		0/14	0.0034 - 0.055	5.5E-02	N/A	9.4E-01 C*	3.3E-03	NCSSL	NO	DLBSL
	541-73-1	1,3-Dichlorobenzene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	2.4E+00 C	7.6E+00	NCSSL	NO	DLBSL
	106-46-7	1,4-Dichlorobenzene	3.4E-04 J	3.4E-04 J	MG/KG	IR15-SS21-0-0_5-10D	1/14	0.0011 - 0.055	3.4E-04	N/A	2.4E+00 C	7.0E-02	NCSSL	NO	BSL
	78-93-3	2-Butanone	4.4E-03 J	4.0E-02 J	MG/KG	IR15-SS08-00-01-09C	9/14	0.0085 - 0.018	4.0E-02	N/A	2.8E+03 N	1.6E+01	NCSSL	NO	BSL
	591-78-6	2-Hexanone	ND	ND	MG/KG		0/14	0.011 - 2.8	2.8E+00	N/A	2.1E+01 N	1.2E+00	NCSSL	NO	DLBSL
	108-10-1	4-Methyl-2-pentanone	ND	ND	MG/KG		0/14	0.011 - 2.8	2.8E+00	N/A	5.3E+02 N	N/A		NO	DLBSL
	67-64-1	Acetone	5.3E-03 J	1.7E+00 J	MG/KG	IR15-SS08-00-01-09C	14/15	0.0085 - 0.036	1.7E+00	N/A	6.1E+03 N	2.4E+01	NCSSL	NO	BSL
	71-43-2	Benzene	5.9E-04 J	7.4E-04 J	MG/KG	IR15-SS21-0-0_5-10D	2/14	0.0042 - 0.0091	7.4E-04	N/A	1.1E+00 C*	7.3E-02	NCSSL	NO	BSL
	75-27-4	Bromodichloromethane	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	2.7E-01 C	2.9E-03	NCSSL	NO	DLBSL
	75-25-2	Bromoform	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	6.2E+01 C*	1.9E-02	NCSSL	NO	DLBSL
	74-83-9	Bromomethane	ND	ND	MG/KG		0/12	0.0045 - 0.055	5.5E-02	N/A	7.3E-01 N	N/A		NO	DLBSL
	75-15-0	Carbon disulfide	4.8E-04 J	5.8E-04 J	MG/KG	IR15-SS21-0-0_5-10D	2/14	0.0042 - 0.0091	5.8E-04	N/A	8.2E+01 N	3.8E+00	NCSSL	NO	BSL
	56-23-5	Carbon tetrachloride	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	6.1E-01 C	2.0E-03	NCSSL	NO	DLBSL
	108-90-7	Chlorobenzene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	2.9E+01 N	4.5E-01	NCSSL	NO	DLBSL
	75-00-3	Chloroethane	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	1.5E+03 N	1.6E+01	NCSSL	NO	DLBSL
	67-66-3	Chloroform	5.2E-03 J	5.2E-03 J	MG/KG	IR15-SS01-00-01-09C	1/14	0.0042 - 0.0091	5.2E-03	N/A	2.9E-01 C	3.4E-01	NCSSL	NO	BSL
	74-87-3	Chloromethane	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	1.2E+01 N	1.5E-02	NCSSL	NO	DLBSL
	156-59-2	cis-1,2-Dichloroethene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	1.6E+01 N	3.6E-01	NCSSL	NO	DLBSL
	10061-01-5	cis-1,3-Dichloropropene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	1.7E+00 C*	2.3E-03	NCSSL	NO	DLBSL
	110-82-7	Cyclohexane	ND	ND	MG/KG		0/14	0.0056 - 0.28	2.8E-01	N/A	1.2E+02 NS	N/A		NO	DLBSL
	124-48-1	Dibromochloromethane	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	6.8E-01 C	1.9E-03	NCSSL	NO	DLBSL
	75-71-8	Dichlorodifluoromethane (Freon-12)	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	9.4E+00 N	2.9E+01	NCSSL	NO	DLBSL
	100-41-4	Ethylbenzene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	5.4E+00 C	8.1E+00	NCSSL	NO	DLBSL
	98-82-8	Isopropylbenzene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	2.1E+02 N	1.3E+00	NCSSL	NO	DLBSL
	79-20-9	Methyl acetate	4.5E-03 J	2.1E+00	MG/KG	IR15-SS08-00-01-09C	5/15	0.0042 - 0.72	2.1E+00	N/A	7.8E+03 N	N/A		NO	BSL
	108-87-2	Methylcyclohexane	3.1E-04 J	3.1E-04 J	MG/KG	IR15-SS20-0-0_5-10D	1/14	0.0042 - 0.0091	3.1E-04	N/A	5.7E+01 N	N/A		NO	BSL
	75-09-2	Methylene chloride	ND	ND	MG/KG		0/14	0.017 - 0.28	2.8E-01	N/A	1.1E+01 C	2.3E-02	NCSSL	NO	DLBSL
	1634-04-4	Methyl-tert-butyl ether (MTBE)	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	4.3E+01 C	8.5E-02	NCSSL	NO	DLBSL
	100-42-5	Styrene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	6.3E+02 N	9.2E-01	NCSSL	NO	DLBSL
	127-18-4	Tetrachloroethene	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	5.5E-01 C	5.0E-03	NCSSL	NO	DLBSL
	108-88-3	Toluene	9.4E-04 J	1.0E-02 J	MG/KG	IR15-SS08-00-01-09C	2/14	0.0022 - 0.055	1.0E-02	N/A	5.0E+02 N	5.5E+00	NCSSL	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	1.5E+01 N	5.1E-01	NCSSL	NO	DLBSL
	10061-02-6	trans-1,3-Dichloropropene	ND	ND	MG/KG		0/14	0.0034 - 0.055	5.5E-02	N/A	1.7E+00 C*	2.3E-03	NCSSL	NO	DLBSL
	79-01-6	Trichloroethene	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	2.5E+00 C**	1.8E-02	NCSSL	NO	DLBSL
	75-69-4	Trichlorofluoromethane(Freon-11)	ND	ND	MG/KG		0/14	0.0022 - 0.055	5.5E-02	N/A	7.9E+01 N	2.4E+01	NCSSL	NO	DLBSL
	75-01-4	Vinyl chloride	ND	ND	MG/KG		0/14	0.0011 - 0.055	5.5E-02	N/A	6.0E-02 C	1.9E-04	NCSSL	NO	DLBSL
	1330-20-7	Xylene, total	ND	ND	MG/KG		0/14	0.0034 - 0.17	1.7E-01	N/A	6.3E+01 N	6.0E+00	NCSSL	NO	DLBSL
	92-52-4	1,1-Biphenyl	ND	ND	MG/KG		0/14	0.018 - 0.019	1.9E-02	N/A	5.1E+00 N	4.3E+01	NCSSL	NO	DLBSL
	108-60-1	2,2'-Oxybis(1-chloropropane)	ND	ND	MG/KG		0/15	0.17 - 0.4	4.0E-01	N/A	4.6E+00 C	N/A		NO	DLBSL
	95-95-4	2,4,5-Trichlorophenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+02 N	N/A		NO	DLBSL
	88-06-2	2,4,6-Trichlorophenol	ND	ND	MG/KG		0/8	0.36 - 0.4	4.0E-01	N/A	6.1E+00 C**	N/A		NO	DLBSL
	120-83-2	2,4-Dichlorophenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.8E+01 N	N/A		NO	DLBSL
	105-67-9	2,4-Dimethylphenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.2E+02 N	1.4E+00	NCSSL	NO	DLBSL
	51-28-5	2,4-Dinitrophenol	ND	ND	MG/KG		0/17	0.17 - 1	1.0E+00	N/A	1.2E+01 N	N/A		NO	DLBSL
	121-14-2	2,4-Dinitrotoluene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.6E+00 C*	N/A		NO	DLBSL

APPENDIX E-1

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	606-20-2	2,6-Dinitrotoluene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+00 N	N/A		NO	DLBSL
	91-58-7	2-Chloronaphthalene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.8E+02 NS	N/A		NO	DLBSL
	95-57-8	2-Chlorophenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.9E+01 N	4.1E-03	NCSSL	NO	DLBSL
	91-57-6	2-Methylnaphthalene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.1E+01 N	1.6E+00	NCSSL	NO	DLBSL
	95-48-7	2-Methylphenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.1E+02 N	N/A		NO	DLBSL
	88-74-4	2-Nitroaniline	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+01 N	N/A		NO	DLBSL
	88-75-5	2-Nitrophenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.9E+01 N	N/A		NO	DLBSL
	m&pCRESOL	3- and 4-Methylphenol	ND	ND	MG/KG		0/5	0.73 - 0.8	8.0E-01	N/A	3.1E+01 N	4.0E-01	NCSSL	NO	DLBSL
	91-94-1	3,3'-Dichlorobenzidine	ND	ND	MG/KG		0/17	0.17 - 1	1.0E+00	N/A	1.1E+00 C	N/A		NO	DLBSL
	99-09-2	3-Nitroaniline	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+01 N	N/A		NO	DLBSL
	534-52-1	4,6-Dinitro-2-methylphenol	ND	ND	MG/KG		0/17	0.17 - 1	1.0E+00	N/A	4.9E-01 N	N/A		YES	DLASL
	101-55-3	4-Bromophenyl-phenylether	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	N/A	N/A		NO	NTX
	59-50-7	4-Chloro-3-methylphenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+02 N	N/A		NO	DLBSL
	106-47-8	4-Chloroaniline	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	2.4E+00 C	N/A		NO	DLBSL
	7005-72-3	4-Chlorophenyl-phenylether	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.1E+01 N	N/A		NO	DLBSL
	106-44-5	4-Methylphenol	ND	ND	MG/KG		0/17	0.17 - 0.21	2.1E-01	N/A	3.1E+01 N	4.0E-01	NCSSL	NO	DLBSL
	100-01-6	4-Nitroaniline	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	2.4E+01 C*	N/A		NO	DLBSL
	100-02-7	4-Nitrophenol	ND	ND	MG/KG		0/17	0.17 - 1	1.0E+00	N/A	4.8E+00 C*	N/A		NO	DLBSL
	83-32-9	Acenaphthene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.4E+02 N	8.4E+00	NCSSL	NO	DLBSL
	208-96-8	Acenaphthylene	3.7E-03 J	3.7E-03 J	MG/KG	IR15-SS20-0-0_5-10D	1/17	0.17 - 0.4	3.7E-03	N/A	3.4E+02 N	1.1E+01	NCSSL	NO	BSL
	98-86-2	Acetophenone	1.1E-03 J	1.9E-03 J	MG/KG	IR15-SS21-0-0_5-10D	2/17	0.17 - 0.4	1.9E-03	N/A	7.8E+02 N	N/A		NO	BSL
	120-12-7	Anthracene	6.7E-03 J	6.7E-03 J	MG/KG	IR15-SS20D-0-0_5-10D	1/17	0.17 - 0.4	6.7E-03	N/A	1.7E+03 N	6.6E+02	NCSSL	NO	BSL
	1912-24-9	Atrazine	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	2.1E+00 C	2.5E-02	NCSSL	NO	DLBSL
	100-52-7	Benzaldehyde	3.7E-03 J	3.8E-03 J	MG/KG	IR15-SS21-0-0_5-10D	2/17	0.17 - 1	3.8E-03	N/A	7.8E+02 N	N/A		NO	BSL
	56-55-3	**Benzo(a)anthracene**	**3.2E-02**	**3.2E-02**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**1/17**	**0.035 - 0.4**	**3.2E-02**	**N/A**	**1.5E-01 C**	**1.8E-01**	**NCSSL**	**YES**	**CPAH**
	50-32-8	**Benzo(a)pyrene**	**1.6E-01**	**1.6E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**1/17**	**0.035 - 0.4**	**1.6E-01**	**N/A**	**1.5E-02 C**	**5.9E-02**	**NCSSL**	**YES**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	**1.7E-02 J**	**2.9E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**2/17**	**0.035 - 0.4**	**2.9E-01**	**N/A**	**1.5E-01 C**	**6.0E-01**	**NCSSL**	**YES**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	9.5E-02 J	3.3E-01	MG/KG	IR15-SS20-0-0_5-10D	2/17	0.17 - 0.4	3.3E-01	N/A	1.7E+02 N	3.6E+02	NCSSL	NO	BSL
	207-08-9	**Benzo(k)fluoranthene**	**1.0E-01**	**1.0E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**1/17**	**0.17 - 0.4**	**1.0E-01**	**N/A**	**1.5E+00 C**	**5.9E+00**	**NCSSL**	**YES**	**CPAH**
	111-91-1	bis(2-Chloroethoxy)methane	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.8E+01 N	N/A		NO	DLBSL
	111-44-4	bis(2-Chloroethyl)ether	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	2.1E-01 C	1.4E-04	NCSSL	YES	DLASL
	39638-32-9	bis(2-Chloroisopropyl)ether	ND	ND	MG/KG		0/2	0.018 - 0.019	1.9E-02	N/A	N/A	N/A		NO	NTX
	117-81-7	bis(2-Ethylhexyl)phthalate	8.8E-02 J	1.8E-01 J	MG/KG	IR15-SS01-00-01-09C	3/17	0.17 - 0.4	1.8E-01	N/A	3.5E+01 C*	7.2E+00	NCSSL	NO	BSL
	85-68-7	Butylbenzylphthalate	1.9E-01 J	1.9E-01 J	MG/KG	IR15-SS01-00-01-09C	1/17	0.17 - 0.4	1.9E-01	N/A	2.6E+02 C*	1.5E+02	NCSSL	NO	BSL
	105-60-2	Caprolactam	ND	ND	MG/KG		0/16	0.17 - 1	1.0E+00	N/A	3.1E+03 N	1.8E+01	NCSSL	NO	DLBSL
	86-74-8	Carbazole	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	N/A	N/A		NO	NTX
	218-01-9	**Chrysene**	**1.5E-02 J**	**8.0E-02**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**3/17**	**0.17 - 0.4**	**8.0E-02**	**N/A**	**1.5E+01 C**	**1.8E+01**	**NCSSL**	**YES**	**CPAH**
	53-70-3	**Dibenz(a,h)anthracene**	**3.4E-03 J**	**6.4E-02 J**	**MG/KG**	**IR15-SS03D-00-01-09C**	**3/17**	**0.035 - 0.4**	**6.4E-02**	**N/A**	**1.5E-02 C**	**1.9E-01**	**NCSSL**	**YES**	**ASL**
	132-64-9	Dibenzofuran	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	7.8E+00 N	4.7E+00	NCSSL	NO	DLBSL
	84-66-2	Diethylphthalate	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	4.9E+03 N	3.7E+01	NCSSL	NO	DLBSL
	131-11-3	Dimethyl phthalate	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	N/A	N/A		NO	NTX
	84-74-2	Di-n-butylphthalate	5.0E-02 J	1.5E-01 J	MG/KG	IR15-SS10-00-01-09C	6/17	0.17 - 0.4	1.5E-01	N/A	6.1E+02 N	1.9E+01	NCSSL	NO	BSL
	117-84-0	Di-n-octylphthalate	1.6E-02 J	1.6E-02 J	MG/KG	IR15-SS20D-0-0_5-10D : IR15-SS21-0-0_5-10D	2/17	0.17 - 0.4	1.6E-02	N/A	3.5E+01 C*	3.8E+01	NCSSL	NO	BSL
	206-44-0	Fluoranthene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	2.3E+02 N	3.3E+02	NCSSL	NO	DLBSL
	86-73-7	Fluorene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	2.3E+02 N	5.6E+01	NCSSL	NO	DLBSL
	118-74-1	Hexachlorobenzene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.0E-01 C	2.6E-03	NCSSL	YES	DLASL
	87-68-3	Hexachlorobutadiene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+00 C**	8.7E-03	NCSSL	NO	DLBSL
	77-47-4	Hexachlorocyclopentadiene	ND	ND	MG/KG		0/17	0.17 - 1	1.0E+00	N/A	3.7E+01 N	N/A		NO	DLBSL
	67-72-1	Hexachloroethane	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	6.1E+00 C**	N/A		NO	DLBSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**5.2E-02 J**	**2.4E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**2/17**	**0.035 - 0.4**	**2.4E-01**	**N/A**	**1.5E-01 C**	**2.0E+00**	**NCSSL**	**YES**	**ASL**
	78-59-1	Isophorone	ND	ND	MG/KG		0/17	0.035 - 0.4	4.0E-01	N/A	5.1E+02 C*	2.0E-01	NCSSL	NO	DLBSL
	91-20-3	Naphthalene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	3.6E+00 C*	2.1E-01	NCSSL	NO	DLBSL
	621-64-7	n-Nitroso-di-n-propylamine	ND	ND	MG/KG		0/17	0.035 - 0.4	4.0E-01	N/A	6.9E-02 C	N/A		YES	DLASL
	86-30-6	n-Nitrosodiphenylamine	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	9.9E+01 C	N/A		NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	4.8E+00 C*	N/A		NO	DLBSL

APPENDIX E-1

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	87-86-5	Pentachlorophenol	ND	ND	MG/KG		0/17	0.17 - 1	1.0E+00	N/A	8.9E-01 C	3.1E-02	NCSSL	YES	DLASL
	85-01-8	Phenanthrene	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.7E+03 N	5.7E+01	NCSSL	NO	DLBSL
	108-95-2	Phenol	ND	ND	MG/KG		0/17	0.17 - 0.4	4.0E-01	N/A	1.8E+03 N	2.3E-01	NCSSL	NO	DLBSL
	129-00-0	Pyrene	2.7E-02	2.7E-02	MG/KG	IR15-SS20-0-0_5-10D	1/17	0.17 - 0.4	2.7E-02	N/A	1.7E+02 N	2.2E+02	NCSSL	NO	BSL
	72-54-8	4,4'-DDD	5.3E-04 J	7.5E-03 J	MG/KG	IR15-SS01-00-01-09C	5/20	0.0017 - 0.0021	7.5E-03	N/A	2.0E+00 C	2.4E-01	NCSSL	NO	BSL
	72-55-9	4,4'-DDE	5.6E-04 J	2.5E-02 J	MG/KG	IR15-SS01-00-01-09C	14/20	0.0017 - 0.0021	2.5E-02	N/A	1.4E+00 C	N/A		NO	BSL
	50-29-3	4,4'-DDT	3.9E-04 J	3.9E-02	MG/KG	IR15-SS11-0-0_5-10D	14/20	0.0017 - 0.0021	3.9E-02	N/A	1.7E+00 C*	3.4E-01	NCSSL	NO	BSL
	309-00-2	Aldrin	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	2.9E-02 C*	N/A		NO	DLBSL
	319-84-6	alpha-BHC	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	7.7E-02 C	1.2E-03	NCSSL	NO	DLBSL
	5103-71-9	alpha-Chlordane	1.0E-03 J	7.4E-03 J	MG/KG	IR15-SS01-00-01-09C	3/17	0.0017 - 0.0021	7.4E-03	N/A	1.6E+00 C*	6.8E-02	NCSSL	NO	BSL
	12674-11-2	Aroclor-1016	ND	ND	MG/KG		0/17	0.036 - 0.037	3.7E-02	N/A	3.9E-01 N	N/A		NO	DLBSL
	11104-28-2	Aroclor-1221	ND	ND	MG/KG		0/17	0.036 - 0.037	3.7E-02	N/A	1.4E-01 C	N/A		NO	DLBSL
	11141-16-5	Aroclor-1232	ND	ND	MG/KG		0/17	0.036 - 0.037	3.7E-02	N/A	1.4E-01 C	N/A		NO	DLBSL
	53469-21-9	Aroclor-1242	ND	ND	MG/KG		0/17	0.036 - 0.037	3.7E-02	N/A	2.2E-01 C	N/A		NO	DLBSL
	12672-29-6	Aroclor-1248	ND	ND	MG/KG		0/17	0.036 - 0.037	3.7E-02	N/A	2.2E-01 C	N/A		NO	DLBSL
	11097-69-1	**Aroclor-1254**	**1.2E-01 J**	**3.6E-01 J**	**MG/KG**	**IR15-SS01-00-01-09C, IR15-SS11-0-0_5-10D**	**4/20**	**0.017 - 0.021**	3.6E-01	**N/A**	**1.1E-01 C****	**N/A**		**YES**	**ASL**
	11096-82-5	Aroclor-1260	ND	ND	MG/KG		0/17	0.036 - 0.037	3.7E-02	N/A	2.2E-01 C	N/A		NO	DLBSL
	319-85-7	beta-BHC	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	2.7E-01 C	1.2E-03	NCSSL	NO	DLBSL
	319-86-8	delta-BHC	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	2.7E-01 C	1.2E-03	NCSSL	NO	DLBSL
	60-57-1	Dieldrin	9.1E-04 J	1.7E-03 J	MG/KG	IR15-SS09-00-01-09C	2/17	0.0017 - 0.0021	1.7E-03	N/A	3.0E-02 C	8.1E-04	NCSSL	NO	BSL
	959-98-8	Endosulfan I	ND	ND	MG/KG		0/17	0.0017 - 0.0021	2.1E-03	N/A	3.7E+01 N	5.6E+00	NCSSL	NO	DLBSL
	33213-65-9	Endosulfan II	1.1E-03 JP	1.2E-03 JP	MG/KG	SWMU46-SM08D-0-1	2/17	0.0017 - 0.0021	1.2E-03	N/A	3.7E+01 N	5.6E+00	NCSSL	NO	BSL
	1031-07-8	Endosulfan sulfate	1.6E-02 P	3.8E-02 D	MG/KG	SWMU46-SM03-0-1	4/17	0.0017 - 0.0037	3.8E-02	N/A	3.7E+01 N	5.6E+00	NCSSL	NO	BSL
	72-20-8	Endrin	8.3E-04 J	1.7E-03 JP	MG/KG	SWMU46-SM01-0-1	2/17	0.0017 - 0.0021	1.7E-03	N/A	1.8E+00 N	8.1E-01	NCSSL	NO	BSL
	7421-93-4	Endrin aldehyde	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	1.8E+00 N	8.1E-01	NCSSL	NO	DLBSL
	53494-70-5	Endrin ketone	3.8E-03 P	1.8E-02 P	MG/KG	SWMU46-SM05-0-1	4/17	0.019 - 0.019	1.8E-02	N/A	1.8E+00 N	8.1E-01	NCSSL	NO	BSL
	58-89-9	gamma-BHC (Lindane)	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	5.2E-01 C*	1.8E-03	NCSSL	NO	DLBSL
	5103-74-2	gamma-Chlordane	5.8E-04 J	8.6E-03 J	MG/KG	IR15-SS01-00-01-09C	3/17	0.019 - 0.019	8.6E-03	N/A	1.6E+00 C*	6.8E-02	NCSSL	NO	BSL
	76-44-8	Heptachlor	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	1.1E-01 C	6.6E-03	NCSSL	NO	DLBSL
	1024-57-3	Heptachlor epoxide	ND	ND	MG/KG		0/17	0.019 - 0.019	1.9E-02	N/A	5.3E-02 C*	8.2E-04	NCSSL	NO	DLBSL
	72-43-5	Methoxychlor	4.6E-03 J	4.6E-03 J	MG/KG	SWMU46-SM01-0-1	1/17	0.019 - 0.019	4.6E-03	N/A	3.1E+01 N	2.2E+01	NCSSL	NO	BSL
	8001-35-2	Toxaphene	ND	ND	MG/KG		0/17	0.19 - 0.19	1.9E-02	N/A	4.4E-01 C	4.6E-02	NCSSL	NO	DLBSL
	1746-01-6	2,3,7,8-TCDD*	8.2E-07	3.1E-06	MG/KG	IR15-SS11-0-0_5-10D	3/3		3.1E-06	N/A	4.5E-06 C*	N/A		NO	BSL
	7429-90-5	**Aluminum**	**1.2E+03 J+**	**1.3E+04**	**MG/KG**	**IR15-SS03-00-01-09C**	**12/12**	**75.3 - 90.9**	1.3E+04	**5.5E+03**	**7.7E+03 N**	**N/A**		**YES**	**ASL**
	7440-36-0	Antimony	2.7E-01 J	6.4E-01 J-	MG/KG	IR15-SS01-00-01-09C	6/12	1.5 - 1.8	6.4E-01	4.5E-01	3.1E+00 N	N/A		NO	BSL
	7440-38-2	**Arsenic**	**2.4E-01 J**	**4.7E+00**	**MG/KG**	**IR15-SS03D-00-01-09C**	**25/28**	**0.5 - 0.5**	4.7E+00	**6.3E-01**	**3.9E-01 C***	**5.8E+00**	**NCSSL**	**YES**	**ASL**
	7440-39-3	Barium	9.1E-01	3.4E+01	MG/KG	IR15-SS01-00-01-09C	24/28	1.4 - 4.5	3.4E+01	1.5E+01	1.5E+03 N	5.8E+02	NCSSL	NO	BSL
	7440-41-7	Beryllium	3.9E-02 J	1.4E-01 J	MG/KG	IR15-SS03D-00-01-09C : IR15-SS03-00-01-09C	7/11	0.15 - 0.18	1.4E-01	1.0E-01	1.6E+01 N	N/A		NO	BSL
	7440-43-9	Cadmium	1.3E-02 J	6.1E-01	MG/KG	IR15-SS01-00-01-09C	15/28	0.011 - 0.55	6.1E-01	3.3E-02	7.0E+00 N	3.0E+00	NCSSL	NO	BSL
	7440-70-2	Calcium	9.4E+01	3.7E+04	MG/KG	IR15-SS01-00-01-09C	13/13	75.3 - 90.9	3.7E+04	6.4E+03	N/A	N/A		NO	NUT
	7440-47-3	Chromium, total, reported	1.4E+00 J	1.7E+01	MG/KG	IR15-SS03D-00-01-09C	28/28	0.27 - 1.8	1.7E+01	6.1E+00	N/A	3.8E+00	NCSSL	NO	Chrom
	18540-29-9	**Chromium (VI), measured**	**4.6E-01 J**	**5.8E-01 J**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**2/2**	**2.2 - 2.2**	**5.8E-01**	**N/A**	**2.9E-01 C**	**N/A**		**YES**	**ASL**
	18540-29-9	**Chromium (VI), estimated [6]**	**1.5E-01**	**1.9E+00**	**MG/KG**				**1.9E+00**	**N/A**	**2.9E-01 C**	**N/A**		**YES**	**ASL**
	16065-83-1	Chromium (III), estimated [6]	1.2E+00	1.5E+01	MG/KG				1.5E+01	N/A	1.2E+04 N	N/A		NO	BSL
	7440-48-4	Cobalt	6.7E-02 J	5.7E-01	MG/KG	IR15-SS01-00-01-09C : IR15-SS03-00-01-09C	10/12	0.38 - 0.45	5.7E-01	2.9E-01	2.3E+00 N	N/A		NO	BSL
	7440-50-8	Copper	5.4E-01 J	4.2E+01	MG/KG	IR15-SS01-00-01-09C	12/12	1.5 - 1.8	4.2E+01	4.8E+00	3.1E+02 N	7.0E+02	NCSSL	NO	BSL
	7439-89-6	**Iron**	**5.6E+02**	**1.0E+04**	**MG/KG**	**IR15-SS03D-00-01-09C**	**12/12**	**11.3 - 13.6**	1.0E+04	**3.2E+03**	**5.5E+03 N**	**1.5E+02**	**NCSSL**	**YES**	**ASL**
	7439-92-1	Lead	3.0E+00	7.0E+01	MG/KG	IR15-SS01-00-01-09C	28/28	0.27 - 1.8	7.0E+01	1.2E+01	4.0E+02 N	2.7E+02	NCSSL	NO	BSL
	7439-95-4	Magnesium	4.7E+01	8.0E+02	MG/KG	IR15-SS03D-00-01-09C	12/11	18.8 - 22.7	8.0E+02	2.4E+02	N/A	N/A		NO	NUT
	7439-96-5	Manganese	4.6E+00	1.6E+02 J	MG/KG	IR15-SS20D-0-0_5-10D	12/12	0.38 - 0.45	1.6E+02	1.4E+01	1.8E+02 N	6.5E+01	NCSSL	NO	BSL
	7439-97-6	Mercury	1.8E-02 J	1.2E+00	MG/KG	IR15-SS11-0-0_5-10D	20/31	0.033 - 0.1	1.2E+00	8.1E-02	2.3E+00 N	1.0E+00	NCSSL	NO	BSL
	7440-02-0	Nickel	4.8E-01 J	2.7E+00	MG/KG	IR15-SS01-00-01-09C	12/12	0.75 - 0.91	2.7E+00	1.2E+00	1.5E+02 N	1.3E+02	NCSSL	NO	BSL

APPENDIX E-1

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Current/Future
Medium: Surface Soil
Exposure Medium: Surface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-09-7	Potassium	1.1E+02	5.0E+02	MG/KG	IR15-SS03-00-01-09C	9/12	75.3 - 90.9	5.0E+02	1.2E+02	N/A	N/A		NO	NUT
	7782-49-2	Selenium	1.8E-01 J	6.0E-01 J	MG/KG	SWMU46-TW03-00	9/24	0.27 - 1.8	6.0E-01	5.6E-01	3.9E+01 N	2.1E+00	NCSSL	NO	BSL
	7440-22-4	Silver	5.5E-02 J	1.7E-01 J	MG/KG	IR15-SS05-00-01-09C	6/28	0.27 - 1.8	1.7E-01	1.4E-01	3.9E+01 N	3.4E+00	NCSSL	NO	BSL
	7440-23-5	Sodium	6.7E+00 J	6.9E+01 J	MG/KG	IR15-SS03D-00-01-09C	7/12	188 - 227	6.9E+01	8.1E+01	N/A	N/A		NO	NUT, BBK
	7440-28-0	Thallium	2.7E-02 J	3.6E-02 J	MG/KG	520-0-0_5-10D : IR15-SS20D-0-0	2/12	2.3 - 2.7	3.6E-02	3.6E-01	7.8E-02 N	N/A		NO	BSL, BBK
	7440-62-2	Vanadium	2.2E+00 J	2.2E+01	MG/KG	IR15-SS03D-00-01-09C	12/12	3.8 - 4.5	2.2E+01	8.9E+00	3.9E+01 N	N/A		NO	BSL
	7440-66-6	Zinc	6.0E+00	1.7E+02	MG/KG	IR15-SS01-00-01-09C	9/12	3.8 - 4.5	1.7E+02	1.1E+01	2.3E+03 N	1.2E+03	NCSSL	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening. If the chemical was not detected, the maximum detection limit is used for screening.

[3] Background values are two times the arithmetic mean basewide background surface soil concentrations.
Background values are from *Final Base Background Soil Study Report, Marine Corps Base Camp Lejeune, North Carolina* , Baker Environmental, April 25, 2001.

[4] Oak Ridge National Laboratory (ORNL). May 2011. Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml. Adjusted (noncarcinogenic RSLs adjusted by dividing by 10) residential soil RSLs.
RSL value for 1,4-Dichlorobenzene used as a surrogate for 1,3-Dichlorobenzene
RSL value for n-Hexane used as surrogate for Methylcyclohexane.
RSL value for p-cresol used as surrogate for 3- and 4-methylphenol.
RSL value for methoxychlor used as surrogate for 4-chlorophenyl-phenylether.
RSL value for 2-Nitroaniline used as surrogate for 3-Nitroaniline.
RSL value for nitrobenzene used as surrogate for 4-nitrophenol.
RSL value for acenaphthene used as surrogate for acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for bis(2-ethylhexyl)phthalate used as surrogate for di-n-octylphthalate.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical-HCH used as surrogate for delta-BHC.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for 1,3-dichloropropene used as a surrogate for cis-1,3-dichloropropene and trans-1,3-dichloropropene.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.
RSL value for 2-chlorophenol used as surrogate for 2-nitrophenol.
RSL value for Mercuric Chloride (and other Mercury salts) used as surrogate for mercury.
RSL value for Manganese (Non-diet) used as surrogate for manganese.
RSL value for Vanadium and Compounds used as surrogate for vanadium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.

[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
	Detection Limit Above Screening Level (DLASL), not quantitatively evaluated in HHRA
	Chemical from same class (carcinogenic PAH) identified as a COPC (CPAH)
Deletion Reason:	No Toxicity Information (NTX)
	Essential Nutrient (NUT)
	Below Screening Level (BSL)
	Detection Limit Below Screening Level (DLBSL)
	Below Background Value (BBK)
	Total chromium not carried through since already screening estimated hexavalent and trivalent (Chrom)

[6] See Table 2.1 Supplement B for calculation of estimated chromium (III) and estimated chromium (VI) concentrations.

* See Table 2.1 Supplment A for 2,3,7,8-TCDD toxicity equivalent concentration calculation

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
NCSSL = North Carolina Soil Screening Levels (NCDENR, 2010)
D = Compound identified in an analysis at a secondary dilution factor
J = Estimated Value
J- = Analyte present. Value may be biased low, actual value may be higher.
J+ = Analyte present. Value may be biased high, actual value may be lower.
P = Difference between the concentration on the two columns is greater than 20%
C = Carcinogenic
C* = N screening level < 100x C screening level, therefore N screening value/10 used as screening level
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
MG/KG = Milligrams per kilogram
N = Noncarcinogenic
N/A = Not available/not applicable
ND = Non-detect
NS = RSL exceeds Csat (soil saturation concentration), Therefore, Csat used as screening level.

APPENDIX E-1

TABLE 2.1 SUPPLEMENT A

Calculation of 2,3,7,8-TCDD Equivalent Concentrations - Surface Soil

Site 15 ESI Report

MCB CamLej, North Carolina

StationID		IR15-IS11			IR15-IS12			IR15-MW03		
SampleID		IR15-SS11-0-0_5-10D			IR15-SS12-0-0_5-10D			IR15-SS21-0-0_5-10D		
SampleDate		11/10/2010			11/10/2010			11/9/2010		
Analyte	TEF[1, 2]	Conc. (mg/kg)	Data Qualifier	Equivalent Conc. (mg/kg)	Conc. (mg/kg)	Data Qualifier	Equivalent Conc.	Conc. (mg/kg)	Data Qualifier	Equivalent Conc. (mg/kg)
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01	1.4E-04		1.4E-06	1.1E-04	U		3.8E-05	U	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01	3.7E-06		3.7E-08	2.2E-06	J	2.2E-08	8.3E-07	U	
1,2,3,4,7,8-Hexachlorodibenzofuran	0.1	6.9E-06	U		1.0E-05		1.0E-06	1.2E-06	J	1.2E-07
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1	4.8E-06	U		3.0E-06	U		1.2E-06	J	1.2E-07
1,2,3,6,7,8-Hexachlorodibenzofuran	0.1	8.7E-06	U		5.5E-06	U		1.4E-06	U	
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1	6.8E-06		6.8E-07	4.9E-06	U		1.8E-06	J	1.8E-07
1,2,3,7,8,9-Hexachlorodibenzofuran	0.1	6.1E-07	U		8.4E-07	U		1.9E-07	U	
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1	3.6E-06	U		3.7E-06	U		1.4E-06	U	
1,2,3,7,8-Pentachlorodibenzofuran	0.03	1.0E-06	U		5.8E-07	U		3.0E-07	U	
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	9.6E-07	U		8.9E-07	U		4.6E-07	U	
2,3,4,6,7,8-Hexachlorodibenzofuran	0.1	2.1E-06	J	2.1E-07	1.9E-06	J	1.9E-07	6.1E-07	U	
2,3,4,7,8-Pentachlorodibenzofuran	0.3	3.5E-06	U		5.7E-07	U		5.1E-07	U	
2,3,7,8-TCDD (dioxin)	1	1.5E-07	U		3.3E-07	U		1.5E-07	U	
2,3,7,8-Tetrachlorodibenzofuran	0.1	3.0E-06		3.0E-07	2.0E-06	U		1.1E-06		1.1E-07
Octachlorodibenzofuran	0.0003	9.6E-05		2.9E-08	7.4E-05		2.2E-08	2.0E-05		6.0E-09
Octachlorodibenzo-p-dioxin	0.0003	1.4E-03		4.2E-07	2.3E-03		6.9E-07	9.5E-04		2.9E-07
Total 2,3,7,8-TCDD equivalents				3.1E-06			1.9E-06			8.2E-07

Minimum equivalent concentration (mg/kg) = 8.2E-07
Maximum equivalent concentration (mg/kg) = 3.1E-06

Notes:
mg/kg = milligrams per kilogram
U = Not Detected
J = Estimated Value

[1] Van den Berg et al., 2006. The 2005 World Health Organization Re-evaluation of Human and Mammalian Toxic Equivalency Factors for

[2] USEPA. 2010. Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds. Risk Assessment Forum, Washington, DC. EPA/100/R-10/005.

APPENDIX E-1

TABLE 2.1 SUPPLEMENT B

Calculation of Chromium Concentrations - Surface Soil

Site 15 ESI Report

MCB CamLej, North Carolina

Location	Sample ID	Sample Date	Measured Total Chromium (mg/kg)	Data Qualifier	Measured Chromium (VI) (mg/kg)	Data Qualifier	Estimated Chromium (VI)[1] (mg/kg)	Estimated Chromium (III)[2] (mg/kg)
IR15-MW02	IR15-SS20-0-0_5-10D	11/9/2010	6.6		0.58	J	0.7	5.9
IR15-MW03	IR15-SS21-0-0_5-10D	11/9/2010	4.1		0.46	J	0.5	3.6
IR15-SS01	IR15-SS01-00-01-09C	7/10/2009	7.2		NA		0.8	6.4
IR15-SS02	IR15-SS02-00-01-09C	7/10/2009	5.7		NA		0.6	5.1
IR15-SS03	IR15-SS03D-00-01-09C	7/10/2009	17.2		NA		1.9	15.3
IR15-SS04	IR15-SS04-00-01-09C	7/10/2009	4		NA		0.4	3.6
IR15-SS05	IR15-SS05-00-01-09C	7/10/2009	1.7		NA		0.2	1.5
IR15-SS06	IR15-SS06-00-01-09C	7/10/2009	1.4	J	NA		0.2	1.2
IR15-SS07	IR15-SS07-00-01-09C	7/10/2009	1.9		NA		0.2	1.7
IR15-SS08	IR15-SS08-00-01-09C	7/10/2009	6.2		NA		0.7	5.5
IR15-SS09	IR15-SS09-00-01-09C	7/10/2009	10.2		NA		1.1	9.1
IR15-SS10	IR15-SS10-00-01-09C	7/10/2009	8.4		NA		0.9	7.5
SWMU46-SM01	SWMU46-SM01-0-1	7/20/2006	6.4		NA		0.7	5.7
SWMU46-SM02	SWMU46-SM02-0-1	7/20/2006	4.8		NA		0.5	4.3
SWMU46-SM03	SWMU46-SM03-0-1	7/20/2006	2.4		NA		0.3	2.1
SWMU46-SM05	SWMU46-SM05-0-1	7/20/2006	2.9		NA		0.3	2.6
SWMU46-SM08	SWMU46-SM08-0-1	7/20/2006	4.4		NA		0.5	3.9
SWMU46-SB02	SWMU46-SB02-00	3/22/2004	4.6	J	NA		0.5	4.1
SWMU46-SB03	SWMU46-SB03-00	3/22/2004	6.9	J	NA		0.8	6.1
SWMU46-SB04	SWMU46-SB04-00	3/22/2004	7.2	J	NA		0.8	6.4
SWMU46-SB05	SWMU46-SB05-00	3/22/2004	5.3	J	NA		0.6	4.7
SWMU46-TW02	SWMU46-TW02-00	3/23/2002	4.6		NA		0.5	4.1
SWMU46-TW03	SWMU46-TW03-00	3/23/2002	4.2		NA		0.5	3.7
SWMU46-TW05	SwMU46-TW05-00	3/23/2002	4.9		NA		0.5	4.4
SWMU46-IS01	SWMU46-IS01-00	9/9/1997	9.3		NA		1.0	8.3
SWMU46-IS02	SWMU46-IS02-00	9/9/1997	7.1		NA		0.8	6.3
SWMU46-IS03	SWMU46-IS03-00	9/9/1997	3.5		NA		0.4	3.1
SWMU46-IS04	SWMU46-IS04-00	9/9/1997	4.1		NA		0.5	3.6
		Minimum	1.4			Minimum	0.2	1.2
		Maximum	17.2			Maximum	1.9	15.3

Notes:

mg/kg = milligrams per kilogram

U = Not Detected

J = Estimated Value

NA = Not Analyzed

ND = Not Detected

1 Estimated Chromium (VI) = (0.11) * (Measured Total Chromium)

2 Estimated Chromium (III) = (0.89) * (Measured Total Chromium)

Two samples (IR15-SS20-0-0_5-10D and IR15-SS21-0-0_5-10D) had detections for both chromium (VI) and total chromium. The ratio of chromium (VI) divided by total chromium for the two samples was 0.09 and 0.11, respectively. To be conservative, the higher of the ratio values (0.11) was used to estimate the chromium (V concentrations for all of the surface soil samples. Also, it was assumed the remaining chromium in the total chromium concentrations was chromium (III). The chromium (III) concentrations were therefore estimated by multiplying the total chromium concentration by 1 - 0.11, or 0.89.

APPENDIX E-1

TABLE 2.1a

Risk Ratio Screening for Surface Soil, Maximum Detected Concentration

Site 15 ESI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semi-volatile Organic Compounds (mg/kg)								
Benzo(a)anthracene	1 / 17	3.2E-02	IR15-SS20-0-0_5-10D	1.5E-01	1E-06	NA	2E-07	NA
Benzo(a)pyrene	1 / 17	1.6E-01	IR15-SS20-0-0_5-10D	1.5E-02	1E-06	NA	1E-05	NA
Benzo(b)fluoranthene	2 / 17	2.9E-01	IR15-SS20-0-0_5-10D	1.5E-01	1E-06	NA	2E-06	NA
Benzo(k)fluoranthene	1 / 17	1.0E-01	IR15-SS20-0-0_5-10D	1.5E+00	1E-06	NA	7E-08	NA
Chrysene	3 / 17	8.0E-02	IR15-SS20-0-0_5-10D	1.5E+01	1E-06	NA	5E-09	NA
Dibenz(a,h)anthracene	3 / 17	6.4E-02 J	IR15-SS03D-00-01-09C	1.5E-02	1E-06	NA	4E-06	NA
Indeno(1,2,3-cd)pyrene	2 / 17	2.4E-01	IR15-SS20-0-0_5-10D	1.5E-01	1E-06	NA	2E-06	NA
Polychlorinated Biphenyls (mg/kg)								
Aroclor-1254	4 / 20	3.6E-01 J	IR15-SS01-00-01-09C, IR15-SS11-0-0_5-10D	1.1E-01	1E-06	NA	3E-06	NA
Metals (mg/kg)								
Aluminum	12 / 12	1.3E+04	IR15-SS03-00-01-09C	7.7E+04	1	0.2	NA	Neurological, Developmental
Arsenic	25 / 28	4.7E+00	IR15-SS03D-00-01-09C	3.9E-01	1E-06	NA	1E-05	NA
Chromium (VI), measured	2 / 2	5.8E-01 J	IR15-SS20-0-0_5-10D	2.9E-01	1E-06	NA	2E-06	NA
Chromium (VI), estimated		1.9E+01		2.9E-01	1E-06	NA	7E-05	NA
Iron	12 / 12	1.0E+04	IR15-SS03D-00-01-09C	5.5E+04	1	0.2	NA	Gastrointestinal
Cumulative Corresponding Hazard Index[c]						**0.3**		
Cumulative Corresponding Cancer Risk, including measured Chromium (VI) but not estimated Chromium (VI)[d]							**4E-05**	
Cumulative Corresponding Cancer Risk, including estimated Chromium (VI) but not measured Chromium (VI)[d]							**1E-04**	

Total Developmental HI =	0.2
Total Gastrointestinal HI =	0.2
Total Neurological HI =	0.2

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Chemical of Potential Concern
HI = Hazard Index
J = Estimated Value
mg/kg = milligrams per kilogram
NA = Not available/not applicable

APPENDIX E-1

TABLE 2.1b

Risk Ratio Screening for Surface Soil, 95% UCL Concentration

Site 15 ESI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semi-volatile Organic Compounds (mg/kg)									
Benzo(a)anthracene	1 / 17	3.2E-02	6	Max	1.5E-01	1E-06	NA	2E-07	NA
Benzo(a)pyrene	1 / 17	1.6E-01	6	Max	1.5E-02	1E-06	NA	1E-05	NA
Benzo(b)fluoranthene	2 / 17	2.9E-01	5	Max	1.5E-01	1E-06	NA	2E-06	NA
Benzo(k)fluoranthene	1 / 17	1.0E-01	6	Max	1.5E+00	1E-06	NA	7E-08	NA
Chrysene	3 / 17	6.2E-02	1, 2	95% KM-t	1.5E+01	1E-06	NA	4E-09	NA
Dibenz(a,h)anthracene	3 / 17	2.6E-02	1, 2	95% KM-t	1.5E-02	1E-06	NA	2E-06	NA
Indeno(1,2,3-cd)pyrene	2 / 17	2.4E-01	4	95% KM-BCA	1.5E-01	1E-06	NA	2E-06	NA
Polychlorinated Biphenyls (mg/kg)									
Aroclor-1254	4 / 20	1.8E-01	1, 2, 3	95% KM-t	1.1E-01	1E-06	NA	2E-06	NA
Metals (mg/kg)									
Arsenic	25 / 28	1.7E+00	1, 3	95% KM-BCA	3.9E-01	1E-06	NA	4E-06	NA
Chromium (VI), measured	2 / 2	5.8E-01	6	Max	2.9E-01	1E-06	NA	2E-06	NA
Chromium (VI), estimated		7.5E-01	1, 3	95% App-G	2.9E-01	1E-06	NA	3E-06	NA
Cumulative Corresponding Hazard Index[c]							**NA**		
Cumulative Corresponding Cancer Risk, including measured Chromium (VI) but not estimated Chromium (VI)[d]								**2E-05**	
Cumulative Corresponding Cancer Risk, including estimated Chromium (VI) but not measured Chromium (VI)[d]								**2E-05**	

Notes:

[a] Corresponding Hazard Index equals 95% UCL concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL concentration divided by the RSL divided by the acceptable risk level

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Chemical of Potential Concern
mg/kg = milligrams per kilogram
HI = Hazard Index
NA = Not available/not applicable

ProUCL, Version 4.1.00 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. May 2010. ProUCL, Version 4.1. Prepared by Lockheed Martin Environmental Services).
Options: 95% Approximate Gamma UCL (95% App-G); Maximum detected concentration (Max);
99% Kaplan-Meier (Chebyshev) UCL (99% KM); 95% Kaplan-Meier (t) UCL (95% KM-t); 95% Kaplan-Meier (BCA) UCL (95% KM-BCA)

Upper Confidence Limit (UCL) Rationale:
(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Test indicates data are gamma distributed.
(4) Distribution tests are inconclusive
(5) Max value used because 95% UCL greater than max.
(6) Only one distinct data value or data set too small, maximum detected concentration used

APPENDIX E-1

TABLE 2.2

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Surface and Subsurface Soil	71-55-6	1,1,1-Trichloroethane	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	6.4E+02 NS	1.2E+00	NCSSL	NO	DLBSL
	79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	5.6E-01 C	1.2E-03	NCSSL	NO	DLBSL
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ND	ND	MG/KG		0/39	0.0016 - 0.0056	5.6E-03	N/A	9.1E+02 NS	9.2E+03	NCSSL	NO	DLBSL
	79-00-5	1,1,2-Trichloroethane	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	1.6E-01 C**	N/A		NO	DLBSL
	75-34-3	1,1-Dichloroethane	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	3.3E+00 C	3.0E-02	NCSSL	NO	DLBSL
	75-35-4	1,1-Dichloroethene	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	2.4E+01 N	4.6E-02	NCSSL	NO	DLBSL
	120-82-1	1,2,4-Trichlorobenzene	1.9E-03 J	2.5E-03 J	MG/KG	IR15-SB07-2-4-09C	4/40	0.0016 - 0.0042	2.5E-03	N/A	6.2E+00 C**	2.2E+00	NCSSL	NO	BSL
	96-12-8	1,2-Dibromo-3-chloropropane	ND	ND	MG/KG		0/39	0.0016 - 0.0056	5.6E-03	N/A	5.4E-03 C	2.5E-04	NCSSL	YES	DLASL
	106-93-4	1,2-Dibromoethane	ND	ND	MG/KG		0/39	0.0016 - 0.0034	3.4E-03	N/A	3.4E-02 C	9.7E-05	NCSSL	NO	DLBSL
	95-50-1	1,2-Dichlorobenzene	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	1.9E+02 N	2.4E-01	NCSSL	NO	DLBSL
	107-06-2	1,2-Dichloroethane	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	4.3E-01 C	2.0E-03	NCSSL	NO	DLBSL
	78-87-5	1,2-Dichloropropane	ND	ND	MG/KG		0/39	0.0016 - 0.0034	3.4E-03	N/A	9.4E-01 C*	3.3E-03	NCSSL	NO	DLBSL
	541-73-1	1,3-Dichlorobenzene	1.3E-03 J	1.6E-03 J	MG/KG	IR15-SB07-2-4-09C	3/40	0.0011 - 0.0042	1.6E-03	N/A	2.4E+00 C	7.6E+00	NCSSL	NO	BSL
	106-46-7	1,4-Dichlorobenzene	1.4E-03 J	1.6E-03 J	MG/KG	IR15-SB07-2-4-09C	3/40	0.0011 - 0.0024	1.6E-03	N/A	2.4E+00 C	7.0E-02	NCSSL	NO	BSL
	78-93-3	2-Butanone	6.6E-03 J	4.0E-02 J	MG/KG	IR15-SS08-00-01-09C	13/40	0.0031 - 0.011	4.0E-02	N/A	2.8E+03 N	1.6E+01	NCSSL	NO	BSL
	591-78-6	2-Hexanone	6.0E-04 J	4.1E-03 J	MG/KG	IR15-SB07-2-4-09C	2/40	0.0031 - 0.011	4.1E-03	N/A	2.1E+01 N	1.2E+00	NCSSL	NO	BSL
	108-10-1	4-Methyl-2-pentanone	1.7E-03 J	1.7E-03 J	MG/KG	IR15-SB09-2-7-09C	1/40	0.0031 - 0.011	1.7E-03	N/A	5.3E+02 N	N/A		NO	BSL
	67-64-1	Acetone	4.6E-03	1.7E+00 J	MG/KG	IR15-SS08-00-01-09C	24/41	0.0031 - 0.016	1.7E+00	N/A	6.1E+03 N	2.4E+01	NCSSL	NO	BSL
	71-43-2	Benzene	2.5E-04 J	4.0E-03 J	MG/KG	SMWU46-TT03-02	8/40	0.0011 - 0.0024	4.0E-03	N/A	1.1E+00 C*	7.3E-02	NCSSL	NO	BSL
	75-27-4	Bromodichloromethane	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	2.7E-01 C	2.9E-03	NCSSL	NO	DLBSL
	75-25-2	Bromoform	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	6.2E+01 C*	1.9E-02	NCSSL	NO	DLBSL
	74-83-9	Bromomethane	ND	ND	MG/KG		0/36	0.0032 - 0.0048	4.8E-03	N/A	7.3E-01 N	N/A		NO	DLBSL
	75-15-0	Carbon disulfide	2.5E-04 J	1.4E-03 J	MG/KG	IR15-SB02D-2-7-09C	5/39	0.0011 - 0.0024	1.4E-03	N/A	8.2E+01 N	3.8E+00	NCSSL	NO	BSL
	56-23-5	Carbon tetrachloride	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	6.1E-01 C	2.0E-03	NCSSL	NO	DLBSL
	108-90-7	Chlorobenzene	2.6E-03 J	2.6E-03 J	MG/KG	IR15-SB09-2-7-09C	1/40	0.0011 - 0.0024	2.6E-03	N/A	2.9E+01 N	4.5E-01	NCSSL	NO	BSL
	75-00-3	Chloroethane	ND	ND	MG/KG		0/38	0.0022 - 0.0048	4.8E-03	N/A	1.5E+03 N	1.6E+01	NCSSL	NO	DLBSL
	67-66-3	Chloroform	5.2E-03 J	5.2E-03 J	MG/KG	IR15-SS01-00-01-09C	1/39	0.0011 - 0.0024	5.2E-03	N/A	2.9E-01 C	3.4E-01	NCSSL	NO	BSL
	74-87-3	Chloromethane	ND	ND	MG/KG		0/39	0.0011 - 0.0048	4.8E-03	N/A	1.2E+01 N	1.5E-02	NCSSL	NO	DLBSL
	156-59-2	cis-1,2-Dichloroethene	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	1.6E+01 N	3.6E-01	NCSSL	NO	DLBSL
	10061-01-5	cis-1,3-Dichloropropene	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	1.7E+00 C*	2.3E-03	NCSSL	NO	DLBSL
	110-82-7	Cyclohexane	ND	ND	MG/KG		0/39	0.0016 - 0.0056	5.6E-03	N/A	1.2E+02 NS	N/A		NO	DLBSL
	124-48-1	Dibromochloromethane	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	6.8E-01 C	1.9E-03	NCSSL	NO	DLBSL
	75-71-8	Dichlorodifluoromethane (Freon-12)	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	9.4E+00 N	2.9E+01	NCSSL	NO	DLBSL
	100-41-4	Ethylbenzene	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	5.4E+00 C	8.1E+00	NCSSL	NO	DLBSL
	98-82-8	Isopropylbenzene	ND	ND	MG/KG		0/39	0.0011 - 0.0042	4.2E-03	N/A	2.1E+02 N	1.3E+00	NCSSL	NO	DLBSL
	79-20-9	Methyl acetate	3.5E-03 J	2.1E+00	MG/KG	IR15-SS08-00-01-09C	7/40	0.0016 - 0.0056	2.1E+00	N/A	7.8E+03 N	N/A		NO	BSL
	108-87-2	Methylcyclohexane	3.1E-04 J	3.1E-04 J	MG/KG	IR15-SS20-0-0_5-10D	1/39	0.0016 - 0.0056	3.1E-04	N/A	5.7E+01 N	N/A		NO	BSL
	75-09-2	Methylene chloride	2.9E-03 J	8.9E-03 J	MG/KG	IR15-SB05-2-7-09C	4/39	0.0031 - 0.017	8.9E-03	N/A	1.1E+01 C	2.3E-02	NCSSL	NO	BSL
	1634-04-4	Methyl-tert-butyl ether (MTBE)	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	4.3E+01 C	8.5E-02	NCSSL	NO	DLBSL
	100-42-5	Styrene	2.6E-03 J	2.9E-03 J	MG/KG	IR15-SB07-2-4-09C	2/40	0.0011 - 0.0042	2.9E-03	N/A	6.3E+02 N	9.2E-01	NCSSL	NO	BSL
	127-18-4	Tetrachloroethene	1.5E-03 J	1.5E-03 J	MG/KG	IR15-SB09-2-7-09C	1/40	0.0016 - 0.0024	1.5E-03	N/A	5.5E-01 C	5.0E-03	NCSSL	NO	BSL
	108-88-3	Toluene	4.2E-04 J	1.0E-02 J	MG/KG	IR15-SS08-00-01-09C	8/40	0.0016 - 0.0024	1.0E-02	N/A	5.0E+02 N	5.5E+00	NCSSL	NO	BSL
	156-60-5	trans-1,2-Dichloroethene	ND	ND	MG/KG		0/39	0.0011 - 0.0024	2.4E-03	N/A	1.5E+01 N	5.1E-01	NCSSL	NO	DLBSL
	10061-02-6	trans-1,3-Dichloropropene	ND	ND	MG/KG		0/39	0.0016 - 0.0034	3.4E-03	N/A	1.7E+00 C*	2.3E-03	NCSSL	NO	DLBSL
	79-01-6	Trichloroethene	ND	ND	MG/KG		0/39	0.0016 - 0.0024	2.4E-03	N/A	2.5E+00 C**	1.8E-02	NCSSL	NO	DLBSL
	75-69-4	Trichlorofluoromethane (Freon-11)	1.0E-03 J	9.0E-03 J	MG/KG	SMWU46-TT02-01	15/39	0.0016 - 0.0024	9.0E-03	N/A	7.9E+01 N	2.4E+01	NCSSL	NO	BSL
	75-01-4	Vinyl chloride	ND	ND	MG/KG		0/39	0.0011 - 0.0048	4.8E-03	N/A	6.0E-02 C	1.9E-04	NCSSL	NO	DLBSL
	1330-20-7	Xylene, total	ND	ND	MG/KG		0/39	0.0016 - 0.0083	8.3E-03	N/A	6.3E+01 N	6.0E+00	NCSSL	NO	DLBSL
	92-52-4	1,1-Biphenyl	ND	ND	MG/KG		0/41	0.019 - 0.21	2.1E-01	N/A	5.1E+00 N	4.3E+01	NCSSL	NO	DLBSL
	108-60-1	2,2'-Oxybis(1-chloropropane)	ND	ND	MG/KG		0/40	0.18 - 0.21	2.1E-01	N/A	4.6E+00 C	N/A		NO	DLBSL
	95-95-4	2,4,5-Trichlorophenol	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	6.1E+02 N	N/A		NO	DLBSL
	88-06-2	2,4,6-Trichlorophenol	ND	ND	MG/KG		0/25	0.019 - 0.02	2.0E-02	N/A	6.1E+00 C**	N/A		NO	DLBSL
	120-83-2	2,4-Dichlorophenol	ND	ND	MG/KG		0/44	0.037 - 0.21	2.1E-01	N/A	1.8E+01 N	N/A		NO	DLBSL
	105-67-9	2,4-Dimethylphenol	ND	ND	MG/KG		0/44	0.18 - 0.39	3.9E-01	N/A	1.2E+02 N	1.4E+00	NCSSL	NO	DLBSL

APPENDIX E-1

TABLE 2.2

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	51-28-5	2,4-Dinitrophenol	ND	ND	MG/KG		0/44	0.18 - 0.21	2.1E-01	N/A	1.2E+01 N	N/A		NO	DLBSL
	121-14-2	2,4-Dinitrotoluene	ND	ND	MG/KG		0/44	0.074 - 0.21	2.1E-01	N/A	1.6E+00 C*	N/A		NO	DLBSL
	606-20-2	2,6-Dinitrotoluene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	6.1E+00 N	N/A		NO	DLBSL
	91-58-7	2-Chloronaphthalene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	1.8E+02 NS	N/A		NO	DLBSL
	95-57-8	2-Chlorophenol	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	3.9E+01 N	4.1E-03	NCSSL	NO	DLBSL
	91-57-6	2-Methylnaphthalene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	3.1E+01 N	1.6E+00	NCSSL	NO	DLBSL
	95-48-7	2-Methylphenol	ND	ND	MG/KG		0/44	0.037 - 0.21	2.1E-01	N/A	3.1E+02 N	N/A		NO	DLBSL
	88-74-4	2-Nitroaniline	ND	ND	MG/KG		0/44	0.074 - 0.21	2.1E-01	N/A	6.1E+01 N	N/A		NO	DLBSL
	88-75-5	2-Nitrophenol	ND	ND	MG/KG		0/29	0.037 - 0.21	2.1E-01	N/A	3.9E+01 N	N/A		NO	DLBSL
	m&pCRESOL	3- and 4-Methylphenol					0/5			N/A	3.1E+01 N	4.0E-01	NCSSL	NO	DLBSL
	91-94-1	3,3'-Dichlorobenzidine	ND	ND	MG/KG		0/43	0.18 - 0.37	3.7E-01	N/A	1.1E+00 C	N/A		NO	DLBSL
	99-09-2	3-Nitroaniline	ND	ND	MG/KG		0/44	0.037 - 0.21	2.1E-01	N/A	6.1E+01 N	N/A		NO	DLBSL
	534-52-1	4,6-Dinitro-2-methylphenol	ND	ND	MG/KG		0/44	0.18 - 0.21	2.1E-01	N/A	4.9E-01 N	N/A		NO	DLBSL
	101-55-3	4-Bromophenyl-phenylether	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	N/A	N/A		NO	NTX
	59-50-7	4-Chloro-3-methylphenol	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	6.1E+02 N	N/A		NO	DLBSL
	106-47-8	4-Chloroaniline	ND	ND	MG/KG		0/44	0.094 - 0.21	2.1E-01	N/A	2.4E+00 C	N/A		NO	DLBSL
	7005-72-3	4-Chlorophenyl-phenylether	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	3.1E+01 N	N/A		NO	DLBSL
	106-44-5	4-Methylphenol	ND	ND	MG/KG		0/44	0.037 - 0.21	2.1E-01	N/A	3.1E+01 N	4.0E-01	NCSSL	NO	DLBSL
	100-01-6	4-Nitroaniline	ND	ND	MG/KG		0/44	0.074 - 0.21	2.1E-01	N/A	2.4E+01 C*	N/A		NO	DLBSL
	100-02-7	4-Nitrophenol	ND	ND	MG/KG		0/44	0.18 - 0.39	3.9E-01	N/A	4.8E+00 C*	N/A		NO	DLBSL
	83-32-9	Acenaphthene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	3.4E+02 N	8.4E+00	NCSSL	NO	DLBSL
	208-96-8	Acenaphthylene	2.8E-03 J	3.7E-03 J	MG/KG	IR15-SS20-0-0_5-10D	2/44	0.019 - 0.21	3.7E-03	N/A	3.4E+02 N	1.1E+01	NCSSL	NO	BSL
	98-86-2	Acetophenone	1.1E-03 J	1.9E-03 J	MG/KG	IR15-SS21-0-0_5-10D	4/44	0.037 - 0.21	1.9E-03	N/A	7.8E+02 N	N/A		NO	BSL
	120-12-7	Anthracene	4.0E-03 J	1.6E-01 J	MG/KG	SMWU46-TT01-01	3/44	0.019 - 0.21	1.6E-01	N/A	1.7E+03 N	6.6E+02	NCSSL	NO	BSL
	1912-24-9	Atrazine	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	2.1E+00 C	2.5E-02	NCSSL	NO	DLBSL
	100-52-7	Benzaldehyde	1.0E-02 J	1.0E-02 J	MG/KG	IR15-SB21-1-4-10D	3/35	0.094 - 0.19	1.0E-02	N/A	7.8E+02 N	N/A		NO	BSL
	56-55-3	**Benzo(a)anthracene**	**3.2E-02**	**4.5E-01**	**MG/KG**	**SMWU46-TT01-01**	**3/44**	**0.019 - 0.042**	**4.5E-01**	**N/A**	**1.5E-01 C**	**1.8E-01**	**NCSSL**	**YES**	**ASL**
	50-32-8	**Benzo(a)pyrene**	**3.0E-02**	**1.6E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**2/44**	**0.019 - 0.042**	**1.6E-01**	**N/A**	**1.5E-02 C**	**5.9E-02**	**NCSSL**	**YES**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	**6.7E-02**	**4.8E-01**	**MG/KG**	**SMWU46-TT01-01**	**4/44**	**0.019 - 0.042**	**4.8E-01**	**N/A**	**1.5E-01 C**	**6.0E-01**	**NCSSL**	**YES**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	2.4E-01 J	3.3E-01	MG/KG	IR15-SS20-0-0_5-10D	3/44	0.037 - 0.21	3.3E-01	N/A	1.7E+02 N	3.6E+02	NCSSL	NO	BSL
	207-08-9	**Benzo(k)fluoranthene**	**2.6E-02**	**1.0E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**2/44**	**0.019 - 0.21**	**1.0E-01**	**N/A**	**1.5E+00 C**	**5.9E+00**	**NCSSL**	**YES**	**cPAH**
	111-91-1	bis(2-Chloroethoxy)methane	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	1.8E+01 N	N/A		NO	DLBSL
	111-44-4	bis(2-Chloroethyl)ether	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	2.1E-01 C	1.4E-04	NCSSL	YES	DLASL
	39638-32-9	bis(2-Chloroisopropyl)ether	ND	ND	MG/KG		0/4	0.019 - 0.02	2.0E-02	N/A	N/A	N/A		NO	NTX
	117-81-7	bis(2-Ethylhexyl)phthalate	3.1E-02 J	1.8E-01 J	MG/KG	IR15-SS01-00-01-09C	7/48	0.037 - 0.36	1.8E-01	N/A	3.5E+01 C*	7.2E+00	NCSSL	NO	BSL
	85-68-7	Butylbenzylphthalate	1.9E-01 J	1.9E-01 J	MG/KG	IR15-SS01-00-01-09C	1/44	0.037 - 0.21	1.9E-01	N/A	2.6E+02 C*	1.5E+02	NCSSL	NO	BSL
	105-60-2	Caprolactam	ND	ND	MG/KG		0/43	0.094 - 0.21	2.1E-01	N/A	3.1E+03 N	1.8E+01	NCSSL	NO	DLBSL
	86-74-8	Carbazole	ND	ND	MG/KG		0/44	0.18 - 0.21	2.1E-01	N/A	N/A	N/A		NO	NTX
	218-01-9	**Chrysene**	**3.6E-02 J**	**8.3E-01**	**MG/KG**	**SMWU46-TT01-01**	**5/44**	**0.019 - 0.21**	**8.3E-01**	**N/A**	**1.5E+01 C**	**1.8E+01**	**NCSSL**	**YES**	**cPAH**
	53-70-3	**Dibenz(a,h)anthracene**	**3.2E-03 J**	**6.4E-02 J**	**MG/KG**	**IR15-SS03D-00-01-09C**	**4/44**	**0.036 - 0.042**	**6.4E-02**	**N/A**	**1.5E-02 C**	**1.9E-01**	**NCSSL**	**YES**	**ASL**
	132-64-9	Dibenzofuran	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	7.8E+00 N	4.7E+00	NCSSL	NO	DLBSL
	84-66-2	Diethylphthalate	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	4.9E+03 N	3.7E+01	NCSSL	NO	DLBSL
	131-11-3	Dimethyl phthalate	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	N/A	N/A		NO	NTX
	84-74-2	Di-n-butylphthalate	1.8E-02 J	1.5E-01 J	MG/KG	IR15-SS10-00-01-09C	7/44	0.093 - 0.21	1.5E-01	N/A	6.1E+02 N	1.9E+01	NCSSL	NO	BSL
	117-84-0	Di-n-octylphthalate	1.4E-02 J	1.6E-02 J	MG/KG	IR15-SS20D-0-0_5-10D : IR15-SS21-0-0_5-10D	3/44	0.037 - 0.21	1.6E-02	N/A	3.5E+01 C*	3.8E+01	NCSSL	NO	BSL
	206-44-0	Fluoranthene	2.2E-02 J	2.2E+00	MG/KG	SMWU46-TT01-01	2/44	0.019 - 0.21	2.2E+00	N/A	2.3E+02 N	3.3E+02	NCSSL	NO	BSL
	86-73-7	Fluorene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	2.3E+02 N	5.6E+01	NCSSL	NO	DLBSL
	118-74-1	Hexachlorobenzene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	3.0E-01 C	2.6E-03	NCSSL	NO	DLBSL
	87-68-3	Hexachlorobutadiene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	6.1E+00 C**	8.7E-03	NCSSL	NO	DLBSL
	77-47-4	Hexachlorocyclopentadiene	ND	ND	MG/KG		0/43	0.019 - 0.21	2.1E-01	N/A	3.7E+01 N	N/A		NO	DLBSL
	67-72-1	Hexachloroethane	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	6.1E+00 C**	N/A		NO	DLBSL
	193-39-5	**Indeno(1,2,3-cd)pyrene**	**5.2E-02 J**	**2.4E-01**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**2/44**	**0.036 - 0.042**	**2.4E-01**	**N/A**	**1.5E-01 C**	**2.0E+00**	**NCSSL**	**YES**	**ASL**
	78-59-1	Isophorone	ND	ND	MG/KG		0/44	0.019 - 0.042	4.2E-02	N/A	5.1E+02 C*	2.0E-01	NCSSL	NO	DLBSL

APPENDIX E-1

TABLE 2.2

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	91-20-3	Naphthalene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	3.6E+00 C*	2.1E-01	NCSSL	NO	DLBSL
	621-64-7	n-Nitroso-di-n-propylamine	ND	ND	MG/KG		0/44	0.019 - 0.042	4.2E-02	N/A	6.9E-02 C	N/A		NO	DLBSL
	86-30-6	n-Nitrosodiphenylamine	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	9.9E+01 C	N/A		NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	MG/KG		0/44	0.019 - 0.21	2.1E-01	N/A	4.8E+00 C*	N/A		NO	DLBSL
	87-86-5	Pentachlorophenol	ND	ND	MG/KG		0/44	0.18 - 0.21	2.1E-01	N/A	8.9E-01 C	3.1E-02	NCSSL	NO	DLBSL
	85-01-8	Phenanthrene	8.0E-01	8.0E-01	MG/KG	SMWU46-TT01-01	1/44	0.019 - 0.21	8.0E-01	N/A	1.7E+03 N	5.7E+01	NCSSL	NO	BSL
	108-95-2	Phenol	ND	ND	MG/KG		0/44	0.18 - 0.21	2.1E-01	N/A	1.8E+03 N	2.3E-01	NCSSL	NO	DLBSL
	129-00-0	Pyrene	5.2E-02	2.4E+00	MG/KG	SMWU46-TT01-01	3/44	0.019 - 0.21	2.4E+00	N/A	1.7E+02 N	2.2E+02	NCSSL	NO	BSL
	72-54-8	**4,4'-DDD**	**5.8E-04 J**	**2.3E+00 D**	**MG/KG**	**SMWU46-TT05-02**	**25/50**	**0.0018 - 18**	**2.3E+00**	**N/A**	**2.0E+00 C**	**2.4E-01**	**NCSSL**	**YES**	**ASL**
	72-55-9	**4,4'-DDE**	**5.6E-04 J**	**4.4E+00 D**	**MG/KG**	**SMWU46-TT04-01**	**36/50**	**0.0018 - 18**	**4.4E+00**	**N/A**	**1.4E+00 C**	**N/A**		**YES**	**ASL**
	50-29-3	**4,4'-DDT**	**9.2E-04 J**	**3.1E+01**	**MG/KG**	**IR15-SB19-1-5-10D**	**33/50**	**0.0018 - 18**	**3.1E+01**	**N/A**	**1.7E+00 C***	**3.4E-01**	**NCSSL**	**YES**	**ASL**
	309-00-2	Aldrin	2.5E-03 J	2.5E-03 J	MG/KG	SMWU46-TT01-01	1/44	0.0018 - 0.02	2.5E-03	N/A	2.9E-02 C*	N/A		NO	BSL
	319-84-6	alpha-BHC	1.7E-03	1.7E-03	MG/KG	SMWU46-TT01-01	1/44	0.0018 - 0.02	1.7E-03	N/A	7.7E-02 C	1.2E-03	NCSSL	NO	BSL
	5103-71-9	alpha-Chlordane	2.8E-03 J	4.0E-01 D	MG/KG	SMWU46-TT05-02	13/44	0.0018 - 0.02	4.0E-01	N/A	1.6E+00 C*	6.8E-02	NCSSL	NO	BSL
	12674-11-2	Aroclor-1016	ND	ND	MG/KG		0/29	0.018 - 0.039	3.9E-02	N/A	3.9E-01 N	N/A		NO	DLBSL
	11104-28-2	Aroclor-1221	ND	ND	MG/KG		0/29	0.018 - 0.039	3.9E-02	N/A	1.4E-01 C	N/A		NO	DLBSL
	11141-16-5	Aroclor-1232	ND	ND	MG/KG		0/29	0.018 - 0.039	3.9E-02	N/A	1.4E-01 C	N/A		NO	DLBSL
	53469-21-9	Aroclor-1242	ND	ND	MG/KG		0/29	0.018 - 0.039	3.9E-02	N/A	2.2E-01 C	N/A		NO	DLBSL
	12672-29-6	Aroclor-1248	ND	ND	MG/KG		0/29	0.018 - 0.039	3.9E-02	N/A	2.2E-01 C	N/A		NO	DLBSL
	11097-69-1	**Aroclor-1254**	**1.2E-01 J**	**3.6E-01 J**	**MG/KG**	**IR15-SS01-00-01-09C, IR15-SS11-0-0_5-10D**	**4/32**	**0.018 - 0.039**	**3.6E-01**	**N/A**	**1.1E-01 C****	**N/A**		**YES**	**ASL**
	11096-82-5	Aroclor-1260	ND	ND	MG/KG		0/29	0.018 - 0.039	3.9E-02	N/A	2.2E-01 C	N/A		NO	DLBSL
	319-85-7	beta-BHC	ND	ND	MG/KG		0/44	0.0018 - 0.02	2.0E-02	N/A	2.7E-01 C	1.2E-03	NCSSL	NO	DLBSL
	319-86-8	delta-BHC	ND	ND	MG/KG		0/44	0.0018 - 0.02	2.0E-02	N/A	2.7E-01 C	1.2E-03	NCSSL	NO	DLBSL
	60-57-1	Dieldrin	2.3E-03	2.5E-03 J	MG/KG	IR15-SB21-1-4-10D	4/44	0.0018 - 0.02	2.5E-03	N/A	3.0E-02 C	8.1E-04	NCSSL	NO	BSL
	959-98-8	Endosulfan I	2.5E-03 JP	9.5E-03 NJ	MG/KG	SMWU46-TT05-02	2/44	0.0018 - 0.02	9.5E-03	N/A	3.7E+01 N	5.6E+00	NCSSL	NO	BSL
	33213-65-9	Endosulfan II	1.1E-03 JP	1.2E-03 JP	MG/KG	SWMU46-SM08D-0-1	2/44	0.0018 - 0.02	1.2E-03	N/A	3.7E+01 N	5.6E+00	NCSSL	NO	BSL
	1031-07-8	Endosulfan sulfate	1.6E-02 P	3.8E-02 D	MG/KG	SWMU46-SM03-0-1	4/44	0.0018 - 0.02	3.8E-02	N/A	3.7E+01 N	5.6E+00	NCSSL	NO	BSL
	72-20-8	Endrin	8.3E-04 J	1.7E-03 JP	MG/KG	SWMU46-SM01-0-1	2/44	0.0018 - 0.02	1.7E-03	N/A	1.8E+00 N	8.1E-01	NCSSL	NO	BSL
	7421-93-4	Endrin aldehyde	ND	ND	MG/KG		0/44	0.0018 - 0.02	2.0E-02	N/A	1.8E+00 N	8.1E-01	NCSSL	NO	DLBSL
	53494-70-5	Endrin ketone	3.8E-03 J	1.8E-02 P	MG/KG	SWMU46-SM05-0-1	5/44	0.0018 - 0.02	1.8E-02	N/A	1.8E+00 N	8.1E-01	NCSSL	NO	BSL
	58-89-9	gamma-BHC (Lindane)	ND	ND	MG/KG		0/44	0.0018 - 0.02	2.0E-02	N/A	5.2E-01 C*	1.8E-03	NCSSL	NO	DLBSL
	5103-74-2	gamma-Chlordane	1.5E-03 J	4.3E-01 D	MG/KG	SMWU46-TT05-02	11/44	0.0018 - 0.02	4.3E-01	N/A	1.6E+00 C*	6.8E-02	NCSSL	NO	BSL
	76-44-8	Heptachlor	ND	ND	MG/KG		0/44	0.0018 - 0.02	2.0E-02	N/A	1.1E-01 C	6.6E-03	NCSSL	NO	DLBSL
	1024-57-3	Heptachlor epoxide	ND	ND	MG/KG		0/44	0.0018 - 0.02	2.0E-02	N/A	5.3E-02 C*	8.2E-04	NCSSL	NO	DLBSL
	72-43-5	Methoxychlor	4.6E-03 J	4.6E-03 J	MG/KG	SWMU46-SM01-0-1	1/44	0.0018 - 0.02	4.6E-03	N/A	3.1E+01 N	2.2E+01	NCSSL	NO	BSL
	8001-35-2	Toxaphene	ND	ND	MG/KG		0/44	0.036 - 0.2	2.0E-01	N/A	4.4E-01 C	4.6E-02	NCSSL	NO	DLBSL
	1746-01-6	2,3,7,8-TCDD*	8.2E-07	3.1E-06	MG/KG	IR15-SS11-0-0_5-10D	3/3		3.1E-06	N/A	4.5E-06 C*	N/A		NO	BSL
	7429-90-5	**Aluminum**	**4.6E+02**	**1.3E+04**	**MG/KG**	**IR15-SS03-00-01-09C**	**24/24**	**10 - 500**	**1.3E+04**	**5.5E+03**	**7.7E+03 N**	**N/A**		**YES**	**ASL**
	7440-36-0	Antimony	9.3E-02 J	2.5E+00	MG/KG	IR15-SB11-1-5-10D	12/27	0.18 - 8.6	2.5E+00	3.6E-01	3.1E+00 N	N/A		NO	BSL
	7440-38-2	**Arsenic**	**3.8E-01 J**	**1.9E+01 J**	**MG/KG**	**SMWU46-TT07-01D**	**52/70**	**0.5 - 8.6**	**1.9E+01**	**6.3E-01**	**3.9E-01 C***	**5.8E+00**	**NCSSL**	**YES**	**ASL**
	7440-39-3	Barium	3.6E+00 J	1.4E+03	MG/KG	SMWU46-TT02-02	59/70	0.1 - 21.5	1.4E+03	1.5E+01	1.5E+03 N	5.8E+02	NCSSL	NO	BSL
	7440-41-7	Beryllium	4.0E-02 J	1.4E-01 J	MG/KG	IR15-SS03D-00-01-09C : IR15-SS03-00-01-09C	13/23	0.1 - 0.86	1.4E-01	1.0E-01	1.6E+01 N	N/A		NO	BSL
	7440-43-9	**Cadmium**	**1.8E-02 J**	**8.4E+00**	**MG/KG**	**SMWU46-TT02-02**	**38/70**	**0.05 - 2.6**	**8.4E+00**	**2.3E-02**	**7.0E+00 N**	**3.0E+00**	**NCSSL**	**YES**	**ASL**
	7440-70-2	Calcium	1.4E+02	3.7E+04	MG/KG	IR15-SS01-00-01-09C	23/25	50 - 430	3.7E+04	4.4E+02	N/A	N/A		NO	NUT
	7440-47-3	Chromium, total, measured	6.9E-01	1.5E+02	MG/KG	SMWU46-TT02-02	67/70	0.2 - 8.6	1.5E+02	6.1E+00	N/A	3.8E+00	NCSSL	NO	Chrom
	18540-29-9	**Chromium (VI), measured**	**2.3E-01 J**	**5.8E-01 J**	**MG/KG**	**IR15-SS20-0-0_5-10D**	**4/4**	**2.2 - 2.4**	**5.8E-01**	**N/A**	**2.9E-01 C**	**N/A**		**YES**	**ASL**
	18540-29-9	**Chromium (VI), estimated [6]**	**7.6E-02**	**1.7E+01**	**MG/KG**				**1.7E+01**	**N/A**	**2.9E-01 C**	**N/A**		**YES**	**ASL**
	16065-83-1	Chromium (III), estimated [6]	6.1E-01	1.3E+02	MG/KG				1.3E+02	N/A	1.2E+04 N	N/A		NO	BSL
	7440-48-4	**Cobalt**	**6.6E-02 J**	**9.3E+00**	**MG/KG**	**IR15-SB09-2-7-09C**	**21/24**	**0.1 - 4.5**	**9.3E+00**	**2.9E-01**	**2.3E+00 N**	**N/A**		**YES**	**ASL**
	7440-50-8	Copper	2.7E-01 J	4.2E+01	MG/KG	IR15-SS01-00-01-09C	22/24	0.2 - 8.6	4.2E+01	2.6E+00	3.1E+02 N	7.0E+02	NCSSL	NO	BSL
	7439-89-6	**Iron**	**1.5E+02 J+**	**1.8E+05 J+**	**MG/KG**	**IR15-SB09-2-7-09C**	**26/27**	**4.7 - 2500**	**1.8E+05**	**3.2E+03**	**5.5E+03 N**	**1.5E+02**	**NCSSL**	**YES**	**ASL**
	7439-92-1	**Lead**	**1.3E+00 J**	**1.2E+04**	**MG/KG**	**SWMU46-IS02-04**	**75/76**	**0.1 - 8.6**	**1.2E+04**	**8.5E+00**	**4.0E+02 N**	**2.7E+02**	**NCSSL**	**YES**	**ASL**

APPENDIX E-1

TABLE 2.2

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7439-95-4	Magnesium	1.7E+01 J	8.0E+02	MG/KG	IR15-SS03D-00-01-09C	24/23	19.2 - 108	8.0E+02	2.4E+02	N/A	N/A		NO	NUT
	7439-96-5	**Manganese**	**1.5E+00**	**6.3E+02**	**MG/KG**	**IR15-SB09-2-7-09C**	**23/24**	**0.2 - 2.2**	**6.3E+02**	**9.3E+00**	**1.8E+02 N**	**6.5E+01**	**NCSSL**	**YES**	**ASL**
	7439-97-6	Mercury	2.7E-03 J	1.2E+00	MG/KG	IR15-SS11-0-0_5-10D	46/73	0.033 - 0.05	1.2E+00	7.1E-02	2.3E+00 N	1.0E+00	NCSSL	NO	BSL
	7440-02-0	Nickel	7.4E-01 J	2.4E+01	MG/KG	IR15-SB09-2-7-09C	20/24	0.2 - 4.3	2.4E+01	1.2E+00	1.5E+02 N	1.3E+02	NCSSL	NO	BSL
	7440-09-7	Potassium	1.8E+01 J	5.0E+02	MG/KG	IR15-SS03-00-01-09C	21/24	50 - 430	5.0E+02	1.2E+02	N/A	N/A		NO	NUT
	7782-49-2	Selenium	1.4E-01 J	1.7E+00	MG/KG	SMWU46-TT07-01D	16/61	0.5 - 8.6	1.7E+00	5.1E-01	3.9E+01 N	2.1E+00	NCSSL	NO	BSL
	7440-22-4	Silver	3.2E-02 J	2.0E+01	MG/KG	SMWU46-TT02-02	17/60	0.1 - 8.6	2.0E+01	1.3E-01	3.9E+01 N	3.4E+00	NCSSL	NO	BSL
	7440-23-5	Sodium	4.3E+00 J	6.9E+01 J	MG/KG	IR15-SS03D-00-01-09C	15/24	50 - 1080	6.9E+01	6.8E+01	N/A	N/A		NO	NUT
	7440-28-0	Thallium	3.5E-02 J	1.9E+00 J	MG/KG	IR15-SB09-2-7-09C	5/24	0.1 - 12.9	1.9E+00	3.6E-01	7.8E-02 N	N/A		YES	ASL
	7440-62-2	Vanadium	2.3E+00 J	2.2E+01	MG/KG	IR15-SS03D-00-01-09C	22/24	0.1 - 21.5	2.2E+01	8.9E+00	3.9E+01 N	N/A		NO	BSL
	7440-66-6	Zinc	1.5E+00 J	3.5E+02	MG/KG	IR15-SB01-4-6-09C	21/30	2 - 21.5	3.5E+02	6.6E+00	2.3E+03 N	1.2E+03	NCSSL	NO	BSL

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening. If the chemical was not detected, the maximum detection limit is used for screening.

[3] Background values are two times the arithmetic mean basewide background surface or subsurface soil concentrations.
Background values are from *Final Base Background Soil Study Report, Marine Corps Base Camp Lejeune, North Carolina*
Baker Environmental, April 25, 2001.

[4] Oak Ridge National Laboratory (ORNL). May 2011. Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml. Adjusted (noncarcinogenic RSLs adjusted by dividing by 10) residential soil RSLs.
RSL value for 1,4-Dichlorobenzene used as a surrogate for 1,3-Dichlorobenzene
RSL value for n-Hexane used as surrogate for Methylcyclohexane.
RSL value for p-cresol used as surrogate for 3- and 4-methylphenol.
RSL value for methoxychlor used as surrogate for 4-chlorophenyl-phenylether.
RSL value for 2-Nitroaniline used as surrogate for 3-Nitroaniline.
RSL value for nitrobenzene used as surrogate for 4-nitrophenol.
RSL value for acenaphthene used as surrogate for acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for bis(2-ethylhexyl)phthalate used as surrogate for di-n-octylphthalate.
RSL value for technical chlordane used as surrogate for alpha-chlordane.
RSL value for technical-HCH used as surrogate for delta-BHC.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for 1,3-dichloropropene used as a surrogate for cis-1,3-dichloropropene and trans-1,3-dichloropropene.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.
RSL value for 2-chlorophenol used as surrogate for 2-nitrophenol.
RSL value for Mercuric Chloride (and other Mercury salts) used as surrogate for mercury.
RSL value for Manganese (Non-diet) used as surrogate for manganese.
RSL value for Vanadium and Compounds used as surrogate for vanadium.
The soil value of 400 mg/kg for lead is from the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities, USEPA, July 14, 1994.

[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
	Detection Limit Above Screening Level (DLASL), not quantitatively evaluated in HHRA
	Chemical from same class (carcinogenic PAH) identified as a COPC (CPAH)
Deletion Reason:	No Toxicity Information (NTX)
	Essential Nutrient (NUT)
	Below Screening Level (BSL)
	Detection Limit Below Screening Level (DLBSL)
	Below Background Value (BBK)
	Total chromium not carried through since already screening estimated hexavalent and trivalent (Chrom)

[6] See Table 2.2 Supplement A for calculation of estimated chromium (III) and estimated chromium (VI) concentrations.

* See Table 2.1 Supplment A for 2,3,7,8-TCDD toxicity equivalent concentration calculation

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
NCSSL = North Carolina Soil Screening Levels (NCDENR, 2010)
D = Compound identified in an analysis at a secondary dilution factor
J = Estimated Value
J+ = Analyte present. Value may be biased high, actual value may be lower.
P = Difference between the concentration on the two columns is greater than 20%
C = Carcinogenic
C* = N screening level < 100x C screening level, therefore N screening value/10 used as screening level
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
MG/KG = Milligrams per kilogram
N = Noncarcinogenic
N/A = Not available/not applicable
ND = Non-detect
NS = RSL exceeds Csat (soil saturation concentration), Therefore, Csat used as screening level.
NJ = Tentatively identified analyte, estimated value

APPENDIX E-1

TABLE 2.2 SUPPLEMENT A

Calculation of Chromium Concentrations - Combined Surface and Subsurface Soil

Site 15 ESI Report

MCB CamLej, North Carolina

Location	Sample ID	Sample Date	Measured Total Chromium (mg/kg)	Data Qualifier	Measured Chromium (VI) (mg/kg)	Data Qualifier	Estimated Chromium (VI)[1] (mg/kg)	Estimated Chromium (III)[2] (mg/kg)
IR15-MW02	IR15-SS20-0-0_5-10D	11/9/2010	6.6		0.58	J	0.7	5.9
IR15-MW03	IR15-SS21-0-0_5-10D	11/9/2010	4.1		0.46	J	0.5	3.6
IR15-SS01	IR15-SS01-00-01-09C	7/10/2009	7.2		NA		0.8	6.4
IR15-SS02	IR15-SS02-00-01-09C	7/10/2009	5.7		NA		0.6	5.1
IR15-SS03	IR15-SS03D-00-01-09C	7/10/2009	17.2		NA		1.9	15.3
IR15-SS04	IR15-SS04-00-01-09C	7/10/2009	4		NA		0.4	3.6
IR15-SS05	IR15-SS05-00-01-09C	7/10/2009	1.7		NA		0.2	1.5
IR15-SS06	IR15-SS06-00-01-09C	7/10/2009	1.4	J	NA		0.2	1.2
IR15-SS07	IR15-SS07-00-01-09C	7/10/2009	1.9		NA		0.2	1.7
IR15-SS08	IR15-SS08-00-01-09C	7/10/2009	6.2		NA		0.7	5.5
IR15-SS09	IR15-SS09-00-01-09C	7/10/2009	10.2		NA		1.1	9.1
IR15-SS10	IR15-SS10-00-01-09C	7/10/2009	8.4		NA		0.9	7.5
SWMU46-SM01	SWMU46-SM01-0-1	7/20/2006	6.4		NA		0.7	5.7
SWMU46-SM02	SWMU46-SM02-0-1	7/20/2006	4.8		NA		0.5	4.3
SWMU46-SM03	SWMU46-SM03-0-1	7/20/2006	2.4		NA		0.3	2.1
SWMU46-SM05	SWMU46-SM05-0-1	7/20/2006	2.9		NA		0.3	2.6
SWMU46-SM08	SWMU46-SM08-0-1	7/20/2006	4.4		NA		0.5	3.9
SWMU46-SB02	SWMU46-SB02-00	3/22/2004	4.6	J	NA		0.5	4.1
SWMU46-SB03	SWMU46-SB03-00	3/22/2004	6.9	J	NA		0.8	6.1
SWMU46-SB04	SWMU46-SB04-00	3/22/2004	7.2	J	NA		0.8	6.4
SWMU46-SB05	SWMU46-SB05-00	3/22/2004	5.3	J	NA		0.6	4.7
SWMU46-TW02	SWMU46-TW02-00	3/23/2002	4.6		NA		0.5	4.1
SWMU46-TW03	SWMU46-TW03-00	3/23/2002	4.2		NA		0.5	3.7
SWMU46-TW05	SwMU46-TW05-00	3/23/2002	4.9		NA		0.5	4.4
SWMU46-IS01	SWMU46-IS01-00	9/9/1997	9.3		NA		1.0	8.3
SWMU46-IS02	SWMU46-IS02-00	9/9/1997	7.1		NA		0.8	6.3
SWMU46-IS03	SWMU46-IS03-00	9/9/1997	3.5		NA		0.4	3.1
SWMU46-IS04	SWMU46-IS04-00	9/9/1997	4.1		NA		0.5	3.6
IR15-MW02	IR15-SB20-1-5-10D	11/9/2010	4.3		0.37	J	0.5	3.8
IR15-MW03	IR15-SB21-1-4-10D	11/9/2010	5.9		0.23	J	0.6	5.3
IR15-SB01	IR15-SB01-4-6-09C	7/29/2009	6.9	J	NA		0.8	6.1
IR15-SB02	IR15-SB02-2-7-09C	7/26/2009	6.3		NA		0.7	5.6
IR15-SB03	IR15-SB03-2-7-09C	7/29/2009	4.7	J	NA		0.5	4.2
IR15-SB04	IR15-SB04-2-7-09C	7/27/2009	7.4		NA		0.8	6.6
IR15-SB05	IR15-SB05-2-7-09C	7/27/2009	6.1		NA		0.7	5.4
IR15-SB06	IR15-SB06-2-7-09C	7/27/2009	6.3		NA		0.7	5.6
IR15-SB07	IR15-SB07-2-4-09C	7/27/2009	3.1		NA		0.3	2.8
IR15-SB08	IR15-SB08-2-4-09C	7/29/2009	1.1	J	NA		0.1	1.0
IR15-SB09	IR15-SB09-2-7-09C	7/29/2009	52.4	J	NA		5.8	46.6
IR15-SB10	IR15-SB10-2-4-09C	7/29/2009	5.7	J	NA		0.6	5.1
SMWU46-TT01	SMWU46-TT01-01	4/1/2004	16.1		NA		1.8	14.3
SMWU46-TT02	SMWU46-TT02-01	4/1/2004	1.5	J	NA		0.2	1.3
SMWU46-TT02	SMWU46-TT02-02	4/1/2004	150		NA		16.5	133.5
SMWU46-TT-03	SMWU46-TT03-01	4/2/2004	1.2	J	NA		0.1	1.1
SMWU46-TT-03	SMWU46-TT03-02	4/2/2004	80.6		NA		8.9	71.7
SMWU46-TT-04	SMWU46-TT04-01	4/2/2004	18		NA		2.0	16.0
SMWU46-TT-04	SMWU46-TT04-02	4/2/2004	4.9		NA		0.5	4.4
SMWU46-TT-05	SMWU46-TT05-01	4/5/2004	1.4	J	NA		0.2	1.2
SMWU46-TT-05	SMWU46-TT05-02	4/5/2004	42.4		NA		4.7	37.7
SMWU46-TT-06	SMWU46-TT06-01	4/5/2004	8.6		NA		0.9	7.7
SMWU46-TT-06	SMWU46-TT06-02	4/5/2004	9.5		NA		1.0	8.5
SMWU46-TT-07	SMWU46-TT07-01D	4/5/2004	40.8		NA		4.5	36.3
SMWU46-TT-07	SMWU46-TT07-02	4/5/2004	3.7		NA		0.4	3.3
SMWU46-TT-08	SMWU46-TT08-01	4/5/2004	5.1		NA		0.6	4.5
SMWU46-TT-08	SMWU46-TT08-02	4/5/2004	2.6		NA		0.3	2.3
SWMU46-SB01	SWMU46-SB01-03	3/22/2004	2.9	UJ	NA		ND	ND
SWMU46-SB02	SWMU46-SB02-04	3/22/2004	2.9	UJ	NA		ND	ND
SWMU46-SB03	SWMU46-SB03-02	3/22/2004	2.4	UJ	NA		ND	ND
SWMU46-SB04	SWMU46-SB04-02	3/22/2004	39.4	J	NA		4.3	35.1
SWMU46-SB05	SWMU46-SB05-04	3/22/2004	1.8	J	NA		0.2	1.6
SWMU46-TW01	SWMU46-TW01-05	3/23/2002	0.72		NA		0.1	0.6
SWMU46-TW02	SWMU46-TW02-04	3/23/2002	2		NA		0.2	1.8
SWMU46-TW03	SWMU46-TW03-04	3/23/2002	2.6		NA		0.3	2.3
SWMU46-TW04	SWMU46-TW04-04	3/23/2002	3.2		NA		0.4	2.8
SWMU46-TW05	SWMU46-TW05-05	3/23/2002	0.69		NA		0.1	0.6
SWMU46-TW06	SWMU46-TW06-04	3/23/2002	3.1		NA		0.3	2.8

APPENDIX E-1

TABLE 2.2 SUPPLEMENT A

Calculation of Chromium Concentrations - Combined Surface and Subsurface Soil

Site 15 ESI Report

MCB CamLej, North Carolina

Location	Sample ID	Sample Date	Measured Total Chromium (mg/kg)	Data Qualifier	Measured Chromium (VI) (mg/kg)	Data Qualifier	Estimated Chromium (VI)[1] (mg/kg)	Estimated Chromium (III)[2] (mg/kg)
SWMU46-IS01	SWMU46-IS01-04	9/9/1997	3.5		NA		0.4	3.1
SWMU46-IS02	SWMU46-IS02-04	9/9/1997	7.4		NA		0.8	6.6
SWMU46-IS03	SWMU46-IS03-04	9/9/1997	21.5		NA		2.4	19.1
SWMU46-IS04	SWMU46-IS04-04	9/9/1997	3		NA		0.3	2.7
		Minimum	0.7			Minimum	0.1	0.6
		Maximum	150.0			Maximum	16.5	133.5

Notes:

mg/kg = milligrams per kilogram

U = Not Detected

J = Estimated Value

NA = Not Analyzed

ND = Not Detected

1 Estimated Chromium (VI) = (0.11) * (Measured Total Chromium)

2 Estimated Chromium (III) = (0.89) * (Measured Total Chromium)

Two samples (IR15-SS20-0-0_5-10D and IR15-SS21-0-0_5-10D) had detections for both chromium (VI) and total chromium. The ratio of chromium (VI) divide by total chromium for the two samples was 0.09 and 0.11, respectively. To be conservative, the higher of the ratio values (0.11) was used to estimate the chromium (VI concentrations for all of the surface soil samples. Also, it was assumed the remaining chromium in the total chromium concentrations was chromium (III). The chromium (III) concentrations were therefore estimated by multiplying the total chromium concentration by 1 - 0.11, or 0.89

APPENDIX E-1

TABLE 2.2a

Risk Ratio Screening for Surface and Subsurface Soil, Maximum Detected Concentration

Site 15 ESI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semi-volatile Organic Compounds (mg/kg)								
Benzo(a)anthracene	3 / 44	4.5E-01	SMWU46-TT01-01	1.5E-01	1E-06	NA	3E-06	NA
Benzo(a)pyrene	2 / 44	1.6E-01	IR15-SS20-0-0_5-10D	1.5E-02	1E-06	NA	1E-05	NA
Benzo(b)fluoranthene	4 / 44	4.8E-01	SMWU46-TT01-01	1.5E-01	1E-06	NA	3E-06	NA
Benzo(k)fluoranthene	2 / 44	1.0E-01	IR15-SS20-0-0_5-10D	1.5E+00	1E-06	NA	7E-08	NA
Chrysene	5 / 44	8.3E-01	SMWU46-TT01-01	1.5E+01	1E-06	NA	6E-08	NA
Dibenz(a,h)anthracene	4 / 44	6.4E-02 J	IR15-SS03D-00-01-09C	1.5E-02	1E-06	NA	4E-06	NA
Indeno(1,2,3-cd)pyrene	2 / 44	2.4E-01	IR15-SS20-0-0_5-10D	1.5E-01	1E-06	NA	2E-06	NA
Pesticides/Polychlorinated Biphenyls (mg/kg)								
4,4'-DDD	25 / 50	2.3E+00 D	SMWU46-TT05-02	2.0E+00	1E-06	NA	1E-06	NA
4,4'-DDE	36 / 50	4.4E+00 D	SMWU46-TT04-01	1.4E+00	1E-06	NA	3E-06	NA
4,4'-DDT	35 / 50	3.1E+01	IR15-SB19-1-5-10D	1.7E+00	1E-06	NA	2E-05	NA
Aroclor-1254	4 / 32	3.6E-01 J	IR15-SS01-00-01-09C, IR15-SS11-0-0_5-10D	1.1E-01	1E-06	NA	3E-06	NA
Metals (mg/kg)								
Aluminum	24 / 24	1.3E+04	IR15-SS03-00-01-09C	7.7E+04	1	0.2	NA	Neurological, Developmental
Arsenic	52 / 70	1.9E+01 J	SMWU46-TT07-01D	3.9E-01	1E-06	NA	5E-05	NA
Cadmium	38 / 70	8.4E+00	SMWU46-TT02-02	7.0E+01	1	0.1	NA	Kidney
Chromium (VI), measured	4 / 4	5.8E-01 J	IR15-SS20-0-0_5-10D	2.9E-01	1E-06	NA	2E-06	NA
Chromium (VI), estimated		1.7E+01		2.9E-01	1E-06	NA	6E-05	NA
Cobalt	21 / 24	9.3E+00	IR15-SB09-2-7-09C	2.3E+01	1	0.4	NA	Thyroid
Iron	26 / 27	1.8E+05 J+	IR15-SB09-2-7-09C	5.5E+04	1	3.3	NA	Gastrointestinal
Lead	75 / 76	1.2E+04	SMWU46-TT02-02	NA	NA	NA	NA	NA
Manganese	23 / 24	6.3E+02	IR15-SB09-2-7-09C	1.8E+03	1	0.3	NA	CNS
Cumulative Corresponding Hazard Index[c]						**4.3**		
Cumulative Corresponding Cancer Risk, including measured Chromium (VI) but not estimated Chromium (VI)[d]							**1E-04**	
Cumulative Corresponding Cancer Risk, including estimated Chromium (VI) but not measured Chromium (VI)[d]							**2E-04**	

Total CNS/Neurological HI =	0.5
Total Developmental HI =	0.2
Total Kidney HI =	0.1
Total Thyroid HI =	0.4
Total Gastrointestinal HI =	**3.3**

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

CNS = Central Nervous System
COPC = Chemical of Potential Concern
D = Reported value from a dilution
HI = Hazard Index
J = Estimated Value
J+ = Analyte present, value may be biased high, actual value may be lower
mg/kg = milligrams per kilogram
NA = Not available/not applicable

APPENDIX E-1

TABLE 2.2b

Risk Ratio Screening for Surface and Subsurface Soil, 95% UCL Concentration

Site 15 ESI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Residential Soil RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semi-volatile Organic Compounds (mg/kg)									
Benzo(a)anthracene	3 / 44	9.2E-02	4	95% KM	1.5E-01	1E-06	NA	6E-07	NA
Benzo(a)pyrene	2 / 44	1.6E-01	4	95% KM-BCA	1.5E-02	1E-06	NA	1E-05	NA
Benzo(b)fluoranthene	4 / 44	7.0E-02	1, 2, 3	95% KM-t	1.5E-01	1E-06	NA	5E-07	NA
Benzo(k)fluoranthene	2 / 44	8.3E-02	4	95% KM-t	1.5E+00	1E-06	NA	6E-08	NA
Chrysene	5 / 44	8.7E-02	1, 3	95% KM-t	1.5E+01	1E-06	NA	6E-09	NA
Dibenz(a,h)anthracene	4 / 44	1.5E-02	1, 2, 3	95% KM-t	1.5E-02	1E-06	NA	1E-06	NA
Indeno(1,2,3-cd)pyrene	2 / 44	2.4E-01	4	95% KM-BCA	1.5E-01	1E-06	NA	2E-06	NA
Polychlorinated Biphenyls (mg/kg)									
4,4'-DDD	25 / 50	8.1E-01	1	99% KM	2.0E+00	1E-06	NA	4E-07	NA
4,4'-DDE	36 / 50	1.1E+00	1	99% KM	1.4E+00	1E-06	NA	8E-07	NA
4,4'-DDT	35 / 50	7.0E+00	4	99% KM	1.7E+00	1E-06	NA	4E-06	NA
Aroclor-1254	4 / 32	1.6E-01	1, 2, 3	95% KM-t	1.1E-01	1E-06	NA	1E-06	NA
Metals (mg/kg)									
Arsenic	52 / 70	5.0E+00	4	97.5% KM	3.9E-01	1E-06	NA	1E-05	NA
Chromium (VI), measured	4 / 4	5.8E-01	6	Max	2.9E-01	1E-06	NA	2E-06	NA
Chromium (VI), estimated		2.4E+00	4	95% KM	2.9E-01	1E-06	NA	8E-06	NA
Iron	26 / 27	5.3E+04	1	97.5% KM	5.5E+04	1	1.0	NA	Gastrointestinal
Lead	75 / 76	3.3E+02	7	Mean	NA		NA	NA	NA
Cumulative Corresponding Hazard Index[c]							**1.0**		
Cumulative Corresponding Cancer Risk, including measured Chromium (VI) but not estimated Chromium (VI)[d]								**4E-05**	
Cumulative Corresponding Cancer Risk, including estimated Chromium (VI) but not measured Chromium (VI)[d]								**4E-05**	
							Total Gastrointestinal HI =		1.0

Notes:

[a] Corresponding Hazard Index equals 95% UCL concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL concentration divided by the RSL divided by the acceptable risk level

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Chemical of Potential Concern
mg/kg = milligrams per kilogram
HI = Hazard Index
NA = Not available/not applicable

ProUCL, Version 4.1.00 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. May 2010. ProUCL, Version 4.1. Prepared by Lockheed Martin Environmental Services).

Options: Maximum detected concentration (Max); 97.5% Kaplan-Meier (Chebyshev) UCL (97.5% KM); 95% Kaplan-Meier (Chebyshev) UCL (95% KM) 95% Chebyshev (mean, sd) UCL (95% Cheb-m); 99% Kaplan-Meier (Chebyshev) UCL (99% KM); 95% Kaplan-Meier (t) UCL (95% KM-t); 95% Kaplan-Meier (BCA) UCL (95% KM-BCA) Arithmetic Mean (Mean)

Upper Confidence Limit (UCL) Rationale:
(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Test indicates data are gamma distributed.
(4) Distribution tests are inconclusive
(5) Max value used because 95% UCL greater than max.
(6) Only one distinct data value or data set too small, maximum detected concentration used.
(7) Lead evaluated using arithmetic mean concentration in lead models, therefore, arithmetic mean concentration presented here.

APPENDIX E-1

Table 2.3

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Groundwater	71-55-6	1,1,1-Trichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	9.1E+02 N	2.0E+02	MCL, 15A NCAC 2L	NO	DLBSL
	79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	UG/L		0/9	1 - 2.4	2.4E+00	N/A	6.7E-02 C	2.0E-01	15A NCAC 2L	YES	DLASL
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	5.9E+03 N	2.0E+05	15A NCAC 2L	NO	DLBSL
	79-00-5	1,1,2-Trichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.2E-02 C**	5.0E+00	MCL	YES	DLASL
	75-34-3	1,1-Dichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.4E+00 C	6.0E+00	15A NCAC 2L	NO	DLBSL
	75-35-4	1,1-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.4E+01 N	7.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	120-82-1	1,2,4-Trichlorobenzene	ND	ND	UG/L		0/9	1 - 2	2.0E+00	N/A	4.1E-01 C**	7.0E+01	MCL, 15A NCAC 2L	YES	DLASL
	96-12-8	1,2-Dibromo-3-chloropropane	ND	ND	UG/L		0/6	2 - 2	2.0E+00	N/A	3.2E-04 C	2.0E-01	MCL	YES	DLASL
												4.0E-02	15A NCAC 2L		
	106-93-4	1,2-Dibromoethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	6.5E-03 C	5.0E-02	MCL	YES	DLASL
												2.0E-02	15A NCAC 2L		
	95-50-1	1,2-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.7E+01 N	6.0E+02	MCL	NO	DLBSL
												2.0E+01	15A NCAC 2L		
	107-06-2	1,2-Dichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E-01 C	5.0E+00	MCL	YES	DLASL
												4.0E-01	15A NCAC 2L		
	78-87-5	1,2-Dichloropropane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.9E-01 C*	5.0E+00	MCL	YES	DLASL
												6.0E-01	15A NCAC 2L		
	541-73-1	1,3-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C	2.0E+02	15A NCAC 2L	YES	DLASL
	106-46-7	1,4-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C	7.5E+01	MCL	YES	DLASL
												6.0E+00	15A NCAC 2L		
	78-93-3	2-Butanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	7.1E+02 N	4.0E+03	15A NCAC 2L	NO	DLBSL
	591-78-6	2-Hexanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	4.7E+00 N	N/A		YES	DLASL
	108-10-1	4-Methyl-2-pentanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	2.0E+02 N	N/A		NO	DLBSL
	67-64-1	Acetone	ND	ND	UG/L		0/9	5 - 10	1.0E+01	N/A	2.2E+03 N	6.0E+03	15A NCAC 2L	NO	DLBSL
	71-43-2	Benzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.1E-01 C	5.0E+00	MCL	YES	DLASL
												1.0E+00	15A NCAC 2L		
	75-27-4	Bromodichloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.2E-01 C	8.0E+01	MCL	YES	DLASL
												6.0E-01	15A NCAC 2L		
	75-25-2	Bromoform	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	8.5E+00 C*	8.0E+01	MCL	NO	DLBSL
												4.0E+00	15A NCAC 2L		
	74-83-9	Bromomethane	ND	ND	UG/L		0/9	1 - 1.1	1.1E+00	N/A	8.7E-01 N	N/A		YES	DLASL
	75-15-0	Carbon disulfide	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	1.0E+02 N	7.0E+02	15A NCAC 2L	NO	DLBSL
	56-23-5	Carbon tetrachloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.4E-01 C	5.0E+00	MCL	YES	DLASL
												3.0E-01	15A NCAC 2L		
	108-90-7	Chlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	9.1E+00 N	1.0E+02	MCL	NO	DLBSL
												5.0E+01	15A NCAC 2L		
	75-00-3	Chloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.1E+03 N	3.0E+03	15A NCAC 2L	NO	DLBSL
	67-66-3	Chloroform	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.9E-01 C	8.0E+01	MCL	YES	DLASL
												7.0E+01	15A NCAC 2L		
	74-87-3	Chloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.9E+01 N	3.0E+00	15A NCAC 2L	NO	DLBSL
	156-59-2	cis-1,2-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	7.3E+00 N	7.0E+01	MCL, 15A NCAC 2L	NO	DLBSL
	10061-01-5	cis-1,3-Dichloropropene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	110-82-7	Cyclohexane	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	1.3E+03 N	N/A		NO	DLBSL
	124-48-1	Dibromochloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E-01 C	6.0E+01	MCL	YES	DLASL
												4.0E-01	15A NCAC 2L		
	75-71-8	Dichlorodifluoromethane (Freon-12)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.0E+01 N	1.0E+03	15A NCAC 2L	NO	DLBSL
	100-41-4	Ethylbenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E+00 C	7.0E+02	MCL	NO	DLBSL
												6.0E+02	15A NCAC 2L		
	98-82-8	Isopropylbenzene	4.9E+00 J	4.9E+00 J	UG/L	IR15-TW03D-09C	1/9	1 - 1	4.9E+00	N/A	6.8E+01 N	7.0E+01	15A NCAC 2L	NO	BSL
	79-20-9	Methyl acetate	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	3.7E+03 N	N/A		NO	DLBSL
	108-87-2	Methylcyclohexane	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	N/A	N/A		NO	NTX

APPENDIX E-1

Table 2.3

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	75-09-2	Methylene chloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.8E+00 C	5.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	1634-04-4	Methyl-tert-butyl ether (MTBE)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.2E+01 C	2.0E+01	15A NCAC 2L	NO	DLBSL
	100-42-5	Styrene	5.9E+00 J	5.9E+00 J	UG/L	IR15-TW03D-09C	1/9	1 - 1	5.9E+00	N/A	1.6E+02 N	1.0E+02	MCL	NO	BSL
												7.0E+01	15A NCAC 2L		
	127-18-4	Tetrachloroethene	ND	ND	UG/L		0/9	1 - 1.1	1.1E+00	N/A	1.1E-01 C	5.0E+00	MCL	YES	DLASL
												7.0E-01	15A NCAC 2L		
	108-88-3	Toluene	6.0E-02 J	6.0E-02 J	UG/L		1/9	1 - 1	6.0E-02	N/A	2.3E+02 N	1.0E+03	MCL	NO	DLBSL
												6.0E+02	15A NCAC 2L		
	156-60-5	trans-1,2-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.1E+01 N	1.0E+02	MCL, 15A NCAC 2L	NO	DLBSL
	10061-02-6	trans-1,3-Dichloropropene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	79-01-6	Trichloroethene	ND	ND	UG/L		0/9	1 - 5.1	5.1E+00	N/A	2.0E+00 C	5.0E+00	MCL	YES	DLASL
												3.0E+00	15A NCAC 2L		
	75-69-4	Trichlorofluoromethane (Freon-11)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.3E+02 N	2.0E+03	15A NCAC 2L	NO	DLBSL
	75-01-4	Vinyl chloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.6E-02 C	2.0E+00	MCL	YES	DLASL
												3.0E-02	15A NCAC 2L		
	1330-20-7	Xylene, total	ND	ND	UG/L		0/9	1.2 - 3	3.0E+00	N/A	2.0E+01 N	1.0E+04	MCL	NO	DLBSL
												5.0E+02	15A NCAC 2L		
	92-52-4	1,1-Biphenyl	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	8.3E-02 N	4.0E+02	15A NCAC 2L	YES	DLASL
	108-60-1	2,2'-Oxybis(1-chloropropane)	ND	ND	UG/L		0/6	10 - 11	1.1E+01	N/A	3.2E-01 C	N/A		YES	DLASL
	95-95-4	2,4,5-Trichlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	88-06-2	2,4,6-Trichlorophenol	ND	ND	UG/L		0/5	0.5 - 0.5	5.0E-01	N/A	3.7E+00 C**	N/A		NO	DLBSL
	120-83-2	2,4-Dichlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+01 N	N/A		YES	DLASL
	105-67-9	2,4-Dimethylphenol	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	7.3E+01 N	1.0E+02	15A NCAC 2L	NO	DLBSL
	51-28-5	2,4-Dinitrophenol	ND	ND	UG/L		0/8	5 - 22	2.2E+01	N/A	7.3E+00 N	N/A		YES	DLASL
	121-14-2	2,4-Dinitrotoluene	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	2.2E-01 C	N/A		YES	DLASL
	606-20-2	2,6-Dinitrotoluene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 N	N/A		YES	DLASL
	91-58-7	2-Chloronaphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+02 N	N/A		NO	DLBSL
	95-57-8	2-Chlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	4.0E-01	15A NCAC 2L	NO	DLBSL
	91-57-6	2-Methylnaphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.5E+01 N	3.0E+01	15A NCAC 2L	NO	DLBSL
	95-48-7	2-Methylphenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+02 N	N/A		NO	DLBSL
	88-74-4	2-Nitroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.7E+01 N	N/A		NO	DLBSL
	88-75-5	2-Nitrophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	N/A		NO	DLBSL
	91-94-1	3,3'-Dichlorobenzidine	ND	ND	UG/L		0/8	10 - 22	2.2E+01	N/A	1.5E-01 C	N/A		YES	DLASL
	99-09-2	3-Nitroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.7E+01 N	N/A		NO	DLBSL
	534-52-1	4,6-Dinitro-2-methylphenol	ND	ND	UG/L		0/8	0.5 - 22	2.2E+01	N/A	2.9E-01 N	N/A		YES	DLASL
	101-55-3	4-Bromophenyl-phenylether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	N/A	N/A		NO	NTX
	59-50-7	4-Chloro-3-methylphenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	106-47-8	4-Chloroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.4E-01 C	N/A		YES	DLASL
	7005-72-3	4-Chlorophenyl-phenylether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	N/A		NO	DLBSL
	106-44-5	4-Methylphenol	ND	ND	UG/L		0/8	0.5 - 22	2.2E+01	N/A	1.8E+01 N	4.0E+01	15A NCAC 2L	YES	DLASL
	100-01-6	4-Nitroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.4E+00 C*	N/A		YES	DLASL
	100-02-7	4-Nitrophenol	ND	ND	UG/L		0/8	10 - 22	2.2E+01	N/A	1.2E-01 C	N/A		YES	DLASL
	83-32-9	Acenaphthene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+02 N	8.0E+01	15A NCAC 2L	NO	DLBSL
	208-96-8	Acenaphthylene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+02 N	2.0E+02	15A NCAC 2L	NO	DLBSL
	98-86-2	Acetophenone	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	120-12-7	Anthracene	4.1E-01 J	4.1E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	4.1E-01	N/A	1.1E+03 N	2.0E+03	15A NCAC 2L	NO	BSL
	1912-24-9	Atrazine	ND	ND	UG/L		0/8	0.5 - 22	2.2E+01	N/A	2.9E-01 C	3.0E+00	MCL, 15A NCAC 2L	YES	DLASL
	100-52-7	Benzaldehyde	ND	ND	UG/L		0/5	0.5 - 0.5	5.0E-01	N/A	3.7E+02 N	N/A		NO	DLBSL
	56-55-3	**Benzo(a)anthracene**	**1.2E-01 J**	**1.2E-01 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**1.2E-01**	N/A	**2.9E-02 C**	**5.0E-02**	**15A NCAC 2L**	**YES**	**ASL**
												2.0E-01	**MCL**		

APPENDIX E-1

Table 2.3

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	50-32-8	**Benzo(a)pyrene**	**7.2E-02 J**	**7.2E-02 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**7.2E-02**	N/A	**2.9E-03 C**	**5.0E-03**	**15A NCAC 2L**	**YES**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	**7.2E-02 J**	**7.2E-02 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**7.2E-02**	N/A	**2.9E-02 C**	**5.0E-02**	**15A NCAC 2L**	**YES**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+02 N	2.0E+02	15A NCAC 2L	NO	DLBSL
	207-08-9	**Benzo(k)fluoranthene**	**9.3E-02 J**	**9.3E-02 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**9.3E-02**	**N/A**	**2.9E-01 C**	**5.0E-01**	**15A NCAC 2L**	**YES**	**cPAH**
	111-91-1	bis(2-Chloroethoxy)methane	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+01 N	N/A		YES	DLASL
	111-44-4	bis(2-Chloroethyl)ether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.2E-02 C	3.0E-02	15A NCAC 2L	YES	DLASL
	39638-32-9	bis(2-Chloroisopropyl)ether	ND	ND	UG/L		0/2	0.5 - 0.5	5.0E-01	N/A	N/A	N/A		NO	NTX
	117-81-7	bis(2-Ethylhexyl)phthalate	2.5E-01 J	3.3E-01 J	UG/L	IR15-GW06-11B	2/8	2 - 11	3.3E-01	N/A	4.8E+00 C	6.0E+00	MCL	NO	BSL
												3.0E+00	15A NCAC 2L		
	85-68-7	Butylbenzylphthalate	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.5E+01 C	1.0E+03	15A NCAC 2L	NO	DLBSL
	105-60-2	Caprolactam	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	1.8E+03 N	4.0E+03	15A NCAC 2L	NO	DLBSL
	86-74-8	Carbazole	1.3E-01 J	1.3E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	1.3E-01	N/A	N/A	N/A		NO	NTX
	218-01-9	Chrysene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+00 C	5.0E+00	15A NCAC 2L	YES	DLASL
	53-70-3	Dibenz(a,h)anthracene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E-03 C	5.0E-03	15A NCAC 2L	YES	DLASL
	132-64-9	Dibenzofuran	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 N	N/A		YES	DLASL
	84-66-2	Diethylphthalate	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+03 N	6.0E+03	15A NCAC 2L	NO	DLBSL
	131-11-3	Dimethyl phthalate	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	N/A	N/A		NO	NTX
	84-74-2	Di-n-butylphthalate	ND	ND	UG/L		0/8	2 - 22	2.2E+01	N/A	3.7E+02 N	7.0E+02	15A NCAC 2L	NO	DLBSL
	117-84-0	Di-n-octylphthalate	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	4.8E+00 C	1.0E+02	15A NCAC 2L	YES	DLASL
	206-44-0	Fluoranthene	7.2E-01 J	7.2E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	7.2E-01	N/A	1.5E+02 N	3.0E+02	15A NCAC 2L	NO	BSL
	86-73-7	Fluorene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.5E+02 N	3.0E+02	15A NCAC 2L	NO	DLBSL
	118-74-1	Hexachlorobenzene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	4.2E-02 C	1.0E+00	MCL	YES	DLASL
												2.0E-02	15A NCAC 2L		
	87-68-3	Hexachlorobutadiene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	8.6E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	77-47-4	Hexachlorocyclopentadiene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+01 N	5.0E+01	MCL	NO	DLBSL
	67-72-1	Hexachloroethane	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 C**	N/A		YES	DLASL
	193-39-5	Indeno(1,2,3-cd)pyrene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E-02 C	5.0E-02	15A NCAC 2L	YES	DLASL
	78-59-1	Isophorone	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	7.1E+01 C	4.0E+01	15A NCAC 2L	NO	DLBSL
	91-20-3	Naphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.4E-01 C*	6.0E+00	15A NCAC 2L	YES	DLASL
	621-64-7	n-Nitroso-di-n-propylamine	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	9.6E-03 C	N/A		YES	DLASL
	86-30-6	n-Nitrosodiphenylamine	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.4E+01 C	N/A		NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.2E-01 C	N/A		YES	DLASL
	87-86-5	Pentachlorophenol	ND	ND	UG/L		0/8	1 - 22	2.2E+01	N/A	1.7E-01 C	1.0E+00	MCL	YES	DLASL
												3.0E-01	15A NCAC 2L		
	85-01-8	Phenanthrene	5.1E-02 J	7.2E-02 J	UG/L	IR15-GW04-11B	2/8	0.5 - 11	7.2E-02	N/A	1.1E+03 N	2.0E+02	15A NCAC 2L	NO	BSL
	108-95-2	Phenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+03 N	3.0E+01	15A NCAC 2L	NO	DLBSL
	129-00-0	Pyrene	6.2E-02 J	6.2E-02 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	6.2E-02	N/A	1.1E+02 N	2.0E+02	15A NCAC 2L	NO	BSL
	72-54-8	4,4'-DDD	1.3E-02	1.3E-02	UG/L	IR15-GW04D-11B	1/8	0.01 - 0.053	1.3E-02	N/A	2.8E-01 C	1.0E-01	15A NCAC 2L	NO	BSL
	72-55-9	4,4'-DDE	8.1E-04 J	3.7E-03 J	UG/L	IR15-GW04D-11B	2/8	0.01 - 0.053	3.7E-03	N/A	2.0E-01 C	N/A		NO	BSL
	50-29-3	4,4'-DDT	1.0E-03 J	1.0E-03 J	UG/L	IR15-GW04D-11B	1/8	0.01 - 0.053	1.0E-03	N/A	2.0E-01 C*	1.0E-01	15A NCAC 2L	NO	BSL
	309-00-2	Aldrin	ND	ND	UG/L		0/8	0.02 - 0.053	5.3E-02	N/A	4.0E-03 C	N/A		YES	DLASL
	319-84-6	alpha-BHC	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.1E-02 C	2.0E-02	15A NCAC 2L	YES	DLASL
	5103-71-9	alpha-Chlordane	1.2E-02	1.2E-02	UG/L	IR15-GW04-11B	1/8	0.01 - 0.053	1.2E-02	N/A	1.9E-01 C*	2.0E+00	MCL	NO	BSL
												1.0E-01	15A NCAC 2L		
	12674-11-2	Aroclor-1016	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	2.6E-01 C**	5.0E-01	MCL	YES	DLASL
	11104-28-2	Aroclor-1221	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	6.8E-03 C	5.0E-01	MCL	YES	DLASL
	11141-16-5	Aroclor-1232	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	6.8E-03 C	5.0E-01	MCL	YES	DLASL
	53469-21-9	Aroclor-1242	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C	5.0E-01	MCL	YES	DLASL
	12672-29-6	Aroclor-1248	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C	5.0E-01	MCL	YES	DLASL
	11097-69-1	Aroclor-1254	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C*	5.0E-01	MCL	YES	DLASL

APPENDIX E-1

Table 2.3

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	11096-82-5	Aroclor-1260	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C	5.0E-01	MCL	YES	DLASL
	319-85-7	beta-BHC	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	3.7E-02 C	2.0E-02	15A NCAC 2L	YES	DLASL
	319-86-8	delta-BHC	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	3.7E-02 C	2.0E-02	15A NCAC 2L	YES	DLASL
	60-57-1	Dieldrin	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	4.2E-03 C	2.0E-03	15A NCAC 2L	YES	DLASL
	959-98-8	Endosulfan I	4.0E-04 J	4.0E-04 J	UG/L	IR15-GW02-10D	1/8	0.01 - 0.053	4.0E-04	N/A	2.2E+01 N	4.0E+01	15A NCAC 2L	NO	BSL
	33213-65-9	Endosulfan II	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	2.2E+01 N	4.0E+01	15A NCAC 2L	NO	DLBSL
	1031-07-8	Endosulfan sulfate	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	2.2E+01 N	4.0E+01	15A NCAC 2L	NO	DLBSL
	72-20-8	Endrin	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.1E+00 N	2.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	7421-93-4	Endrin aldehyde	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.1E+00 N	2.0E+00	15A NCAC 2L	NO	DLBSL
	53494-70-5	Endrin ketone	ND	ND	UG/L		0/8	0.02 - 0.053	5.3E-02	N/A	1.1E+00 N	2.0E+00	15A NCAC 2L	NO	DLBSL
	58-89-9	gamma-BHC (Lindane)	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	6.1E-02 C	2.0E-01	MCL	NO	DLBSL
												3.0E-02	15A NCAC 2L		
	5103-74-2	gamma-Chlordane	7.2E-02 J	7.2E-02 J	UG/L	IR15-GW04D-11B	1/8	0.01 - 0.053	7.2E-02	N/A	1.9E-01 C*	2.0E+00	MCL	NO	BSL
												1.0E-01	15A NCAC 2L		
	76-44-8	Heptachlor	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.5E-02 C	4.0E-01	MCL	YES	DLASL
												8.0E-03	15A NCAC 2L		
	1024-57-3	Heptachlor epoxide	8.1E-04 J	3.9E-03 J	UG/L	IR15-GW04D-11B	2/8	0.01 - 0.053	3.9E-03	N/A	7.4E-03 C*	2.0E-01	MCL	NO	BSL
												4.0E-03	15A NCAC 2L		
	72-43-5	Methoxychlor	ND	ND	UG/L		0/8	0.02 - 0.053	5.3E-02	N/A	1.8E+01 N	4.0E+01	MCL, 15A NCAC 2L	NO	DLBSL
	8001-35-2	Toxaphene	ND	ND	UG/L		0/8	0.3 - 1.1	1.1E+00	N/A	6.1E-02 C	3.0E+00	MCL	YES	DLASL
												3.0E-02	15A NCAC 2L		
	7429-90-5	Aluminum	4.6E+01 J	2.4E+03	UG/L	IR15-GW02D-10D	9/9	100 - 1000	2.4E+03	1.9E+03	3.7E+03 N	50 - 200	SMCL	NO	BSL
	7440-36-0	Antimony	6.2E-01 J	2.1E+00	UG/L	IR15-GW03-10D	2/9	2 - 20	2.1E+00	3.3E+00	1.5E+00 N	6.0E+00	MCL	NO	BBK
	7440-38-2	Arsenic	3.2E-01 J	4.2E+00 J	UG/L	SWMU46-TW03	5/15	5 - 20	4.2E+00	5.8E+00	4.5E-02 C	1.0E+01	MCL, 15A NCAC 2L	NO	BBK
	7440-39-3	Barium	1.9E+01 J	1.5E+02	UG/L	SWMU46-TW01	15/15	2 - 50	1.5E+02	8.6E+01	7.3E+02 N	2.0E+03	MCL	NO	BSL
												7.0E+02	15A NCAC 2L		
	7440-41-7	Beryllium	1.8E-01 J	1.8E-01 J	UG/L	IR15-TW03D-09C	1/9	1 - 2	1.8E-01	3.1E-01	7.3E+00 N	4.0E+00	MCL	NO	BSL
	7440-43-9	Cadmium	4.4E-02 J	6.3E-02 J	UG/L	IR15-GW03-10D	3/10	0.2 - 6	6.3E-02	3.6E-01	1.8E+00 N	5.0E+00	MCL	NO	BSL
												2.0E+00	15A NCAC 2L		
	7440-70-2	Calcium	8.0E+02	4.9E+04	UG/L	IR15-GW03-10D	9/9	500 - 1000	4.9E+04	6.9E+04	N/A	N/A		NO	NUT
	7440-47-3	Chromium, total, measured	8.3E-01 J	4.7E+00 J	UG/L	SWMU46-TW01	9/16	0.88 - 20	4.7E+00	3.1E+00	N/A	1.0E+02	MCL	NO	Chrom
												1.0E+01	15A NCAC 2L		
	18540-29-9	**Chromium (VI), measured**	**1.1E+00 J**	**1.1E+00 J**	**UG/L**	**IR15-GW01-10D**	**1/6**	**5 - 5**	**1.1E+00**	**N/A**	**4.3E-02 C**	**N/A**		**YES**	**ASL**
	18540-29-9	**Chromium (VI), estimated [6]**	**4.0E-01**	**2.3E+00**	**UG/L**				**2.3E+00**	**N/A**	**4.3E-02 C**	**N/A**		**YES**	**ASL**
	16065-83-1	Chromium (III), estimated [6]	4.3E-01	2.4E+00	UG/L				2.4E+00	N/A	5.5E+03 N	N/A		NO	BSL
	7440-48-4	**Cobalt**	**5.8E-01 J**	**3.9E+00 J**	**UG/L**	**IR15-TW01-09C**	**9/9**	**1 - 5**	**3.9E+00**	**3.4E+00**	**1.1E+00 N**	**N/A**		**YES**	**ASL**
	7440-50-8	Copper	3.9E-01 J	2.9E+00 J	UG/L	IR15-GW04-11B, IR15-TW03D-09C	7/9	1 - 20	2.9E+00	2.8E+00	1.5E+02 N	1.3E+03	MCL	NO	BSL
												1.0E+03	15A NCAC 2L		
	7439-89-6	**Iron**	**2.3E+02**	**2.6E+04**	**UG/L**	**IR15-TW01-09C**	**9/9**	**20 - 150**	**2.6E+04**	6.0E+03	**2.6E+03 N**	**3.0E+02**	**SMCL, 15A NCAC 2L**	**YES**	**ASL**
	7439-92-1	Lead	4.7E-01 J	4.6E+00 J	UG/L	SWMU46-TW02	8/15	1 - 20	4.6E+00	2.8E+00	1.5E+01	1.5E+01	MCL, 15A NCAC 2L	NO	BSL
	7439-95-4	Magnesium	3.9E+02	6.2E+03	UG/L	IR15-GW03-10D	9/9	250 - 500	6.2E+03	6.4E+03	N/A	N/A		NO	NUT
	7439-96-5	**Manganese**	**5.2E+00**	**4.4E+02**	**UG/L**	**IR15-TW01-09C**	**9/9**	**2 - 5**	**4.4E+02**	**2.1E+02**	**8.8E+01 N**	**5.0E+01**	**SMCL, 15A NCAC 2L**	**YES**	**ASL**
	7439-97-6	Mercury	ND	ND	UG/L		0/10	0.2 - 0.2	2.0E-01	1.0E-01	1.1E+00 N	2.0E+00	MCL	NO	DLBSL
												1.0E+00	15A NCAC 2L		

APPENDIX E-1

Table 2.3

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-02-0	Nickel	8.8E-01 J	3.0E+01	UG/L	IR15-TW01-09C	7/9	1 - 10	3.0E+01	8.0E+00	7.3E+01 N	1.0E+02	15A NCAC 2L	NO	BSL
	7440-09-7	Potassium	6.2E+02 J	6.0E+03	UG/L	IR15-GW04D-11B	9/9	100 - 1000	6.0E+03	3.3E+03	N/A	N/A		NO	NUT
	7782-49-2	Selenium	ND	ND	UG/L		0/10	5 - 20	2.0E+01	3.1E+00	1.8E+01 N	5.0E+01	MCL	YES	DLASL
												2.0E+01	15A NCAC 2L		
	7440-22-4	Silver	6.6E-02 J	8.6E-02 J	UG/L	IR15-GW02-10D	2/10	0.5 - 20	8.6E-02	7.7E-01	1.8E+01 N	2.0E+01	15A NCAC 2L	NO	BSL
												1.0E+02	SMCL		
	7440-23-5	Sodium	1.6E+03 J	1.5E+04	UG/L	IR15-GW02D-10D	9/9	500 - 2500	1.5E+04	2.3E+04	N/A	N/A		NO	NUT
	7440-28-0	Thallium	6.9E-02 J	3.2E+00 J	UG/L	IR15-TW04-09C	5/9	0.2 - 30	3.2E+00	3.8E+00	3.7E-02 N	2.0E+00	MCL	NO	BBK
	7440-62-2	Vanadium	7.4E-01 J	3.1E+00	UG/L	IR15-GW05-11B	5/9	1 - 50	3.1E+00	4.7E+00	1.8E+01 N	N/A		NO	BSL, BBK
	7440-66-6	Zinc	5.3E+00 J	1.4E+01	UG/L	IR15-GW04-11B	9/9	10 - 50	1.4E+01	4.2E+01	1.1E+03 N	1.0E+03	15A NCAC 2L	NO	BSL, BBK
												5.0E+03	SMCL		

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening. If the chemical was not detected, the maximum detection limit is used for screening.

[3] Background values are two times the arithmetic mean basewide background shallow groundwater concentrations. Background values are from *Final Base Background Groundwater Study Report, Marine Corps Base Camp Lejeune, North Carolina*, Baker Environmental, August 2002.

[4] Oak Ridge National Laboratory (ORNL). May 2011. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml. Adjusted (noncarcinogenic RSLs adjusted by dividing by 10) tap water RSLs.
The tap water value of 15 ug/L for lead is the action level provided in the Drinking Water Regulations and Health Advisories.
RSL value for 1,4-Dichlorobenzene used as a surrogate for 1,3-Dichlorobenzene
RSL value for methoxychlor used as surrogate for 4-chlorophenyl-phenylether.
RSL value for 2-Nitroaniline used as surrogate for 3-Nitroaniline.
RSL value for nitrobenzene used as surrogate for 4-nitrophenol.
RSL value for acenaphthene used as surrogate for acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for chlordane used as surrogate for alpha-chlordane.
RSL value for technical-HCH used as surrogate for delta-BHC.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for 1,3-dichloropropene used as a surrogate for cis-1,3-dichloropropene and trans-1,3-dichloropropene.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.
RSL value for 2-chlorophenol used as surrogate for 4-chloro-3-methylphenol and 2-nitrophenol.
RSL value for cadmium (water) used as surrogate for cadmium.
RSL value for Manganese (Non-diet) used as surrogate for manganese.
RSL value for Mercury (mercuric chloride) used as surrogate for mercury.
RSL value for bis(2-ethylhexyl)phthalate used as a surrogate for di-n-octylphthalate.

[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
	Detection Limit Above Screening Level (DLASL), not quantitatively evaluated in HHRA
Deletion Reason:	No Toxicity Information (NTX)
	Essential Nutrient (NUT)
	Below Screening Level (BSL)
	Below Background (BBK)
	Detection Limit Below Screening Level (DLBSL)
	Total chromium not carried through since already screening estimated hexavalent and trivalent (Chrom)

[6] See Table 2.3 Supplement A for calculation of estimated chromium (III) and estimated chromium (VI).

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered
MCL = Maximum Contaminant Level from EPA's National Primary Drinking Water Standards
SMCL = Secondary Maximum Contaminant Level
15A NCAC 2L = North Carolina Classifications and Groundwater Quality Standards, January 2010.
J = Estimated Value
C = Carcinogenic
C* = N screening level < 100x C screening level, therefore N screening value/10 used as screening level
C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available/not applicable
ND = Not detected
UG/L = Micrograms per liter

APPENDIX E-1

TABLE 2.3 SUPPLEMENT A

Calculation of Chromium Concentrations - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Location	Sample ID	Sample Date	Measured Total Chromium (ug/L)	Data Qualifier	Measured Chromium (VI) (ug/L)	Data Qualifier	Estimated Chromium (VI)[1] (ug/L)	Estimated Chromium (III)[2] (ug/L)
IR15-MW01	IR15-GW01-10D	11/10/2010	2.3		1.1	J	1.1	1.2
IR15-MW04	IR15-GW04-11B	4/6/2011	2.1	U	1	U	ND	ND
IR15-MW05	IR15-GW05-11B	4/7/2011	3.5	U	1	U	ND	ND
IR15-MW06	IR15-GW06-11B	4/7/2011	0.95	U	1	U	ND	ND
IR15-MW02	IR15-GW02-10D	11/11/2010	2.6		1	U	ND	1.4
IR15-MW03	IR15-GW03-10D	11/11/2010	0.95	J	1	U	ND	0.5
IR15-TW01	IR15-TW01-09C	7/29/2009	20	U	NA		ND	ND
IR15-TW02	IR15-TW02-09C	7/29/2009	20	U	NA		ND	ND
IR15-TW03	IR15-TW03D-09C	7/28/2009	1.7	J	NA		0.8	0.9
IR15-TW04	IR15-TW04-09C	7/29/2009	20	U	NA		ND	ND
SWMU46-MW01	SWMU46-MW01	3/21/2004	0.88	U	NA		ND	ND
SWMU46-TW01	SWMU46-TW01	4/6/2002	4.7	J	NA		2.3	2.4
SWMU46-TW02	SWMU46-TW02	4/6/2002	0.83	J	NA		0.4	0.4
SWMU46-TW03	SWMU46-TW03	4/6/2002	2.1	J	NA		1.0	1.1
SWMU46-TW04	SWMU46-TW04	4/6/2002	1	J	NA		0.5	0.5
SWMU46-TW05	SWMU46-TW05	4/6/2002	3	J	NA		1.4	1.6
		Minimum	0.83			Minimum	0.4	0.4
		Maximum	4.7			Maximum	2.3	2.4

Notes:

ug/L = Micrograms per liter

U = Not Detected

J = Estimated Value

NA = Not Analyzed

ND = Not Detected

1 Estimated Chromium (VI) = (0.48) * (Measured Total Chromium)

2 Estimated Chromium (III) = (0.52) * (Measured Total Chromium)

Only one sample (IR15-GW01-10D) had detections for both chromium (VI) and total chromium, which were 1.1 J and 2.3, respectively. The ratio of chromium (VI) divided by total chromium was 0.48. This value was used to estimate the chromium (VI) concentrations for all of the groundwater samples. Also, it was assumed the remaining chromium in the total chromium concentrations was chromium (III). The chromium (III) concentrations were therefore estimated by multiplying the total chromium concentration by 1 - 0.48, or 0.52.

APPENDIX E-1

TABLE 2.3a

Risk Ratio Screening for Groundwater, Maximum Detected Concentration

Site 15 ESI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	Maximum Detected Concentration (Qualifier)	Sample Location of Maximum Detected Concentration	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semi-volatile Organic Compounds (ug/L)								
Benzo(a)anthracene	1 / 8	1.2E-01 J	IR15-GW04-11B	2.9E-02	1E-06	NA	4E-06	NA
Benzo(a)pyrene	1 / 8	7.2E-02 J	IR15-GW04-11B	2.9E-03	1E-06	NA	2E-05	NA
Benzo(b)fluoranthene	1 / 8	7.2E-02 J	IR15-GW04-11B	2.9E-02	1E-06	NA	2E-06	NA
Benzo(k)fluoranthene	1 / 8	9.3E-02 J	IR15-GW04-11B	2.9E-01	1E-06	NA	3E-07	NA
Metals (ug/L)								
Chromium (VI), measured	1 / 6	1.1E+00 J	IR15-GW01-10D	4.3E-02	1E-06	NA	3E-05	NA
Chromium (VI), estimated		2.3E+00		4.3E-02	1E-06	NA	5E-05	NA
Cobalt	9 / 9	3.9E+00 J	IR15-TW01-09C	1.1E+01	1	0.4	NA	Thyroid
Iron	9 / 9	2.6E+04	IR15-TW01-09C	2.6E+04	1	1.0	NA	Gastrointestinal
Manganese	9 / 9	4.4E+02	IR15-TW01-09C	8.8E+02	1	0.5	NA	Central Nervous System
Cumulative Corresponding Hazard Index[c]						**1.8**		
Cumulative Corresponding Cancer Risk, including measured Chromium (VI) but not estimated Chromium (VI)[d]							**6E-05**	
Cumulative Corresponding Cancer Risk, including estimated Chromium (VI) but not measured Chromium (VI)[d]							**8E-05**	

Total Gastrointestinal HI =	**1.0**
Total Central Nervous System HI =	0.5
Total Thyroid HI =	0.4

Notes:

[a] Corresponding Hazard Index equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals maximum detected concentration divided by the RSL divided by the acceptable risk level.

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Chemical of Potential Concern
HI = Hazard Index
J = Estimated Value
ug/L = micrograms per liter
NA = Not available/not applicable

APPENDIX E-1

TABLE 2.3b

Risk Ratio Screening for Groundwater, 95% UCL Concentration

Site 15 ESI Report

MCB CamLej, North Carolina

Analyte	Detection Frequency	95% UCL		95% UCL Rationale	Tap Water RSL	Acceptable Risk Level	Corresponding Hazard Index[a]	Corresponding Cancer Risk[b]	Target Organ
Semi-volatile Organic Compounds (ug/L)									
Benzo(a)anthracene	1 / 8	1.2E-01	6	Max	2.9E-02	1E-06	NA	4E-06	NA
Benzo(a)pyrene	1 / 8	7.2E-02	6	Max	2.9E-03	1E-06	NA	2E-05	NA
Benzo(b)fluoranthene	1 / 8	7.2E-02	6	Max	2.9E-02	1E-06	NA	2E-06	NA
Benzo(k)fluoranthene	1 / 8	9.3E-02	6	Max	2.9E-01	1E-06	NA	3E-07	NA
Metals (ug/L)									
Chromium (VI), measured	1 / 6	1.1E+00	6	Max	4.3E-02	1E-06	NA	3E-05	NA
Chromium (VI), estimated		1.1E+00	1, 2, 3	95% KM-t	4.3E-02	1E-06	NA	3E-05	NA
Iron	9 / 9	1.6E+04	1, 3	95% App-G	2.6E+04	1	0.6	NA	Gastrointestinal
Cumulative Corresponding Hazard Index[c]							**0.6**		
Cumulative Corresponding Cancer Risk, including measured Chromium (VI) but not estimated Chromium (VI) [d]								**6E-05**	
Cumulative Corresponding Cancer Risk, including estimated Chromium (VI) but not measured Chromium (VI) [d]								**6E-05**	
							Total Gastrointestinal HI =		**0.6**

Notes:

[a] Corresponding Hazard Index equals 95% UCL concentration divided by the RSL divided by the acceptable risk level.

[b] Corresponding Cancer Risk equals 95% UCL concentration divided by the RSL divided by the acceptable risk level

[c] Cumulative Corresponding Hazard Index equals sum of Corresponding Hazard Indices for each constituent.

[d] Cumulative Corresponding Cancer Risk equals sum of Corresponding Cancer Risks for each constituent.

[e] 95% UCL for estimated Chromium (VI) was calculated using the non-detect values for total chromium if chromium (VI) was not analyzed.

Constituent selected as COPC if it contributes to an overall Hazard Index by target organ greater than 0.5 or Cumulative Corresponding Cancer Risk greater than 5E-05, otherwise, constituent not selected as COPC.

Constituents selected as COPCs are indicated by shading.

COPC = Chemical of Potential Concern

HI = Hazard Index

NA = Not available/not applicable

ug/L = micrograms per liter

ProUCL, Version 4.1.00 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. May 2010. ProUCL, Version 4.1. Prepared by Lockheed Martin Environmental Services).

Options: Maximum detected concentration (Max); 95% Approximate Gamma UCL (95% App-G); 95% Kaplan-Meier (t) UCL (95% KM-t)

Upper Confidence Limit (UCL) Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Test indicates data are gamma distributed.

(4) Distribution tests are inconclusive

(5) Max value used because 95% UCL greater than max.

(6) Only detected in one sample, maximum detected concentration used.

Appendix E-2
Baseline

APPENDIX E-2

TABLE 1.1

Selection of Exposure Pathways

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future	Groundwater	Groundwater	Tap Water	Resident	Adult	Ingestion	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply.
						Dermal Absorption	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply.
					Child	Ingestion	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply.
						Dermal Absorption	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply.
					Child/Adult	Ingestion	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply. Child/Adult evaluated for cancer risk only.
						Dermal Absorption	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply. Child/Adult evaluated for cancer risk only.
			Water in Excavation Pit	Construction Worker	Adult	Ingestion	On-site	None	Ingestion of groundwater during construction activities expected to be minimal.
						Dermal Absorption	On-site	Quant	Construction worker may contact groundwater in an excavation during construction/excavation activities.
		Air	Water Vapors at Showerhead	Resident	Adult	Inhalation	On-site	Quant	Although unlikely, groundwater will be evaluated for use as future potable water supply.
					Child	Inhalation	On-site	Quant	Although unlikely, groundwater will be evaluated for use as future potable water supply.
					Child/Adult	Inhalation	On-site	Quant	Although unlikely, groundwater will be evaluated for use as a future potable water supply. Child/Adult evaluated for cancer risk only.
			Water Vapors in Excavation Pit	Construction Worker	Adult	Inhalation	On-site	Quant	Construction worker may inhale vapors from groundwater in an open excavation during construction/excavation activities.
			Vapor Intrusion to Indoor Air	Resident	Adult	Inhalation	On-site	None	Historic site use not associated with significant VOC contamination and mininal VOCs were detected.Therefore, vapor intrusion to indoor air not evaluated.
					Child	Inhalation	On-site	None	Historic site use not associated with significant VOC contamination and mininal VOCs were detected.Therefore, vapor intrusion to indoor air not evaluated.
					Child/Adult	Inhalation	On-site	None	Historic site use not associated with significant VOC contamination and mininal VOCs were detected.Therefore, vapor intrusion to indoor air not evaluated.

Notes:

Quant: will be quantitatively evaluated.

None: Not considered to be a complete pathway, therefore, not evaluated.

APPENDIX E-2

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concerr

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Tap Water and Water in Excavation Pit	71-55-6	1,1,1-Trichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	9.1E+02 N	2.0E+02	MCL, 15A NCAC 2L	NO	DLBSL
	79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	UG/L		0/9	1 - 2.4	2.4E+00	N/A	6.7E-02 C	2.0E-01	15A NCAC 2L	YES	DLASL
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	5.9E+03 N	2.0E+05	15A NCAC 2L	NO	DLBSL
	79-00-5	1,1,2-Trichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.2E-02 C**	5.0E+00	MCL	YES	DLASL
	75-34-3	1,1-Dichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.4E+00 C	6.0E+00	15A NCAC 2L	NO	DLBSL
	75-35-4	1,1-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.4E+01 N	7.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	120-82-1	1,2,4-Trichlorobenzene	ND	ND	UG/L		0/9	1 - 2	2.0E+00	N/A	4.1E-01 C**	7.0E+01	MCL, 15A NCAC 2L	YES	DLASL
	96-12-8	1,2-Dibromo-3-chloropropane	ND	ND	UG/L		0/6	2 - 2	2.0E+00	N/A	3.2E-04 C	2.0E-01	MCL	YES	DLASL
												4.0E-02	15A NCAC 2L		
	106-93-4	1,2-Dibromoethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	6.5E-03 C	5.0E-02	MCL	YES	DLASL
												2.0E-02	15A NCAC 2L		
	95-50-1	1,2-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.7E+01 N	6.0E+02	MCL	NO	DLBSL
												2.0E+01	15A NCAC 2L		
	107-06-2	1,2-Dichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E-01 C	5.0E+00	MCL	YES	DLASL
												4.0E-01	15A NCAC 2L		
	78-87-5	1,2-Dichloropropane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.9E-01 C*	5.0E+00	MCL	YES	DLASL
												6.0E-01	15A NCAC 2L		
	541-73-1	1,3-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C	2.0E+02	15A NCAC 2L	YES	DLASL
	106-46-7	1,4-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C	7.5E+01	MCL	YES	DLASL
												6.0E+00	15A NCAC 2L		
	78-93-3	2-Butanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	7.1E+02 N	4.0E+03	15A NCAC 2L	NO	DLBSL
	591-78-6	2-Hexanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	4.7E+00 N	N/A		YES	DLASL
	108-10-1	4-Methyl-2-pentanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	2.0E+02 N	N/A		NO	DLBSL
	67-64-1	Acetone	ND	ND	UG/L		0/9	5 - 10	1.0E+01	N/A	2.2E+03 N	6.0E+03	15A NCAC 2L	NO	DLBSL
	71-43-2	Benzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.1E-01 C	5.0E+00	MCL	YES	DLASL
												1.0E+00	15A NCAC 2L		
	75-27-4	Bromodichloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.2E-01 C	8.0E+01	MCL	YES	DLASL
												6.0E-01	15A NCAC 2L		
	75-25-2	Bromoform	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	8.5E+00 C*	8.0E+01	MCL	NO	DLBSL
												4.0E+00	15A NCAC 2L		
	74-83-9	Bromomethane	ND	ND	UG/L		0/9	1 - 1.1	1.1E+00	N/A	8.7E-01 N	N/A		YES	DLASL
	75-15-0	Carbon disulfide	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	1.0E+02 N	7.0E+02	15A NCAC 2L	NO	DLBSL
	56-23-5	Carbon tetrachloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.4E-01 C	5.0E+00	MCL	YES	DLASL
												3.0E-01	15A NCAC 2L		
	108-90-7	Chlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	9.1E+00 N	1.0E+02	MCL	NO	DLBSL
												5.0E+01	15A NCAC 2L		
	75-00-3	Chloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.1E+03 N	3.0E+03	15A NCAC 2L	NO	DLBSL
	67-66-3	Chloroform	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.9E-01 C	8.0E+01	MCL	YES	DLASL
												7.0E+01	15A NCAC 2L		
	74-87-3	Chloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.9E+01 N	3.0E+00	15A NCAC 2L	NO	DLBSL
	156-59-2	cis-1,2-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	7.3E+00 N	7.0E+01	MCL, 15A NCAC 2L	NO	DLBSL
	10061-01-5	cis-1,3-Dichloropropene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	110-82-7	Cyclohexane	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	1.3E+03 N	N/A		NO	DLBSL
	124-48-1	Dibromochloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E-01 C	6.0E+01	MCL	YES	DLASL
												4.0E-01	15A NCAC 2L		
	75-71-8	Dichlorodifluoromethane (Freon-12)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.0E+01 N	1.0E+03	15A NCAC 2L	NO	DLBSL
	100-41-4	Ethylbenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E+00 C	7.0E+02	MCL	NO	DLBSL
												6.0E+02	15A NCAC 2L		
	98-82-8	Isopropylbenzene	4.9E+00 J	4.9E+00 J	UG/L	IR15-TW03D-09C	1/9	1 - 1	4.9E+00	N/A	6.8E+01 N	7.0E+01	15A NCAC 2L	NO	BSL

APPENDIX E-2

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concerr

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	79-20-9	Methyl acetate	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	3.7E+03 N	N/A		NO	DLBSL
	108-87-2	Methylcyclohexane	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	N/A	N/A		NO	NTX
	75-09-2	Methylene chloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.8E+00 C	5.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	1634-04-4	Methyl-tert-butyl ether (MTBE)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.2E+01 C	2.0E+01	15A NCAC 2L	NO	DLBSL
	100-42-5	Styrene	5.9E+00 J	5.9E+00 J	UG/L	IR15-TW03D-09C	1/9	1 - 1	5.9E+00	N/A	1.6E+02 N	1.0E+02	MCL	NO	BSL
												7.0E+01	15A NCAC 2L		
	127-18-4	Tetrachloroethene	ND	ND	UG/L		0/9	1 - 1.1	1.1E+00	N/A	1.1E-01 C	5.0E+00	MCL	YES	DLASL
												7.0E-01	15A NCAC 2L		
	108-88-3	Toluene	6.0E-02 J	6.0E-02 J	UG/L		1/9	1 - 1	6.0E-02	N/A	2.3E+02 N	1.0E+03	MCL	NO	DLBSL
												6.0E+02	15A NCAC 2L		
	156-60-5	trans-1,2-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.1E+01 N	1.0E+02	MCL, 15A NCAC 2L	NO	DLBSL
	10061-02-6	trans-1,3-Dichloropropene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	79-01-6	Trichloroethene	ND	ND	UG/L		0/9	1 - 5.1	5.1E+00	N/A	2.0E+00 C	5.0E+00	MCL	YES	DLASL
												3.0E+00	15A NCAC 2L		
	75-69-4	Trichlorofluoromethane (Freon-11)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.3E+02 N	2.0E+03	15A NCAC 2L	NO	DLBSL
	75-01-4	Vinyl chloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.6E-02 C	2.0E+00	MCL	YES	DLASL
												3.0E-02	15A NCAC 2L		
	1330-20-7	Xylene, total	ND	ND	UG/L		0/9	1.2 - 3	3.0E+00	N/A	2.0E+01 N	1.0E+04	MCL	NO	DLBSL
												5.0E+02	15A NCAC 2L		
	92-52-4	1,1-Biphenyl	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	8.3E-02 N	4.0E+02	15A NCAC 2L	YES	DLASL
	108-60-1	2,2'-Oxybis(1-chloropropane)	ND	ND	UG/L		0/6	10 - 11	1.1E+01	N/A	3.2E-01 C	N/A		YES	DLASL
	95-95-4	2,4,5-Trichlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	88-06-2	2,4,6-Trichlorophenol	ND	ND	UG/L		0/5	0.5 - 0.5	5.0E-01	N/A	3.7E+00 C**	N/A		NO	DLBSL
	120-83-2	2,4-Dichlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+01 N	N/A		YES	DLASL
	105-67-9	2,4-Dimethylphenol	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	7.3E+01 N	1.0E+02	15A NCAC 2L	NO	DLBSL
	51-28-5	2,4-Dinitrophenol	ND	ND	UG/L		0/8	5 - 22	2.2E+01	N/A	7.3E+00 N	N/A		YES	DLASL
	121-14-2	2,4-Dinitrotoluene	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	2.2E-01 C	N/A		YES	DLASL
	606-20-2	2,6-Dinitrotoluene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 N	N/A		YES	DLASL
	91-58-7	2-Chloronaphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+02 N	N/A		NO	DLBSL
	95-57-8	2-Chlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	4.0E-01	15A NCAC 2L	NO	DLBSL
	91-57-6	2-Methylnaphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.5E+01 N	3.0E+01	15A NCAC 2L	NO	DLBSL
	95-48-7	2-Methylphenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+02 N	N/A		NO	DLBSL
	88-74-4	2-Nitroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.7E+01 N	N/A		NO	DLBSL
	88-75-5	2-Nitrophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	N/A		NO	DLBSL
	91-94-1	3,3'-Dichlorobenzidine	ND	ND	UG/L		0/8	10 - 22	2.2E+01	N/A	1.5E-01 C	N/A		YES	DLASL
	99-09-2	3-Nitroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.7E+01 N	N/A		NO	DLBSL
	534-52-1	4,6-Dinitro-2-methylphenol	ND	ND	UG/L		0/8	0.5 - 22	2.2E+01	N/A	2.9E-01 N	N/A		YES	DLASL
	101-55-3	4-Bromophenyl-phenylether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	N/A	N/A		NO	NTX
	59-50-7	4-Chloro-3-methylphenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	106-47-8	4-Chloroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.4E-01 C	N/A		YES	DLASL
	7005-72-3	4-Chlorophenyl-phenylether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	N/A		NO	DLBSL
	106-44-5	4-Methylphenol	ND	ND	UG/L		0/8	0.5 - 22	2.2E+01	N/A	1.8E+01 N	4.0E+01	15A NCAC 2L	YES	DLASL
	100-01-6	4-Nitroaniline	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.4E+00 C*	N/A		YES	DLASL
	100-02-7	4-Nitrophenol	ND	ND	UG/L		0/8	10 - 22	2.2E+01	N/A	1.2E-01 C	N/A		YES	DLASL
	83-32-9	Acenaphthene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+02 N	8.0E+01	15A NCAC 2L	NO	DLBSL
	208-96-8	Acenaphthylene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+02 N	2.0E+02	15A NCAC 2L	NO	DLBSL
	98-86-2	Acetophenone	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	120-12-7	Anthracene	4.1E-01 J	4.1E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	4.1E-01	N/A	1.1E+03 N	2.0E+03	15A NCAC 2L	NO	BSL
	1912-24-9	Atrazine	ND	ND	UG/L		0/8	0.5 - 22	2.2E+01	N/A	2.9E-01 C	3.0E+00	MCL, 15A NCAC 2L	YES	DLASL

APPENDIX E-2

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concerr

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	100-52-7	Benzaldehyde	ND	ND	UG/L		0/5	0.5 - 0.5	5.0E-01	N/A	3.7E+02 N	N/A		NO	DLBSL
	56-55-3	**Benzo(a)anthracene**	**1.2E-01 J**	**1.2E-01 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**1.2E-01**	**N/A**	**2.9E-02 C**	**5.0E-02**	**15A NCAC 2L**	**YES**	**ASL**
												2.0E-01	**MCL**		
	50-32-8	**Benzo(a)pyrene**	**7.2E-02 J**	**7.2E-02 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**7.2E-02**	**N/A**	**2.9E-03 C**	**5.0E-03**	**15A NCAC 2L**	**YES**	**ASL**
	205-99-2	**Benzo(b)fluoranthene**	**7.2E-02 J**	**7.2E-02 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**7.2E-02**	**N/A**	**2.9E-02 C**	**5.0E-02**	**15A NCAC 2L**	**YES**	**ASL**
	191-24-2	Benzo(g,h,i)perylene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+02 N	2.0E+02	15A NCAC 2L	NO	DLBSL
	207-08-9	**Benzo(k)fluoranthene**	**9.3E-02 J**	**9.3E-02 J**	**UG/L**	**IR15-GW04-11B**	**1/8**	**0.5 - 11**	**9.3E-02**	**N/A**	**2.9E-01 C**	**5.0E-01**	**15A NCAC 2L**	**YES**	**cPAH**
	111-91-1	bis(2-Chloroethoxy)methane	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+01 N	N/A		YES	DLASL
	111-44-4	bis(2-Chloroethyl)ether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.2E-02 C	3.0E-02	15A NCAC 2L	YES	DLASL
	39638-32-9	bis(2-Chloroisopropyl)ether	ND	ND	UG/L		0/2	0.5 - 0.5	5.0E-01	N/A	N/A	N/A		NO	NTX
	117-81-7	bis(2-Ethylhexyl)phthalate	2.5E-01 J	3.3E-01 J	UG/L	IR15-GW06-11B	2/8	2 - 11	3.3E-01	N/A	4.8E+00 C	6.0E+00	MCL	NO	BSL
												3.0E+00	15A NCAC 2L		
	85-68-7	Butylbenzylphthalate	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	3.5E+01 C	1.0E+03	15A NCAC 2L	NO	DLBSL
	105-60-2	Caprolactam	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	1.8E+03 N	4.0E+03	15A NCAC 2L	NO	DLBSL
	86-74-8	Carbazole	1.3E-01 J	1.3E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	1.3E-01	N/A	N/A	N/A		NO	NTX
	218-01-9	Chrysene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+00 C	5.0E+00	15A NCAC 2L	YES	DLASL
	53-70-3	Dibenz(a,h)anthracene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E-03 C	5.0E-03	15A NCAC 2L	YES	DLASL
	132-64-9	Dibenzofuran	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 N	N/A		YES	DLASL
	84-66-2	Diethylphthalate	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+03 N	6.0E+03	15A NCAC 2L	NO	DLBSL
	131-11-3	Dimethyl phthalate	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	N/A	N/A		NO	NTX
	84-74-2	Di-n-butylphthalate	ND	ND	UG/L		0/8	2 - 22	2.2E+01	N/A	3.7E+02 N	7.0E+02	15A NCAC 2L	NO	DLBSL
	117-84-0	Di-n-octylphthalate	ND	ND	UG/L		0/8	1 - 11	1.1E+01	N/A	4.8E+00 C	1.0E+02	15A NCAC 2L	YES	DLASL
	206-44-0	Fluoranthene	7.2E-01 J	7.2E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	7.2E-01	N/A	1.5E+02 N	3.0E+02	15A NCAC 2L	NO	BSL
	86-73-7	Fluorene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.5E+02 N	3.0E+02	15A NCAC 2L	NO	DLBSL
	118-74-1	Hexachlorobenzene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	4.2E-02 C	1.0E+00	MCL	YES	DLASL
												2.0E-02	15A NCAC 2L		
	87-68-3	Hexachlorobutadiene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	8.6E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	77-47-4	Hexachlorocyclopentadiene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+01 N	5.0E+01	MCL	NO	DLBSL
	67-72-1	Hexachloroethane	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 C**	N/A		YES	DLASL
	193-39-5	Indeno(1,2,3-cd)pyrene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E-02 C	5.0E-02	15A NCAC 2L	YES	DLASL
	78-59-1	Isophorone	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	7.1E+01 C	4.0E+01	15A NCAC 2L	NO	DLBSL
	91-20-3	Naphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.4E-01 C*	6.0E+00	15A NCAC 2L	YES	DLASL
	621-64-7	n-Nitroso-di-n-propylamine	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	9.6E-03 C	N/A		YES	DLASL
	86-30-6	n-Nitrosodiphenylamine	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.4E+01 C	N/A		NO	DLBSL
	98-95-3	Nitrobenzene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.2E-01 C	N/A		YES	DLASL
	87-86-5	Pentachlorophenol	ND	ND	UG/L		0/8	1 - 22	2.2E+01	N/A	1.7E-01 C	1.0E+00	MCL	YES	DLASL
												3.0E-01	15A NCAC 2L		
	85-01-8	Phenanthrene	5.1E-02 J	7.2E-02 J	UG/L	IR15-GW04-11B	2/8	0.5 - 11	7.2E-02	N/A	1.1E+03 N	2.0E+02	15A NCAC 2L	NO	BSL
	108-95-2	Phenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.1E+03 N	3.0E+01	15A NCAC 2L	NO	DLBSL
	129-00-0	Pyrene	6.2E-02 J	6.2E-02 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	6.2E-02	N/A	1.1E+02 N	2.0E+02	15A NCAC 2L	NO	BSL
	72-54-8	4,4'-DDD	1.3E-02	1.3E-02	UG/L	IR15-GW04D-11B	1/8	0.01 - 0.053	1.3E-02	N/A	2.8E-01 C	1.0E-01	15A NCAC 2L	NO	BSL
	72-55-9	4,4'-DDE	8.1E-04 J	3.7E-03 J	UG/L	IR15-GW04D-11B	2/8	0.01 - 0.053	3.7E-03	N/A	2.0E-01 C	N/A		NO	BSL
	50-29-3	4,4'-DDT	1.0E-03 J	1.0E-03 J	UG/L	IR15-GW04D-11B	1/8	0.01 - 0.053	1.0E-03	N/A	2.0E-01 C*	1.0E-01	15A NCAC 2L	NO	BSL
	309-00-2	Aldrin	ND	ND	UG/L		0/8	0.02 - 0.053	5.3E-02	N/A	4.0E-03 C	N/A		YES	DLASL
	319-84-6	alpha-BHC	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.1E-02 C	2.0E-02	15A NCAC 2L	YES	DLASL
	5103-71-9	alpha-Chlordane	1.2E-02	1.2E-02	UG/L	IR15-GW04-11B	1/8	0.01 - 0.053	1.2E-02	N/A	1.9E-01 C*	2.0E+00	MCL	NO	BSL
												1.0E-01	15A NCAC 2L		
	12674-11-2	Aroclor-1016	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	2.6E-01 C**	5.0E-01	MCL	YES	DLASL
	11104-28-2	Aroclor-1221	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	6.8E-03 C	5.0E-01	MCL	YES	DLASL

APPENDIX E-2

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concerr

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	11141-16-5	Aroclor-1232	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	6.8E-03 C	5.0E-01	MCL	YES	DLASL
	53469-21-9	Aroclor-1242	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C	5.0E-01	MCL	YES	DLASL
	12672-29-6	Aroclor-1248	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C	5.0E-01	MCL	YES	DLASL
	11097-69-1	Aroclor-1254	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C*	5.0E-01	MCL	YES	DLASL
	11096-82-5	Aroclor-1260	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	3.4E-02 C	5.0E-01	MCL	YES	DLASL
	319-85-7	beta-BHC	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	3.7E-02 C	2.0E-02	15A NCAC 2L	YES	DLASL
	319-86-8	delta-BHC	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	3.7E-02 C	2.0E-02	15A NCAC 2L	YES	DLASL
	60-57-1	Dieldrin	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	4.2E-03 C	2.0E-03	15A NCAC 2L	YES	DLASL
	959-98-8	Endosulfan I	4.0E-04 J	4.0E-04 J	UG/L	IR15-GW02-10D	1/8	0.01 - 0.053	4.0E-04	N/A	2.2E+01 N	4.0E+01	15A NCAC 2L	NO	BSL
	33213-65-9	Endosulfan II	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	2.2E+01 N	4.0E+01	15A NCAC 2L	NO	DLBSL
	1031-07-8	Endosulfan sulfate	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	2.2E+01 N	4.0E+01	15A NCAC 2L	NO	DLBSL
	72-20-8	Endrin	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.1E+00 N	2.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	7421-93-4	Endrin aldehyde	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.1E+00 N	2.0E+00	15A NCAC 2L	NO	DLBSL
	53494-70-5	Endrin ketone	ND	ND	UG/L		0/8	0.02 - 0.053	5.3E-02	N/A	1.1E+00 N	2.0E+00	15A NCAC 2L	NO	DLBSL
	58-89-9	gamma-BHC (Lindane)	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	6.1E-02 C	2.0E-01	MCL	NO	DLBSL
												3.0E-02	15A NCAC 2L		
	5103-74-2	gamma-Chlordane	7.2E-02 J	7.2E-02 J	UG/L	IR15-GW04D-11B	1/8	0.01 - 0.053	7.2E-02	N/A	1.9E-01 C*	2.0E+00	MCL	NO	BSL
												1.0E-01	15A NCAC 2L		
	76-44-8	Heptachlor	ND	ND	UG/L		0/8	0.01 - 0.053	5.3E-02	N/A	1.5E-02 C	4.0E-01	MCL	YES	DLASL
												8.0E-03	15A NCAC 2L		
	1024-57-3	Heptachlor epoxide	8.1E-04 J	3.9E-03 J	UG/L	IR15-GW04D-11B	2/8	0.01 - 0.053	3.9E-03	N/A	7.4E-03 C*	2.0E-01	MCL	NO	BSL
												4.0E-03	15A NCAC 2L		
	72-43-5	Methoxychlor	ND	ND	UG/L		0/8	0.02 - 0.053	5.3E-02	N/A	1.8E+01 N	4.0E+01	MCL, 15A NCAC 2L	NO	DLBSL
	8001-35-2	Toxaphene	ND	ND	UG/L		0/8	0.3 - 1.1	1.1E+00	N/A	6.1E-02 C	3.0E+00	MCL	YES	DLASL
												3.0E-02	15A NCAC 2L		
	7429-90-5	Aluminum	4.6E+01 J	2.4E+03	UG/L	IR15-GW02D-10D	9/9	100 - 1000	2.4E+03	1.9E+03	3.7E+03 N	50 - 200	SMCL	NO	BSL
	7440-36-0	Antimony	6.2E-01 J	2.1E+00	UG/L	IR15-GW03-10D	2/9	2 - 20	2.1E+00	3.3E+00	1.5E+00 N	6.0E+00	MCL	NO	BBK
	7440-38-2	Arsenic	3.2E-01 J	4.2E+00 J	UG/L	SWMU46-TW03	5/15	5 - 20	4.2E+00	5.8E+00	4.5E-02 C	1.0E+01	MCL, 15A NCAC 2L	NO	BBK
	7440-39-3	Barium	1.9E+01 J	1.5E+02	UG/L	SWMU46-TW01	15/15	2 - 50	1.5E+02	8.6E+01	7.3E+02 N	2.0E+03	MCL	NO	BSL
												7.0E+02	15A NCAC 2L		
	7440-41-7	Beryllium	1.8E-01 J	1.8E-01 J	UG/L	IR15-TW03D-09C	1/9	1 - 2	1.8E-01	3.1E-01	7.3E+00 N	4.0E+00	MCL	NO	BSL
	7440-43-9	Cadmium	4.4E-02 J	6.3E-02 J	UG/L	IR15-GW03-10D	3/10	0.2 - 6	6.3E-02	3.6E-01	1.8E+00 N	5.0E+00	MCL	NO	BSL
												2.0E+00	15A NCAC 2L		
	7440-70-2	Calcium	8.0E+02	4.9E+04	UG/L	IR15-GW03-10D	9/9	500 - 1000	4.9E+04	6.9E+04	N/A	N/A		NO	NUT
	7440-47-3	Chromium, total, measured	8.3E-01 J	4.7E+00 J	UG/L	SWMU46-TW01	9/16	0.88 - 20	4.7E+00	3.1E+00	N/A	1.0E+02	MCL	NO	Chrom
												1.0E+01	15A NCAC 2L		
	18540-29-9	**Chromium (VI), measured**	**1.1E+00 J**	**1.1E+00 J**	**UG/L**	**IR15-GW01-10D**	**1/6**	**5 - 5**	**1.1E+00**	**N/A**	**4.3E-02 C**	**N/A**		**YES**	**ASL**
	18540-29-9	**Chromium (VI), estimated [6]**	**4.0E-01**	**2.3E+00**	**UG/L**				**2.3E+00**	**N/A**	**4.3E-02 C**	**N/A**		**YES**	**ASL**
	16065-83-1	Chromium (III), estimated [6]	4.3E-01	2.4E+00	UG/L				2.4E+00	N/A	5.5E+03 N	N/A		NO	BSL
	7440-48-4	**Cobalt**	**5.8E-01 J**	**3.9E+00 J**	**UG/L**	**IR15-TW01-09C**	**9/9**	**1 - 5**	**3.9E+00**	**3.4E+00**	**1.1E+00 N**	**N/A**		**YES**	**ASL**
						IR15-GW04-11B, IR15-									
	7440-50-8	Copper	3.9E-01 J	2.9E+00 J	UG/L	TW03D-09C	7/9	1 - 20	2.9E+00	2.8E+00	1.5E+02 N	1.3E+03	MCL	NO	BSL
												1.0E+03	15A NCAC 2L		
	7439-89-6	**Iron**	**2.3E+02**	**2.6E+04**	**UG/L**	**IR15-TW01-09C**	**9/9**	**20 - 150**	**2.6E+04**	**6.0E+03**	**2.6E+03 N**	**3.0E+02**	**SMCL, 15A NCAC 2L**	**YES**	**ASL**
	7439-92-1	Lead	4.7E-01 J	4.6E+00 J	UG/L	SWMU46-TW02	8/15	1 - 20	4.6E+00	2.8E+00	1.5E+01	1.5E+01	MCL, 15A NCAC 2L	NO	BSL
	7439-95-4	Magnesium	3.9E+02	6.2E+03	UG/L	IR15-GW03-10D	9/9	250 - 500	6.2E+03	6.4E+03	N/A	N/A		NO	NUT
	7439-96-5	**Manganese**	**5.2E+00**	**4.4E+02**	**UG/L**	**IR15-TW01-09C**	**9/9**	**2 - 5**	**4.4E+02**	**2.1E+02**	**8.8E+01 N**	**5.0E+01**	**SMCL, 15A NCAC 2L**	**YES**	**ASL**
	7439-97-6	Mercury	ND	ND	UG/L		0/10	0.2 - 0.2	2.0E-01	1.0E-01	1.1E+00 N	2.0E+00	MCL	NO	DLBSL
												1.0E+00	15A NCAC 2L		

APPENDIX E-2

TABLE 2.1

Occurrence, Distribution and Selection of Chemicals of Potential Concerr

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	7440-02-0	Nickel	8.8E-01 J	3.0E+01	UG/L	IR15-TW01-09C	7/9	1 - 10	3.0E+01	8.0E+00	7.3E+01 N	1.0E+02	15A NCAC 2L	NO	BSL
	7440-09-7	Potassium	6.2E+02 J	6.0E+03	UG/L	IR15-GW04D-11B	9/9	100 - 1000	6.0E+03	3.3E+03	N/A	N/A		NO	NUT
	7782-49-2	Selenium	ND	ND	UG/L		0/10	5 - 20	2.0E+01	3.1E+00	1.8E+01 N	5.0E+01	MCL	YES	DLASL
												2.0E+01	15A NCAC 2L		
	7440-22-4	Silver	6.6E-02 J	8.6E-02 J	UG/L	IR15-GW02-10D	2/10	0.5 - 20	8.6E-02	7.7E-01	1.8E+01 N	2.0E+01	15A NCAC 2L	NO	BSL
												1.0E+02	SMCL		
	7440-23-5	Sodium	1.6E+03 J	1.5E+04	UG/L	IR15-GW02D-10D	9/9	500 - 2500	1.5E+04	2.3E+04	N/A	N/A		NO	NUT
	7440-28-0	Thallium	6.9E-02 J	3.2E+00 J	UG/L	IR15-TW04-09C	5/9	0.2 - 30	3.2E+00	3.8E+00	3.7E-02 N	2.0E+00	MCL	NO	BBK
	7440-62-2	Vanadium	7.4E-01 J	3.1E+00	UG/L	IR15-GW05-11B	5/9	1 - 50	3.1E+00	4.7E+00	1.8E+01 N	N/A		NO	BSL, BBK
	7440-66-6	Zinc	5.3E+00 J	1.4E+01	UG/L	IR15-GW04-11B	9/9	10 - 50	1.4E+01	4.2E+01	1.1E+03 N	1.0E+03	15A NCAC 2L	NO	BSL, BBK
												5.0E+03	SMCL		

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening. If the chemical was not detected, the maximum detection limit is used for screening.

[3] Background values are two times the arithmetic mean basewide background shallow groundwater concentrations. Background values are from *Final Base Background Groundwater Study Report, Marine Corps Base Camp Lejeune, North Carolina*, Baker Environmental, August 2002.

[4] Oak Ridge National Laboratory (ORNL). May 2011. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml. Adjusted (noncarcinogenic RSLs adjusted by dividing by 10) tap water RSLs.
The tap water value of 15 ug/L for lead is the action level provided in the Drinking Water Regulations and Health Advisories.
RSL value for 1,4-Dichlorobenzene used as a surrogate for 1,3-Dichlorobenzene
RSL value for methoxychlor used as surrogate for 4-chlorophenyl-phenylether.
RSL value for 2-Nitroaniline used as surrogate for 3-Nitroaniline.
RSL value for nitrobenzene used as surrogate for 4-nitrophenol.
RSL value for acenaphthene used as surrogate for acenaphthylene.
RSL value for pyrene used as surrogate for benzo(g,h,i)perylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for chlordane used as surrogate for alpha-chlordane.
RSL value for technical-HCH used as surrogate for delta-BHC.
RSL value for technical chlordane used as surrogate for gamma-chlordane.
RSL value for 1,3-dichloropropene used as a surrogate for cis-1,3-dichloropropene and trans-1,3-dichloropropene.
RSL value for endosulfan used as surrogate for endosulfan I, endosulfan II, and endosulfan sulfate.
RSL value for endrin used as surrogate for endrin aldehyde and endrin ketone.
RSL value for 2-chlorophenol used as surrogate for 4-chloro-3-methylphenol and 2-nitrophenol.
RSL value for cadmium (water) used as surrogate for cadmium.
RSL value for Manganese (Non-diet) used as surrogate for manganese.
RSL value for Mercury (mercuric chloride) used as surrogate for mercury.
RSL value for bis(2-ethylhexyl)phthalate used as a surrogate for di-n-octylphthalate.

[5] Rationale Codes

Selection Reason:	Above Screening Levels (ASL)
	Detection Limit Above Screening Level (DLASL), not quantitatively evaluated in HHRA
	Chemical from same class (carcinogenic PAH) identified as a COPC (CPAH)
Deletion Reason:	No Toxicity Information (NTX)
	Essential Nutrient (NUT)
	Below Screening Level (BSL)
	Below Background (BBK)
	Detection Limit Below Screening Level (DLBSL)
	Total chromium not screened since no toxicity information, screened chromium (III) and chromium (VI) (Chrom)

[6] See Table 2.1 Supplement A for calculation of estimated chromium (III) and estimated chromium (VI).

COPC = Chemical of Potential Concern
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/
To Be Considered
MCL = Maximum Contaminant Level from EPA's National Primary Drinking Water Standards
SMCL = Secondary Maximum Contaminant Level
15A NCAC 2L = North Carolina Classifications and Groundwater Quality Standards,
January 2010.
J = Estimated Value
C = Carcinogenic
C* = N screening level < 100x C screening level, therefore
N screening value/10 used as screening level
C** = N screening level < 10x C screening level, therefore
N screening value/10 used as screening level
N = Noncarcinogenic
N/A = Not available/not applicable
ND = Not detected
UG/L = Micrograms per liter

APPENDIX E-2

TABLE 2.1 SUPPLEMENT A

Calculation of Chromium Concentrations - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Location	Sample ID	Sample Date	Measured Total Chromium (ug/L)	Data Qualifier	Measured Chromium (VI) (ug/L)	Data Qualifier	Estimated Chromium (VI)[1] (ug/L)	Estimated Chromium (III)[2] (ug/L)
IR15-MW01	IR15-GW01-10D	11/10/2010	2.3		1.1	J	1.1	1.2
IR15-MW04	IR15-GW04-11B	4/6/2011	2.1	U	1	U	ND	ND
IR15-MW05	IR15-GW05-11B	4/7/2011	3.5	U	1	U	ND	ND
IR15-MW06	IR15-GW06-11B	4/7/2011	0.95	U	1	U	ND	ND
IR15-MW02	IR15-GW02-10D	11/11/2010	2.6		1	U	ND	1.4
IR15-MW03	IR15-GW03-10D	11/11/2010	0.95	J	1	U	ND	0.5
IR15-TW01	IR15-TW01-09C	7/29/2009	20	U	NA		ND	ND
IR15-TW02	IR15-TW02-09C	7/29/2009	20	U	NA		ND	ND
IR15-TW03	IR15-TW03D-09C	7/28/2009	1.7	J	NA		0.8	0.9
IR15-TW04	IR15-TW04-09C	7/29/2009	20	U	NA		ND	ND
SWMU46-MW01	SWMU46-MW01	3/21/2004	0.88	U	NA		ND	ND
SWMU46-TW01	SWMU46-TW01	4/6/2002	4.7	J	NA		2.3	2.4
SWMU46-TW02	SWMU46-TW02	4/6/2002	0.83	J	NA		0.4	0.4
SWMU46-TW03	SWMU46-TW03	4/6/2002	2.1	J	NA		1.0	1.1
SWMU46-TW04	SWMU46-TW04	4/6/2002	1	J	NA		0.5	0.5
SWMU46-TW05	SWMU46-TW05	4/6/2002	3	J	NA		1.4	1.6
		Minimum	0.83			Minimum	0.4	0.4
		Maximum	4.7			Maximum	2.3	2.4

Notes:

ug/L = Micrograms per liter

U = Not Detected

J = Estimated Value

NA = Not Analyzed

ND = Not Detected

1 Estimated Chromium (VI) = (0.48) * (Measured Total Chromium)

2 Estimated Chromium (III) = (0.52) * (Measured Total Chromium)

Only one sample (IR15-GW01-10D) had detections for both chromium (VI) and total chromium, which were 1.1 J and 2.3, respectively. The ratio of chromium (VI) divided by total chromium was 0.48. This value was used to estimate the chromium (VI) concentrations for all of the groundwater samples. Also, it was assumed the remaining chromium in the total chromium concentrations was chromium (III). The chromium (III) concentrations were therefore estimated by multiplying the total chromium concentration by 1 - 0.48, or 0.52.

APPENDIX E-2

TABLE 2.2

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Water Vapors at Showerhead and Excavation Pit	71-55-6	1,1,1-Trichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	9.1E+02 N	2.0E+02	MCL, 15A NCAC 2L	NO	DLBSL
	79-34-5	1,1,2,2-Tetrachloroethane	ND	ND	UG/L		0/9	1 - 2.4	2.4E+00	N/A	6.7E-02 C	2.0E-01	15A NCAC 2L	YES	DLASL
	76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	5.9E+03 N	2.0E+05	15A NCAC 2L	NO	DLBSL
	79-00-5	1,1,2-Trichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.2E-02 C**	5.0E+00	MCL	YES	DLASL
	75-34-3	1,1-Dichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.4E+00 C	6.0E+00	15A NCAC 2L	NO	DLBSL
	75-35-4	1,1-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.4E+01 N	7.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	120-82-1	1,2,4-Trichlorobenzene	ND	ND	UG/L		0/9	1 - 2	2.0E+00	N/A	4.1E-01 C**	7.0E+01	MCL, 15A NCAC 2L	YES	DLASL
	96-12-8	1,2-Dibromo-3-chloropropane	ND	ND	UG/L		0/6	2 - 2	2.0E+00	N/A	3.2E-04 C	2.0E-01	MCL	YES	DLASL
												4.0E-02	15A NCAC 2L		
	106-93-4	1,2-Dibromoethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	6.5E-03 C	5.0E-02	MCL	YES	DLASL
												2.0E-02	15A NCAC 2L		
	95-50-1	1,2-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.7E+01 N	6.0E+02	MCL	NO	DLBSL
												2.0E+01	15A NCAC 2L		
	107-06-2	1,2-Dichloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E-01 C	5.0E+00	MCL	YES	DLASL
												4.0E-01	15A NCAC 2L		
	78-87-5	1,2-Dichloropropane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	3.9E-01 C*	5.0E+00	MCL	YES	DLASL
												6.0E-01	15A NCAC 2L		
	541-73-1	1,3-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C	2.0E+02	15A NCAC 2L	YES	DLASL
	106-46-7	1,4-Dichlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C	7.5E+01	MCL	YES	DLASL
												6.0E+00	15A NCAC 2L		
	78-93-3	2-Butanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	7.1E+02 N	4.0E+03	15A NCAC 2L	NO	DLBSL
	591-78-6	2-Hexanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	4.7E+00 N	N/A		YES	DLASL
	108-10-1	4-Methyl-2-pentanone	ND	ND	UG/L		0/9	5 - 5	5.0E+00	N/A	2.0E+02 N	N/A		NO	DLBSL
	67-64-1	Acetone	ND	ND	UG/L		0/9	5 - 10	1.0E+01	N/A	2.2E+03 N	6.0E+03	15A NCAC 2L	NO	DLBSL
	71-43-2	Benzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.1E-01 C	5.0E+00	MCL	YES	DLASL
												1.0E+00	15A NCAC 2L		
	75-27-4	Bromodichloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.2E-01 C	8.0E+01	MCL	YES	DLASL
												6.0E-01	15A NCAC 2L		
	74-83-9	Bromomethane	ND	ND	UG/L		0/9	1 - 1.1	1.1E+00	N/A	8.7E-01 N	N/A		YES	DLASL
	75-15-0	Carbon disulfide	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	1.0E+02 N	7.0E+02	15A NCAC 2L	NO	DLBSL
	56-23-5	Carbon tetrachloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.4E-01 C	5.0E+00	MCL	YES	DLASL
												3.0E-01	15A NCAC 2L		
	108-90-7	Chlorobenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	9.1E+00 N	1.0E+02	MCL	NO	DLBSL
												5.0E+01	15A NCAC 2L		
	75-00-3	Chloroethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.1E+03 N	3.0E+03	15A NCAC 2L	NO	DLBSL
	67-66-3	Chloroform	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.9E-01 C	8.0E+01	MCL	YES	DLASL
												7.0E+01	15A NCAC 2L		
	74-87-3	Chloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.9E+01 N	3.0E+00	15A NCAC 2L	NO	DLBSL
	156-59-2	cis-1,2-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	7.3E+00 N	7.0E+01	MCL, 15A NCAC 2L	NO	DLBSL
	10061-01-5	cis-1,3-Dichloropropene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	110-82-7	Cyclohexane	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	1.3E+03 N	N/A		NO	DLBSL
	124-48-1	Dibromochloromethane	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E-01 C	6.0E+01	MCL	YES	DLASL
												4.0E-01	15A NCAC 2L		
	75-71-8	Dichlorodifluoromethane (Freon-12)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	2.0E+01 N	1.0E+03	15A NCAC 2L	NO	DLBSL
	100-41-4	Ethylbenzene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.5E+00 C	7.0E+02	MCL	NO	DLBSL
												6.0E+02	15A NCAC 2L		
	98-82-8	Isopropylbenzene	4.9E+00 J	4.9E+00 J	UG/L	IR15-TW03D-09C	1/9	1 - 1	4.9E+00	N/A	6.8E+01 N	7.0E+01	15A NCAC 2L	NO	BSL
	79-20-9	Methyl acetate	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	3.7E+03 N	N/A		NO	DLBSL
	108-87-2	Methylcyclohexane	ND	ND	UG/L		0/9	1 - 5	5.0E+00	N/A	N/A	N/A		NO	NTX
	75-09-2	Methylene chloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.8E+00 C	5.0E+00	MCL, 15A NCAC 2L	NO	DLBSL
	1634-04-4	Methyl-tert-butyl ether (MTBE)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.2E+01 C	2.0E+01	15A NCAC 2L	NO	DLBSL
	100-42-5	Styrene	5.9E+00 J	5.9E+00 J	UG/L	IR15-TW03D-09C	1/9	1 - 1	5.9E+00	N/A	1.6E+02 N	1.0E+02	MCL	NO	BSL
												7.0E+01	15A NCAC 2L		

APPENDIX E-2

TABLE 2.2

Occurrence, Distribution and Selection of Chemicals of Potential Concern

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Air

Exposure Point	CAS Number	Chemical	Minimum [1] Concentration Qualifier	Maximum [1] Concentration Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
	127-18-4	Tetrachloroethene	ND	ND	UG/L		0/9	1 - 1.1	1.1E+00	N/A	1.1E-01 C	5.0E+00	MCL	YES	DLASL
												7.0E-01	15A NCAC 2L		
	108-88-3	Toluene	6.0E-02 J	6.0E-02 J	UG/L		1/9	1 - 1	6.0E-02	N/A	2.3E+02 N	1.0E+03	MCL	NO	DLBSL
												6.0E+02	15A NCAC 2L		
	156-60-5	trans-1,2-Dichloroethene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.1E+01 N	1.0E+02	MCL, 15A NCAC 2L	NO	DLBSL
	10061-02-6	trans-1,3-Dichloropropene	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	4.3E-01 C*	4.0E-01	15A NCAC 2L	YES	DLASL
	79-01-6	Trichloroethene	ND	ND	UG/L		0/9	1 - 5.1	5.1E+00	N/A	2.0E+00 C	5.0E+00	MCL	YES	DLASL
												3.0E+00	15A NCAC 2L		
	75-69-4	Trichlorofluoromethane (Freon-11)	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.3E+02 N	2.0E+03	15A NCAC 2L	NO	DLBSL
	75-01-4	Vinyl chloride	ND	ND	UG/L		0/9	1 - 1	1.0E+00	N/A	1.6E-02 C	2.0E+00	MCL	YES	DLASL
												3.0E-02	15A NCAC 2L		
	1330-20-7	Xylene, total	ND	ND	UG/L		0/9	1.2 - 3	3.0E+00	N/A	2.0E+01 N	1.0E+04	MCL	NO	DLBSL
												5.0E+02	15A NCAC 2L		
	92-52-4	1,1-Biphenyl	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	8.3E-02 N	4.0E+02	15A NCAC 2L	YES	DLASL
	108-60-1	2,2'-Oxybis(1-chloropropane)	ND	ND	UG/L		0/6	10 - 11	1.1E+01	N/A	3.2E-01 C	N/A		YES	DLASL
	91-58-7	2-Chloronaphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.9E+02 N	N/A		NO	DLBSL
	95-57-8	2-Chlorophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	4.0E-01	15A NCAC 2L	NO	DLBSL
	91-57-6	2-Methylnaphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.5E+01 N	3.0E+01	15A NCAC 2L	NO	DLBSL
	88-75-5	2-Nitrophenol	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.8E+01 N	N/A		NO	DLBSL
	83-32-9	Acenaphthene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+02 N	8.0E+01	15A NCAC 2L	NO	DLBSL
	208-96-8	Acenaphthylene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	2.2E+02 N	2.0E+02	15A NCAC 2L	NO	DLBSL
	98-86-2	Acetophenone	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+02 N	N/A		NO	DLBSL
	120-12-7	Anthracene	4.1E-01 J	4.1E-01 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	4.1E-01	N/A	1.1E+03 N	2.0E+03	15A NCAC 2L	NO	BSL
	100-52-7	Benzaldehyde	ND	ND	UG/L		0/5	0.5 - 0.5	5.0E-01	N/A	3.7E+02 N	N/A		NO	DLBSL
	111-44-4	bis(2-Chloroethyl)ether	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.2E-02 C	3.0E-02	15A NCAC 2L	YES	DLASL
	39638-32-9	bis(2-Chloroisopropyl)ether	ND	ND	UG/L		0/2	0.5 - 0.5	5.0E-01	N/A	N/A	N/A		NO	NTX
	132-64-9	Dibenzofuran	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 N	N/A		YES	DLASL
	132-64-9	Dibenzofuran	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	3.7E+00 N	N/A		YES	DLASL
	86-73-7	Fluorene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.5E+02 N	3.0E+02	15A NCAC 2L	NO	DLBSL
	91-20-3	Naphthalene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.4E-01 C*	6.0E+00	15A NCAC 2L	YES	DLASL
	98-95-3	Nitrobenzene	ND	ND	UG/L		0/8	0.5 - 11	1.1E+01	N/A	1.2E-01 C	N/A		YES	DLASL
	85-01-8	Phenanthrene	5.1E-02 J	7.2E-02 J	UG/L	IR15-GW04-11B	2/8	0.5 - 11	7.2E-02	N/A	1.1E+03 N	2.0E+02	15A NCAC 2L	NO	BSL
	129-00-0	Pyrene	6.2E-02 J	6.2E-02 J	UG/L	IR15-GW04-11B	1/8	0.5 - 11	6.2E-02	N/A	1.1E+02 N	2.0E+02	15A NCAC 2L	NO	BSL
	11104-28-2	Aroclor-1221	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	6.8E-03 C	5.0E-01	MCL	YES	DLASL
	11141-16-5	Aroclor-1232	ND	ND	UG/L		0/8	0.2 - 0.53	5.3E-01	N/A	6.8E-03 C	5.0E-01	MCL	YES	DLASL
												3.0E-02	15A NCAC 2L		

[1] Minimum/Maximum detected concentrations.

[2] Maximum concentration is used for screening. If the chemical was not detected, the maximum detection limit is used for screening.

[3] Background values not available.

[4] Oak Ridge National Laboratory (ORNL). May 2011. Regional Screening Levels for Chemical Contaminants at Superfund Sites.
http://epa-prgs.ornl.gov/chemicals/index.shtml. Adjusted (noncarcinogenic RSLs adjusted by dividing by 10) tap water RSLs.
RSL value for 1,4-Dichlorobenzene used as a surrogate for 1,3-Dichlorobenzene
RSL value for acenaphthene used as surrogate for acenaphthylene.
RSL value for anthracene used as surrogate for phenanthrene.
RSL value for 1,3-dichloropropene used as a surrogate for cis-1,3-dichloropropene and trans-1,3-dichloropropene.
RSL value for 2-chlorophenol used as surrogate for 2-nitrophenol.

[5] Rationale Codes

Selection Reason:
- Above Screening Levels (ASL)
- Detection Limit Above Screening Level (DLASL), not quantitatively evaluated in HHRA

Deletion Reason:
- No Toxicity Information (NTX)
- Essential Nutrient (NUT)
- Below Screening Level (BSL)
- Detection Limit Below Screening Level (DLBSL)

COPC = Chemical of Potential Concern

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/ To Be Considered

MCL = Maximum Contaminant Level from EPA's National Primary Drinking Water Standards

SMCL = Secondary Maximum Contaminant Level

15A NCAC 2L = North Carolina Classifications and Groundwater Quality Standards, January 2010.

J = Estimated Value

C = Carcinogenic

C* = N screening level < 100x C screening level, therefore N screening value/10 used as screening level

C** = N screening level < 10x C screening level, therefore N screening value/10 used as screening level

N = Noncarcinogenic

N/A = Not available/not applicable

ND = Not detected

UG/L = Micrograms per liter

APPENDIX E-2

TABLE 3.1.RME

Medium-Specific Exposure Point Concentration Summary

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
								Value	Units	Statistic	Rationale
Tap Water and Water in Excavation Pit	Benzo(a)anthracene	UG/L	NA	NA		1.2E-01	J	1.2E-01	UG/L	Max	5
	Benzo(a)pyrene	UG/L	NA	NA		7.2E-02	J	7.2E-02	UG/L	Max	5
	Benzo(b)fluoranthene	UG/L	NA	NA		7.2E-02	J	7.2E-02	UG/L	Max	5
	Benzo(k)fluoranthene	UG/L	NA	NA		9.3E-02	J	9.3E-02	UG/L	Max	5
	Chromium (VI), measured	UG/L	NA	NA		1.1E+00	J	1.1E+00	UG/L	Max	5
	Chromium (VI), estimated	UG/L	8.4E-01	1.1E+00	NP	2.3E+00		1.1E+00	UG/L	95% KM-t	1, 2, 3
	Cobalt	UG/L	1.3E+00	3.0E+00	NP	3.9E+00	J	3.0E+00	UG/L	95% Cheb-m	4
	Iron	UG/L	5.8E+03	1.6E+04	G	2.6E+04		1.6E+04	UG/L	App. Gamma	1, 3
	Manganese	UG/L	9.6E+01	2.2E+02	G	4.4E+02		2.2E+02	UG/L	App. Gamma	1, 3

ProUCL, Version 4.1 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. March 2011. Prepared by Lockheed Martin Environmental Services).

Options: Maximum Detected Value (Max); 95% Kaplan-Meier (t) UCL (95% KM-t); 95% Chebyshev (Mean, Sd) UCL (95% Cheb-m) 95% Approximate Gamma UCL (App. Gamma)

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.
(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.
(3) Test indicates data are gamma distributed.
(4) Distribution tests are inconclusive
(5) Maximun detected concentration used because constituent was detected in only one sample.

G = Gamma
NP = Non-Parametric
ug/l = micrograms per liter
J = Estimated Value

APPENDIX E-2

TABLE 3.1.CTE

Medium-Specific Esxposure Point Concentration Summary

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (Distribution)		Maximum Concentration (Qualifier)		Exposure Point Concentration			
								Value	Units	Statistic	Rationale
Tap Water and Water in Excavation Pit	Benzo(a)anthracene	UG/L	NA	NA		1.2E-01	J	1.2E-01	UG/L	Max	5
	Benzo(a)pyrene	UG/L	NA	NA		7.2E-02	J	7.2E-02	UG/L	Max	5
	Benzo(b)fluoranthene	UG/L	NA	NA		7.2E-02	J	7.2E-02	UG/L	Max	5
	Benzo(k)fluoranthene	UG/L	NA	NA		9.3E-02	J	9.3E-02	UG/L	Max	5
	Chromium (VI), measured	UG/L	NA	NA		1.1E+00	J	1.1E+00	UG/L	Max	5
	Chromium (VI), estimated	UG/L	8.4E-01	1.1E+00	NP	2.3E+00		8.4E-01	UG/L	Mean-NP	1, 2, 3
	Cobalt	UG/L	1.3E+00	3.0E+00	NP	3.9E+00	J	1.3E+00	UG/L	Mean-NP	4
	Iron	UG/L	5.8E+03	1.6E+04	G	2.6E+04		5.8E+03	UG/L	Mean-N	1, 3
	Manganese	UG/L	9.6E+01	2.2E+02	G	4.4E+02		9.6E+01	UG/L	Mean-N	1, 3

ProUCL, Version 4.1 used to determine distribution of data and calculate 95% UCL, following recommendations in users guide (USEPA. March 2011. Prepared by Lockheed Martin Environmental Services).

Options: Mean-Normal (Mean-N); Mean-Non-Parametric (Mean-NP); Maximum Detected Value (Max)

UCL Rationale:

(1) Shapiro-Wilk W Test/Lilliefors test indicates data are log-normally distributed.

(2) Shapiro-Wilk W Test/Lilliefors indicates data are normally distributed.

(3) Test indicates data are gamma distributed.

(4) Distribution tests are inconclusive

(5) Maximun detected concentration used because constituent was detected in only one sample.

G = Gamma

NP = Non-Parametric

ug/l = micrograms per liter

J = Estimated Value

APPENDIX E-2

TABLE 4.1.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Resident	Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-W	Ingestion Rate of Water	2	liters/day	EPA, 1997	CW x IR-W x EF x ED x CF2 x 1/BW x 1/AT
				EF	Exposure Frequency	350	days/year	EPA, 1991	
				ED	Exposure Duration	24	years	EPA, 1991	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				BW	Body Weight	70	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	8,760	days	EPA, 1989	
		Child	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	CDI (mg/kg-day) =
				IR-W	Ingestion Rate of Water	1	liters/day	EPA, 1997	CW x IR-W x EF x ED x CF2 x 1/BW x 1/AT
				EF	Exposure Frequency	350	days/year	EPA, 1991	
				ED	Exposure Duration	6	years	EPA, 1991	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				BW	Body Weight	15	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	EPA, 1989	
		Child/Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	CDI (mg/kg-day) =
				IR-W-A	Ingestion Rate of Water, Adult	2	liters/day	EPA, 1997	CW x IR-W-Adj x EF x CF2 x 1/AT
				IR-W-C	Ingestion Rate of Water, Child	1	liters/day	EPA, 1997	
				IR-W-Adj	Ingestion Rate of Water, Age-adjusted	1.09	liter-year/kg-day	calculated	IR-W-Adj (liter-year/kg-day) =
				EF	Exposure Frequency	350	days/year	EPA, 1991	(ED-C x IR-W-C / BW-C) +
				ED-A	Exposure Duration, Adult	24	years	EPA, 1991	(ED-A x IR-W-A / BW-A)
				ED-C	Exposure Duration, Child	6	years	EPA, 1991	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				BW-A	Body Weight , Adult	70	kg	EPA, 1991	
				BW-C	Body Weight, Child	15	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
Dermal	Resident	Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	CDI (mg/kg-day) =
				DAevent	Dermally Absorbed Dose per Event	calculated	mg/cm^2-event	calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
				FA	Fraction absorbed water	chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}	Event Time	0.58	hr/event	EPA, 2004	tevent<t*: DAevent (mg/cm2-event) =
				SA	Skin Surface Area Available for Contact	18,000	cm^2	EPA, 2004	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				EV	Event Frequency	1	events/day	EPA, 2004	x CF2 x CF3
				EF	Exposure Frequency	350	days/year	EPA, 2004	
				ED	Exposure Duration	24	years	EPA, 2004	tevent>t*: DAevent (mg/cm2-event) =
				BW	Body Weight	70	kg	EPA, 1991	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				AT-N	Averaging Time (Non-Cancer)	8,760	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	L/cm^3	- -	

APPENDIX E-2

TABLE 4.1.RME

VALUES USED FOR DAILY INTAKE CALCULATIONS

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Dermal (cont'd)	Resident	Child	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	CDI (mg/kg-day) =
				DAevent	Dermally Absorbed Dose per Event	calculated	mg/cm^2-event	calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
				FA	Fraction absorbed water	chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}	Event Time	1.0	hr/event	EPA, 2004	tevent<t*: DAevent (mg/cm2-event) =
				SA	Skin Surface Area Available for Contact	6,600	cm^2	EPA, 2004	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				EV	Event Frequency	1	events/day	EPA, 2004	x CF2 x CF3
				EF	Exposure Frequency	350	days/year	EPA, 2004	
				ED	Exposure Duration	6	years	EPA, 2004	tevent>t*: DAevent (mg/cm2-event) =
				BW	Body Weight	15	kg	EPA, 1991	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				AT-N	Averaging Time (Non-Cancer)	2,190	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	L/cm^3	- -	
		Child/Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
				DAevent-A	Dermally Absorbed Dose per Event, Adult	calculated	mg/cm^2-event	calculated	
				DAevent-C	Dermally Absorbed Dose per Event, Child	calculated	mg/cm^2-event	calculated	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A)
				DA-Adj	Dermally Absorbed Dose, Age-adjusted	calculated	mg-year/event-kg	calculated	+ (Daevent-C x SA-C x ED-C x 1/BW-C)
				FA	Fraction absorbed water	chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}-A	Event Time, Adult	0.58	hr/event	EPA, 2004	tevent<t*: DAevent (mg/cm2-event) =
				t_{event}-C	Event Time, Child	1.0	hr/event	EPA, 2004	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				SA-A	Skin Surface Area, Adult	18,000	cm^2	EPA, 2004	x CF2 x CF3
				SA-C	Skin Surface Area, Child	6,600	cm^2	EPA, 2004	
				EV	Event Frequency	1	events/day	EPA, 2004	tevent>t*: DAevent (mg/cm2-event) =
				EF	Exposure Frequency	350	days/year	EPA, 2004	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				ED-A	Exposure Duration, Adult	24	years	EPA, 2004	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				ED-C	Exposure Duration, Child	6	years	EPA, 2004	
				BW-A	Body Weight, Adult	70	kg	EPA, 1991	
				BW-C	Body Weight, Child	15	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	L/cm^3	- -	
	Construction Worker	Adult	Groundwater - Water in Excavation Pit	CW	Chemical Concentration in Water	See Table 3.1.RME	µg/L	See Table 3.1.RME	CDI (mg/kg-day) =
				DAevent	Dermally Absorbed Dose per Event	calculated	mg/cm^2-event	calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
				FA	Fraction absorbed water	chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}	Event Time	4	hr/day	(1)	tevent<t*: DAevent (mg/cm2-event) =
				SA	Skin Surface Area Available for Contact	5,700	cm^2	EPA, 2004, (3)	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				EV	Event Frequency	1	events/day	EPA, 2004	x CF2 x CF3
				EF	Exposure Frequency	30	days/year	(2)	
				ED	Exposure Duration	1	years	EPA, 1991	tevent>t*: DAevent (mg/cm2-event) =
				BW	Body Weight	70	kg	EPA, 1991	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				AT-N	Averaging Time (Non-Cancer)	365	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	L/cm^3	- -	

Notes:

(1) Professional Judgment based on construction activities that would result in contact with groundwater would occur 4 hrs per day for the RME.
(2) Assumes contact with groundwater during construction could occur 30 days per year.
(3) Skin surface area in contact with groundwater assumed to be hands, forearms, lower legs, and feet.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03.
EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.
EPA, 2004 . Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment (Final). EPA/540/R/99/005. July 2004.

APPENDIX E-2

TABLE 4.1.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Ingestion	Resident	Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.CTE	µg/L	See Table 3.1.CTE	Chronic Daily Intake (CDI) (mg/kg-day) =
				IR-W	Ingestion Rate of Water	1.4	liters/day	EPA, 1997	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
				EF	Exposure Frequency	234	days/year	EPA, 2003	
				ED	Exposure Duration	9	years	EPA, 2004	
				CF1	Conversion Factor 1	0.001	mg/µg	- -	
				BW	Body Weight	70	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	3,285	days	EPA, 1989	
		Child	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.CTE	µg/L	See Table 3.1.CTE	CDI (mg/kg-day) =
				IR-W	Ingestion Rate of Water	1	liters/day	EPA, 1997	CW x IR-W x EF x ED x CF1 x 1/BW x 1/AT
				EF	Exposure Frequency	234	days/year	EPA, 2003	
				ED	Exposure Duration	6	years	EPA, 2004	
				CF1	Conversion Factor 1	0.001	mg/µg	- -	
				BW	Body Weight	15	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
				AT-N	Averaging Time (Non-Cancer)	2,190	days	EPA, 1989	
		Child/Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.CTE	µg/L	See Table 3.1.CTE	CDI (mg/kg-day) =
				IR-W-A	Ingestion Rate of Water, Adult	1.4	liters/day	EPA, 1997	CW x IR-W-Adj x EF x CF1 x 1/AT
				IR-W-C	Ingestion Rate of Water, Child	1	liters/day	EPA, 1997	
				IR-W-Adj	Ingestion Rate of Water, Age-adjusted	0.58	liter-year/kg-day	calculated	IR-W-Adj (liter-year/kd-day) =
				EF	Exposure Frequency	234	days/year	EPA, 2003	(ED-C x IR-W-C / BW-C) +
				ED-A	Exposure Duration, Adult	9	years	EPA, 2004	(ED-A x IR-W-A / BW-A)
				ED-C	Exposure Duration	6	years	EPA, 2004	
				CF1	Conversion Factor 1	0.001	mg/µg	- -	
				BW-A	Body Weight , Adult	70	kg	EPA, 1991	
				BW-C	Body Weight, Child	15	kg	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
Dermal	Resident	Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.CTE	µg/L	See Table 3.1.CTE	CDI (mg/kg-day) =
				DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm^2-event	calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
				FA	Fraction absorbed water	Chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	Chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	Chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	Chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	Chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}	Event Time	0.25	hr/event	EPA, 2004	tevent<t*: DAevent (mg/cm2-event) =
				SA	Skin Surface Area Available for Contact	18,000	cm^2	EPA, 2004	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				EV	Event Frequency	1	events/day	EPA, 2004	x CF2 x CF3
				EF	Exposure Frequency	234	days/year	EPA, 1993	
				ED	Exposure Duration	9	years	EPA, 2004	tevent>t*: DAevent (mg/cm2-event) =
				BW	Body Weight	70	kg	EPA, 1991	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				AT-N	Averaging Time (Non-Cancer)	3,285	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	l/cm^3	- -	

APPENDIX E-2

TABLE 4.1.CTE

VALUES USED FOR DAILY INTAKE CALCULATIONS

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/Reference	Intake Equation/Model Name
Dermal (cont'd)	Resident	Child	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.CTE	µg/L	See Table 3.1.CTE	CDI (mg/kg-day) =
				DAevent	Dermally Absorbed Dose per Event	Calculated	mg/cm^2-event	calculated	DAevent x SA x EV x EF x ED x 1/BW x 1/AT
				FA	Fraction absorbed water	Chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	Chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	Chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	Chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	Chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}	Event Time	0.33	hr/event	EPA, 2004	tevent<t*: DAevent (mg/cm2-event) =
				SA	Skin Surface Area Available for Contact	6,600	cm^2	EPA, 2004	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				EV	Event Frequency	1	events/day	EPA, 2004	x CF2 x CF3
				EF	Exposure Frequency	234	days/year	EPA, 1993	
				ED	Exposure Duration	6	years	EPA, 1991	tevent>t*: DAevent (mg/cm2-event) =
				BW	Body Weight	15	kg	EPA, 1991	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				AT-N	Averaging Time (Non-Cancer)	2,190	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	L/cm^3	- -	
		Child/Adult	Groundwater - Tap Water	CW	Chemical Concentration in Water	See Table 3.1.CTE	µg/L	See Table 3.1.CTE	CDI (mg/kg-day) = DA-Adj x EF x 1/AT
				DAevent-A	Dermally Absorbed Dose per Event, Adult	Calculated	mg/cm^2-event	calculated	
				DAevent-C	Dermally Absorbed Dose per Event, Child	Calculated	mg/cm^2-event	calculated	DA-Adj = (Daevent-A x SA-A x ED-A x 1/BW-A)
				DA-Adj	Dermally Absorbed Dose, Age-adjusted	Calculated	mg-year/event-kg	calculated	+ (Daevent-C x SA-C x ED-C x 1/BW-C)
				FA	Fraction absorbed water	Chemical specific	dimensionless	EPA, 2004	
				K_p	Permeability Coefficient	Chemical specific	cm/hr	EPA, 2004	Inorganics: DAevent (mg/cm2-event) =
				t	Lag Time	Chemical specific	hr/event	EPA, 2004	Kp x CW x t_{event} x CF2 x CF3
				t*	Time to Reach Steady-state	Chemical specific	hours	EPA, 2004	
				B	Ratio of Permeability of Stratum Corneum to Epidermis	Chemical specific	dimensionless	EPA, 2004	Organics :
				t_{event}-A	Event Time, Adult	0.25	hr/event	EPA, 2004	tevent<t*: DAevent (mg/cm2-event) =
				t_{event}-C	Event Time, Child	0.33	hr/event	EPA, 2004	2 x FA x Kp x CW x (sqrt((6 x t x t_{event})/p))
				SA-A	Skin Surface Area, Adult	18,000	cm^2	EPA, 2004	x CF2 x CF3
				SA-C	Skin Surface Area, Child	6,600	cm^2	EPA, 2004	
				EV	Event Frequency	1	events/day	EPA, 2004	tevent>t*: DAevent (mg/cm2-event) =
				EF	Exposure Frequency	234	days/year	EPA, 1993	FA x Kp x CW x (t_{event}/(1+B) + 2 x t x
				ED-A	Exposure Duration, Adult	9	years	EPA, 2004	((1 + 3B + 3B2)/(1+B)2)) x CF2 x CF3
				ED-C	Exposure Duration, Child	6	years	EPA, 1991	
				BW-A	Body Weight, Adult	70	kg	EPA, 1991	
				BW-C	Body Weight, Child	15	ke	EPA, 1991	
				AT-C	Averaging Time (Cancer)	25,550	days	EPA, 1989	
				CF2	Conversion Factor 2	0.001	mg/µg	- -	
				CF3	Conversion Factor 3	0.001	L/cm^3	- -	

Notes:

(1) Professional Judgment based on construction activities that would result in contact with groundwater would occur 4 hrs per day for the RME.
(2) Assumes contact with groundwater during construction could occur 30 days per year.
(3) Skin surface area in contact with groundwater assumed to be hands, forearms, lower legs, and feet.

Sources:

EPA, 1989: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual, Part A. OERR. EPA/540/1-89/002.
EPA, 1991: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual - Supplemental Guidance, Standard Default Exposure Factors. Interim Final. OSWER Directive 9285.6-03
EPA, 1993: Superfund's Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure.
EPA, 1997: Exposure Factors Handbook. EPA/600/P-95/002Fa.
EPA, 2003: Superfund Standard Default Exposure Factors for the Central Tendency and Reasonable Maximum Exposure, Draft.
EPA, 2004: Risk Assessment Guidance for Superfund. Vol.1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. EPA/540/R/99/005

APPENDIX E-2

TABLE 5.1

NON-CANCER TOXICITY DATA -- ORAL/DERMAL

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD		Oral Absorption Efficiency for Dermal (1)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s) (MM/DD/YYYY)
Benzo(a)anthracene	Chronic / Subchronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	Chronic / Subchronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	Chronic / Subchronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	Chronic/Subchronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium (VI)	Chronic	3.0E-03	mg/kg-day	2.5%	7.5E-05	mg/kg-day	NOE	300 / 3	IRIS	6/6/2011
Chromium (VI)	Subchronic	2.0E-02	mg/kg-day	2.5%	5.0E-04	mg/kg-day	NOE	100	HEAST	7/31/1997
Cobalt	Chronic	3.0E-04	mg/kg-day	>50%	3.0E-04	mg/kg-day	Thyroid	3000	PPRTV	8/25/2008
Cobalt	Subchronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	Chronic	7.0E-01	mg/kg-day	>50%	7.0E-01	mg/kg-day	GI System	1.5	PPRTV	9/11/2006
Iron	Subchronic	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (diet)	Chronic	1.4E-01	mg/kg-day	4%	5.6E-03	mg/kg-day	CNS	1 / 1	IRIS	6/6/2011
Manganese (non-diet)	Chronic	2.4E-02	mg/kg-day	4%	9.6E-04	mg/kg-day	CNS	1 / 1	IRIS (3)	6/6/2011
Manganese	Subchronic	2.4E-02	mg/kg-day	4%	9.6E-04	mg/kg-day	CNS	1	HEAST	7/31/1997

Note:

(1) Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Section 4.2 and Exhibit 4-1. USEPA recommends that the oral RfD should not be adjusted to estimate the absorbed dose for compounds when the absorption efficiency is greater than 50%. Constituents that do not have oral absorption efficiencies reported on this table were assumed to have an oral absorption efficiency of 100%.

(2) Adjusted based on RAGS Part E.

(3) As cited in Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA, May 2011).

Definitions:

CNS = Central Nervous System
GI System = Gastrointestinal System
HEAST = Health Effects Assessment Summary Tables
IRIS = Integrated Risk Information System
NA = Not Available
NOE = No Observed Effects
PPRTV = Provisional Peer-Reviewed Toxicity Value

APPENDIX E-2

TABLE 6.1

CANCER TOXICITY DATA -- ORAL/DERMAL

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal (1)	Absorbed Cancer Slope Factor for Dermal (2)		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s) (MM/DD/YYYY)
Benzo(a)anthracene	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58-89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	ECAO (3)	05/2011
Benzo(a)pyrene	7.3E+00	$(mg/kg\text{-}day)^{-1}$	58-89%	7.3E+00	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	6/6/2011
Benzo(b)fluoranthene	7.3E-01	$(mg/kg\text{-}day)^{-1}$	58-89%	7.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	ECAO (3)	05/2011
Benzo(k)fluoranthene	7.3E-02	$(mg/kg\text{-}day)^{-1}$	58-89%	7.3E-02	$(mg/kg\text{-}day)^{-1}$	NA	ECAO (3)	05/2011
Chromium (VI)	5.0E-01	$(mg/kg\text{-}day)^{-1}$	2.5%	2.0E+01	$(mg/kg\text{-}day)^{-1}$	D	NJ (3)	05/2011
Cobalt	NA	NA	NA	NA	NA	NA	NA	NA
Iron	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	D	IRIS	6/6/2011

Notes:

(1) Source: Risk Assessment Guidance for Superfund. Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. Section 4.2 and Exhibit 4-1. USEPA recommends that the oral slope factor should not be adjusted to estimate the absorbed dose for compounds when the absorption efficiency is greater than 50%. Constituents that do not have oral absorption efficiencies reported on this table were assumed to have an oral absorption efficiency of 100%.

(2) Adjusted based on RAGS Part E.

(3) As cited in Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA, May 2011).

Definitions:

ECAO = Environmental Criteria and Assessment Office
IRIS = Integrated Risk Information System
NA = Not Available
NJ = New Jersey

Weight of Evidence definitions:

Group A chemicals (known human carcinogens) are agents for which there is sufficient evidence to support the causal association between exposure to the agents in humans and cancer.
Group B1 chemicals (probable human carcinogens) are agents for which there is limited evidence of possible carcinogenicity in humans.
Group B2 chemicals (probable human carcinogens) are agents for which there is sufficient evidence of carcinogenicity in animals but inadequate or a lack of evidence in humans.
Group C chemicals (possible human carcinogens) are agents for which there is limited evidence of carcinogenicity in animals and inadequate or a lack of human data.
Group D chemicals (not classifiable as to human carcinogenicity) are agents with inadequate human and animal evidence of carcinogenicity or for which no data are available.
Group E chemicals (evidence of noncarcinogenicity in humans) are agents for which there is no evidence of carcinogenicity from human or animal studies, or both.

APPENDIX E-2

TABLE 7.1.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations[2]				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	3.3E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	2.0E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	2.0E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	2.5E-06	mg/kg/day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	3.0E-05	mg/kg/day	3.0E-03	mg/kg/day	1.0E-02
				Chromium (VI), estimated	1.1E+00	mg/L	N/A		N/A		N/A	3.1E-05	mg/kg/day	3.0E-03	mg/kg/day	1.0E-02
				Cobalt	3.0E+00	mg/L	N/A		N/A		N/A	8.2E-05	mg/kg/day	3.0E-04	mg/kg/day	2.7E-01
				Iron	1.6E+04	mg/L	N/A		N/A		N/A	4.4E-01	mg/kg/day	7.0E-01	mg/kg/day	6.2E-01
				Manganese	2.2E+02	mg/L	N/A		N/A		N/A	6.2E-03	mg/kg/day	2.4E-02	mg/kg/day	2.6E-01
			Exp. Route Total								N/A					1.2E+00
			Dermal Absorption[1]	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	4.2E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	4.3E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	4.4E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	5.2E-05	mg/kg-day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	3.1E-07	mg/kg-day	7.5E-05	mg/kg/day	4.2E-03
				Chromium (VI), estimated	1.1E+00	mg/L	N/A		N/A		N/A	3.2E-07	mg/kg-day	7.5E-05	mg/kg/day	4.3E-03
				Cobalt	3.0E+00	mg/L	N/A		N/A		N/A	1.7E-07	mg/kg-day	3.0E-04	mg/kg/day	5.7E-04
				Iron	1.6E+04	mg/L	N/A		N/A		N/A	2.3E-03	mg/kg-day	7.0E-01	mg/kg/day	3.3E-03
				Manganese	2.2E+02	mg/L	N/A		N/A		N/A	3.2E-05	mg/kg-day	9.6E-04	mg/kg/day	3.3E-02
			Exp. Route Total								N/A					4.2E-02
		Exposure Point Total									N/A					1.2E+00
	Exposure Medium Total										N/A					1.2E+00
Groundwater Total											N/A					1.2E+00
											Total of Receptor Risks					N/A	Total of Receptor Hazards				1.2E+00

Notes:

1. Dermal absorption from groundwater calculated on Table 7.1.RME Supplement A.

2. The non-cancer hazards for chromium (VI), estimated are included in the hazard total. The non-cancer hazards for chromium (VI), measured are not included in the total to avoid double counting for chromium (VI).

N/A = Not available/not applicable

APPENDIX E-2

TABLE 7.1.RME SUPPLEMENT A

Calculation of Daevent, Resident Adult - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Water Concentration (CW) (mg/L)	Permeability Coefficient (Kp) (cm/hr)	B (dimensionless)	Lag Time (t_{event}) (hr)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Benzo(a)anthracene	1.2E-01	4.7E-01	2.8E+00	2.0E+00	8.5E+00	1.0E+00	0.58	1.7E-07	2
Benzo(a)pyrene	7.2E-02	7.0E-01	4.3E+00	2.7E+00	1.2E+01	1.0E+00	0.58	1.7E-07	2
Benzo(b)fluoranthene	7.2E-02	7.0E-01	4.3E+00	2.8E+00	1.2E+01	1.0E+00	0.58	1.8E-07	2
Benzo(k)fluoranthene[1]	9.3E-02	6.6E-01	4.0E+00	2.7E+00	1.2E+01	1.0E+00	0.58	2.1E-07	2
Chromium (VI), measured	1.1E+00	2.0E-03	NA	NA	NA	NA	0.58	1.3E-09	1
Chromium (VI), estimated	1.1E+00	2.0E-03	NA	NA	NA	NA	0.58	1.3E-09	1
Cobalt	3.0E+00	4.0E-04	NA	NA	NA	NA	0.58	6.9E-10	1
Iron	1.6E+04	1.0E-03	NA	NA	NA	NA	0.58	9.3E-06	1
Manganese	2.2E+02	1.0E-03	NA	NA	NA	NA	0.58	1.3E-07	1

Inorganics: DA_{event} (mg/cm^2-event) =

$K_p \times CW \times t_{event} \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 1)

Organics: DA_{event} (mg/cm^2-event) =

If $t_{event} < t^*$, then DA_{event} =

$2 \times FA \times K_p \times CW \times (\sqrt{(6 \times t_{event} \times t_{event})/p}) \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 2)

If $t_{event} > t^*$, then DA_{event} =

$FA \times K_p \times CW \times (t_{event}/(1+B) + 2 \times t_{event} \times ((1 + 3xB + 3xB^2)/(1+B)^2) \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 3)

Notes:

[1]Lag time and B calculated on Table 7.1.RME Supplement B

NA - Not applicable

Permeability constants from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final).* EPA/540/R/99/005. The permeability constant for cobalt was obtained from the Risk Assessment Information System (ORNL, 2011), http://rais.ornl.gov/cgi-bin/tools/TOX_search.

B - Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

t* - Time to reach steady-state

* Permeability constants calculated using Equation 3.8 ($\log K_p = 2.80 + 0.66 \log K_{ow} - 0.0056$ MW, where $r^2 = 0.66$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final*, . EPA/540/R/99/005.

B calculated using Equation A.1 ($B = K_p * MW^{1/2}/2.6$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

t_{event} calculated using Equation A.4 ($t_{event} = {l_{sc}}^{2/6D}{}_{sc} = 0.105 \times 10\text{^}[0.0056\ MW]$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

Since $B \leq 0.6$, then t* calculated using Equation A.4 ($t^* = 2.4\ t_{event}$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

APPENDIX E-2

TABLE 7.1.RME SUPPLEMENT B

Calculation of Daevent, Resident Adult - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical	MW	log Kow	Kow	log Kp^1	Kp (cm/hr)	B^1	log $D_{sc}/l_{sc}{}^1$	$D_{sc}/l_{sc}{}^1$	l_{sc} (cm)	D_{sc} (cm^2/hr)	$t_{event}{}^1$ (hr)	c^1	b^1	t^{*1} (hr)
Benzo(k)fluoranthene	2.52E+02	6.11E+00	1.29E+06	-1.81E-01	6.59E-01	4.03E+00	-4.21E+00	6.12E-05	1.00E-03	6.12E-08	2.72E+00	4.09E+00	1.20E+01	1.18E+01

1. Equations from Risk Assessment Guidance for Superfund Volume 1; Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment, EPA/540/R/99/005. July 2004.
MW and log Kow from the Risk Assessment Information System (ORNL, 2011), http://rais.ornl.gov/cgi-bin/tools/TOX_search.

APPENDIX E-2

TABLE 7.2.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations[2]				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	7.7E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	4.6E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	4.6E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	5.9E-06	mg/kg/day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	7.0E-05	mg/kg/day	3.0E-03	mg/kg/day	2.3E-02
				Chromium (VI), estimated	1.1E+00	mg/L	N/A		N/A		N/A	7.2E-05	mg/kg/day	3.0E-03	mg/kg/day	2.4E-02
				Cobalt	3.0E+00	mg/L	N/A		N/A		N/A	1.9E-04	mg/kg/day	3.0E-04	mg/kg/day	6.4E-01
				Iron	1.6E+04	mg/L	N/A		N/A		N/A	1.0E+00	mg/kg/day	7.0E-01	mg/kg/day	1.5E+00
				Manganese	2.2E+02	mg/L	N/A		N/A		N/A	1.4E-02	mg/kg/day	2.4E-02	mg/kg/day	6.0E-01
			Exp. Route Total								N/A					2.7E+00
			Dermal Absorption[1]	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	9.4E-05	mg-kg-day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	9.7E-05	mg-kg-day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	9.8E-05	mg-kg-day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	1.2E-04	mg-kg-day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	9.3E-07	mg-kg-day	7.5E-05	mg/kg/day	1.2E-02
				Chromium (VI), estimated	1.1E+00	mg/L	N/A		N/A		N/A	9.5E-07	mg-kg-day	7.5E-05	mg/kg/day	1.3E-02
				Cobalt	3.0E+00	mg/L	N/A		N/A		N/A	5.1E-07	mg-kg-day	3.0E-04	mg/kg/day	1.7E-03
				Iron	1.6E+04	mg/L	N/A		N/A		N/A	6.7E-03	mg-kg-day	7.0E-01	mg/kg/day	9.6E-03
				Manganese	2.2E+02	mg/L	N/A		N/A		N/A	9.5E-05	mg-kg-day	9.6E-04	mg/kg/day	9.9E-02
			Exp. Route Total								N/A					1.2E-01
		Exposure Point Total									N/A					2.8E+00
	Exposure Medium Total										N/A					2.8E+00
Groundwater Total											N/A					2.8E+00
									Total of Receptor Risks		N/A			Total of Receptor Hazards		2.8E+00

Notes:

1. Dermal absorption from groundwater calculated on Table 7.2.RME Supplement A.

2. The non-cancer hazards for chromium (VI), estimated are included in the hazard total. The non-cancer hazards for chromium (VI), measured are not included in the total to avoid double counting for chromium (VI).

N/A = Not available/not applicable

APPENDIX E-2

TABLE 7.2.RME SUPPLEMENT A

Calculation of Daevent, Resident Child - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Water Concentration (CW) (mg/L)	Permeability Coefficient (Kp) (cm/hr)	B (dimensionless)	Lag Time (t_{event}) (hr)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Benzo(a)anthracene	1.2E-01	4.7E-01	2.8E+00	2.0E+00	8.5E+00	1.0E+00	1	2.2E-07	2
Benzo(a)pyrene	7.2E-02	7.0E-01	4.3E+00	2.7E+00	1.2E+01	1.0E+00	1	2.3E-07	2
Benzo(b)fluoranthene	7.2E-02	7.0E-01	4.3E+00	2.8E+00	1.2E+01	1.0E+00	1	2.3E-07	2
Benzo(k)fluoranthene[1]	9.3E-02	6.6E-01	4.0E+00	2.7E+00	1.2E+01	1.0E+00	1	2.8E-07	2
Chromium (VI), measured	1.1E+00	2.0E-03	NA	NA	NA	NA	1	2.2E-09	1
Chromium (VI), estimated	1.1E+00	2.0E-03	NA	NA	NA	NA	1	2.3E-09	1
Cobalt	3.0E+00	4.0E-04	NA	NA	NA	NA	1	1.2E-09	1
Iron	1.6E+04	1.0E-03	NA	NA	NA	NA	1	1.6E-05	1
Manganese	2.2E+02	1.0E-03	NA	NA	NA	NA	1	2.2E-07	1

Inorganics: DA_{event} (mg/cm^2-event) =

$K_p \times CW \times t_{event} \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 1)

Organics: DA_{event} (mg/cm^2-event) =

If $t_{event} < t^*$, then DA_{event} =

$2 \times FA \times K_p \times CW \times (\sqrt{(6 \times t_{event} \times t_{event})/p)} \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 2)

If $t_{event} > t^*$, then DA_{event} =

$FA \times K_p \times CW \times (t_{event}/(1+B) + 2 \times t_{event} \times ((1 + 3xB + 3xB^2)/(1+B)^2) \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 3)

Notes:

[1]Lag time and B calculated on Table 7.1.RME Supplement B

NA - Not applicable

Permeability constants from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final).* EPA/540/R/99/005. The permeability constant for cobalt was obtained from the Risk Assessment Information System (ORNL, 2011), http://rais.ornl.gov/cgi-bin/tools/TOX_search.

B - Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

t* - Time to reach steady-state

[1]Lag time and B calculated on Table 7.5b.RME Supplement.

* Permeability constants calculated using Equation 3.8 ($\log K_p = 2.80 + 0.66 \log K_{ow} - 0.0056$ MW, where $r^2 = 0.66$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final*, . EPA/540/R/99/005.

B calculated using Equation A.1 ($B = K_p * MW^{1/2}/2.6$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

t_{event} calculated using Equation A.4 ($t_{event} = l_{sc}^{2/6D}{}_{sc} = 0.105 \times 10\text{^}[0.0056\ MW]$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

Since $B \leq 0.6$, then t* calculated using Equation A.4 ($t^* = 2.4\ t_{event}$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

APPENDIX E-2

TABLE 7.3.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations[2]					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L					4.1E-06	N/A		N/A		N/A
				Benzo(a)pyrene	7.2E-02	mg/L					2.4E-05	N/A		N/A		N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L					2.4E-06	N/A		N/A		N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L					3.2E-07	N/A		N/A		N/A
				Chromium (VI), measured	1.1E+00	mg/L					2.6E-05	N/A		N/A		N/A
				Chromium (VI), estimated	1.1E+00	mg/L					2.6E-05	N/A		N/A		N/A
				Cobalt	3.0E+00	mg/L	4.5E-05	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Iron	1.6E+04	mg/L	2.4E-01	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Manganese	2.2E+02	mg/L	3.4E-03	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
			Exp. Route Total								5.7E-05					N/A
			Dermal Absorption[1]	Benzo(a)anthracene	1.2E-01	mg/L					5.1E-05	N/A		N/A		N/A
				Benzo(a)pyrene	7.2E-02	mg/L					5.2E-04	N/A		N/A		N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L					5.3E-05	N/A		N/A		N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L					6.3E-06	N/A		N/A		N/A
				Chromium (VI), measured	1.1E+00	mg/L					1.2E-05	N/A		N/A		N/A
				Chromium (VI), estimated	1.1E+00	mg/L					1.3E-05	N/A		N/A		N/A
				Cobalt	3.0E+00	mg/L	1.0E-07	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Iron	1.6E+04	mg/L	1.4E-03	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Manganese	2.2E+02	mg/L	1.9E-05	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
			Exp. Route Total								6.4E-04					N/A
		Exposure Point Total									7.0E-04					N/A
	Exposure Medium Total										7.0E-04					N/A
Groundwater											7.0E-04					N/A
											Total of Receptor Risks	7.0E-04		Total of Receptor Hazards		N/A

Notes:

1. Dermal absorption from groundwater calculated on Tables 7.1.RME and 7.2.RME Supplement A.
2. See Table 7.3.RME Supplement A for calculation of intake and cancer risk following mutagenic mode of action (MMOA) method. The cancer risks for chromium (VI), estimated are included in the risk total.
   The risks for chromium (VI), measured are not included in the risk total to avoid double counting for chromium (VI).

N/A = Not available/not applicable

APPENDIX E-2

TABLE 7.3.RME SUPPLEMENT A

CALCULATION OF CHEMICAL CANCER RISKS FOR COPC WITH MUTAGENIC MODE OF ACTION

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations										
							Intake					CSF/Unit Risk					
							Value				Units	Value				Units	Cancer Risk
					Value	Units	0-2 yrs	2-6 yrs	6-16 years	16-30 yrs		0-2 yrs (ADAF=10)	2-6 yrs (ADAF=3)	6-16 yrs (ADAF=3)	16-30 yrs (ADAF=1)		
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L	2.2E-07	4.4E-07	4.7E-07	6.6E-07	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	4.1E-06
				Benzo(a)pyrene	7.2E-02	mg/L	1.3E-07	2.6E-07	2.8E-07	3.9E-07	mg/kg/day	7.3E+01	2.2E+01	2.2E+01	7.3E+00	1/(mg/kg-day)	2.4E-05
				Benzo(b)fluoranthene	7.2E-02	mg/L	1.3E-07	2.6E-07	2.8E-07	3.9E-07	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	2.4E-06
				Benzo(k)fluoranthene	9.3E-02	mg/L	1.7E-07	3.4E-07	3.6E-07	5.1E-07	mg/kg/day	7.3E-01	2.2E-01	2.2E-01	7.3E-02	1/(mg/kg-day)	3.2E-07
				Chromium (VI), measured	1.1E+00	mg/L	2.0E-06	4.0E-06	4.3E-06	6.0E-06	mg/kg/day	5.0E+00	1.5E+00	1.5E+00	5.0E-01	1/(mg/kg-day)	2.6E-05
				Chromium (VI), estimated	1.1E+00	mg/L	2.1E-06	4.1E-06	4.4E-06	6.2E-06	mg/kg/day	5.0E+00	1.5E+00	1.5E+00	5.0E-01	1/(mg/kg-day)	2.6E-05
			Dermal	Benzo(a)anthracene	1.2E-01	mg/L	2.7E-06	5.4E-06	6.0E-06	8.4E-06	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	5.1E-05
				Benzo(a)pyrene	7.2E-02	mg/L	2.8E-06	5.5E-06	6.1E-06	8.6E-06	mg/kg/day	7.3E+01	2.2E+01	2.2E+01	7.3E+00	1/(mg/kg-day)	5.2E-04
				Benzo(b)fluoranthene	7.2E-02	mg/L	2.8E-06	5.6E-06	6.2E-06	8.7E-06	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	5.3E-05
				Benzo(k)fluoranthene	9.3E-02	mg/L	3.4E-06	6.7E-06	7.5E-06	1.0E-05	mg/kg/day	7.3E-01	2.2E-01	2.2E-01	7.3E-02	1/(mg/kg-day)	6.3E-06
				Chromium (VI), measured	1.1E+00	mg/L	2.7E-08	5.3E-08	4.5E-08	6.3E-08	mg/kg/day	2.0E+02	6.0E+01	6.0E+01	2.0E+01	1/(mg/kg-day)	1.2E-05
				Chromium (VI), estimated	1.1E+00	mg/L	2.7E-08	5.4E-08	4.6E-08	6.5E-08	mg/kg/day	2.0E+02	6.0E+01	6.0E+01	2.0E+01	1/(mg/kg-day)	1.3E-05

APPENDIX E-2

TABLE 7.4.RME

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations[2]					Non-Cancer Hazard Calculations[2]				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Water in Excavation Pit	Dermal[1]	Benzo(a)anthracene	1.2E-01	mg/L	4.3E-08	mg/kg/day	7.3E-01	mg/kg/day	3.1E-08	3.0E-06	mg/kg-day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	4.4E-08	mg/kg/day	7.3E+00	mg/kg/day	3.2E-07	3.1E-06	mg/kg-day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	4.4E-08	mg/kg/day	7.3E-01	mg/kg/day	3.2E-08	3.1E-06	mg/kg-day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	5.3E-08	mg/kg/day	7.3E-02	mg/kg/day	3.9E-09	3.7E-06	mg/kg-day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	8.4E-10	mg/kg/day	2.0E+01	mg/kg/day	1.7E-08	5.9E-08	mg/kg-day	5.0E-04	mg/kg/day	1.2E-04
				Chromium (VI), estimated	1.1E+00	mg/L	8.6E-10	mg/kg/day	2.0E+01	mg/kg/day	1.7E-08	6.1E-08	mg/kg-day	5.0E-04	mg/kg/day	1.2E-04
				Cobalt	3.0E+00	mg/L	4.6E-10	mg/kg/day	N/A	N/A	N/A	3.2E-08	mg/kg-day	3.0E-04	mg/kg/day	1.1E-04
				Iron	1.6E+04	mg/L	6.1E-06	mg/kg/day	N/A	N/A	N/A	4.3E-04	mg/kg-day	7.0E-01	mg/kg/day	6.1E-04
				Manganese	2.2E+02	mg/L	8.6E-08	mg/kg/day	N/A	N/A	N/A	6.0E-06	mg/kg-day	9.6E-04	mg/kg/day	6.3E-03
			Exp. Route Total								4.0E-07					7.1E-03
		Exposure Point									4.0E-07					7.1E-03
	Exposure Medium Total										4.0E-07					7.1E-03
Groundwater Total											4.0E-07					7.1E-03
										Total of Receptor Risks	4.0E-07			Total of Receptor Hazards		7.1E-03

N/A = Not available/not applicable

1. Dermal absorption from groundwater calculated on Table 7.4.RME Supplement A.
2. The cancer risks and non-cancer hazards for chromium (VI), estimated are included in the risk/hazard totals. The risks/hazards for chromium (VI), measured are not included in the totals to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 7.4.RME SUPPLEMENT A

Calculation of Daevent, Construction Worker - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Water Concentration (CW) (mg/L)	Permeability Coefficient (Kp) (cm/hr)	B (dimensionless)	Lag Time (t_{event}) (hr)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Benzo(a)anthracene	1.2E-01	4.7E-01	2.8E+00	2.0E+00	8.5E+00	1.0E+00	4	4.5E-07	2
Benzo(a)pyrene	7.2E-02	7.0E-01	4.3E+00	2.7E+00	1.2E+01	1.0E+00	4	4.6E-07	2
Benzo(b)fluoranthene	7.2E-02	7.0E-01	4.3E+00	2.8E+00	1.2E+01	1.0E+00	4	4.7E-07	2
Benzo(k)fluoranthene[1]	9.3E-02	6.6E-01	4.0E+00	2.7E+00	1.2E+01	1.0E+00	4	5.6E-07	2
Chromium (VI), measured	1.1E+00	2.0E-03	NA	NA	NA	NA	4	8.8E-09	1
Chromium (VI), estimated	1.1E+00	2.0E-03	NA	NA	NA	NA	4	9.0E-09	1
Cobalt	3.0E+00	4.0E-04	NA	NA	NA	NA	4	4.8E-09	1
Iron	1.6E+04	1.0E-03	NA	NA	NA	NA	4	6.4E-05	1
Manganese	2.2E+02	1.0E-03	NA	NA	NA	NA	4	9.0E-07	1

Inorganics: DA_{event} (mg/cm^2-event) =

$K_p \times CW \times t_{event} \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 1)

Organics: DA_{event} (mg/cm^2-event) =

If $t_{event} < t^*$, then DA_{event} =

$2 \times FA \times K_p \times CW \times (\sqrt{(6 \times t_{event} \times t_{event})/p}) \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 2)

If $t_{event} > t^*$, then DA_{event} =

$FA \times K_p \times CW \times (t_{event}/(1+B) + 2 \times t_{event} \times ((1 + 3xB + 3xB^2)/(1+B)^2) \times 0.001\ mg/\mu g \times 0.001\ l/cm^3$ (eq 3)

Notes:

[1]Lag time and B calculated on Table 7.1.RME Supplement B

NA - Not applicable

Permeability constants from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final).* EPA/540/R/99/005. The permeability constant for cobalt was obtained from the Risk Assessment Information System (ORNL, 2011), http://rais.ornl.gov/cgi-bin/tools/TOX_search.

B - Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

t* - Time to reach steady-state

* Permeability constants calculated using Equation 3.8 ($\log K_p = 2.80 + 0.66 \log K_{ow} - 0.0056$ MW, where $r^2 = 0.66$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final)* . EPA/540/R/99/005.

B calculated using Equation A.1 ($B = K_p * MW^{1/2}/2.6$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

t_{event} calculated using Equation A.4 ($t_{event} = I_{sc}^{2/6D_{sc}} = 0.105 \times 10\text{^}[0.0056\ MW]$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

Since $B \leq 0.6$, then t* calculated using Equation A.4 ($t^* = 2.4\ t_{event}$) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

APPENDIX E-2

TABLE 7.1.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations[2]				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	1.5E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	9.2E-07	mg/kg/day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	9.2E-07	mg/kg/day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	1.2E-06	mg/kg/day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	1.4E-05	mg/kg/day	3.0E-03	mg/kg/day	4.7E-03
				Chromium (VI), estimated	8.4E-01	mg/L	N/A		N/A		N/A	1.1E-05	mg/kg/day	3.0E-03	mg/kg/day	3.6E-03
				Cobalt	1.3E+00	mg/L	N/A		N/A		N/A	1.7E-05	mg/kg/day	3.0E-04	mg/kg/day	5.6E-02
				Iron	5.8E+03	mg/L	N/A		N/A		N/A	7.5E-02	mg/kg/day	7.0E-01	mg/kg/day	1.1E-01
				Manganese	9.6E+01	mg/L	N/A		N/A		N/A	1.2E-03	mg/kg/day	2.4E-02	mg/kg/day	5.1E-02
			Exp. Route Total								N/A					2.2E-01
			Dermal Absorption[1]	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	1.8E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	1.9E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	1.9E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	2.3E-05	mg/kg-day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	9.1E-08	mg/kg-day	7.5E-05	mg/kg/day	1.2E-03
				Chromium (VI), estimated	8.4E-01	mg/L	N/A		N/A		N/A	6.9E-08	mg/kg-day	7.5E-05	mg/kg/day	9.2E-04
				Cobalt	1.3E+00	mg/L	N/A		N/A		N/A	2.2E-08	mg/kg-day	3.0E-04	mg/kg/day	7.2E-05
				Iron	5.8E+03	mg/L	N/A		N/A		N/A	2.4E-04	mg/kg-day	7.0E-01	mg/kg/day	3.4E-04
				Manganese	9.6E+01	mg/L	N/A		N/A		N/A	3.9E-06	mg/kg-day	9.6E-04	mg/kg/day	4.1E-03
			Exp. Route Total								N/A					5.7E-03
		Exposure Point Total									N/A					2.2E-01
	Exposure Medium Total										N/A					2.2E-01
Groundwater Total											N/A					2.2E-01
									Total of Receptor Risks		N/A			Total of Receptor Hazards		2.2E-01

Notes:

1. Dermal absorption from groundwater calculated on Table 7.1.CTE Supplement A.

2. The non-cancer hazards for chromium (VI), measured are included in the hazard total. The non-cancer hazards for chromium (VI), estimated are not included in the total to avoid double counting for chromium (VI).

N/A = Not available/not applicable

APPENDIX E-2

TABLE 7.1.CTE SUPPLEMENT B

Calculation of Daevent, Resident Adult - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Water Concentration (CW) (mg/L)	Permeability Coefficient (Kp) (cm/hr)	B (dimensionless)	Lag Time (t_{event}) (hr)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Benzo(a)anthracene	1.2E-01	4.7E-01	2.8E+00	2.0E+00	8.5E+00	1.0E+00	0.25	1.1E-07	2
Benzo(a)pyrene	7.2E-02	7.0E-01	4.3E+00	2.7E+00	1.2E+01	1.0E+00	0.25	1.1E-07	2
Benzo(b)fluoranthene	7.2E-02	7.0E-01	4.3E+00	2.8E+00	1.2E+01	1.0E+00	0.25	1.2E-07	2
Benzo(k)fluoranthene[1]	9.3E-02	6.6E-01	4.0E+00	2.7E+00	1.2E+01	1.0E+00	0.25	1.4E-07	2
Chromium (VI), measured	1.1E+00	2.0E-03	NA	NA	NA	NA	0.25	5.5E-10	1
Chromium (VI), estimated	8.4E-01	2.0E-03	NA	NA	NA	NA	0.25	4.2E-10	1
Cobalt	1.3E+00	4.0E-04	NA	NA	NA	NA	0.25	1.3E-10	1
Iron	5.8E+03	1.0E-03	NA	NA	NA	NA	0.25	1.5E-06	1
Manganese	9.6E+01	1.0E-03	NA	NA	NA	NA	0.25	2.4E-08	1

Inorganics: DA_{event} (mg/cm^2-event) =

K_p x CW x t_{event} x 0.001 mg/µg x 0.001 l/cm^3 (eq 1)

Organics: DA_{event} (mg/cm^2-event) =

If t_{event}<t*, then DA_{event} =

2 x FA x K_p x CW x (sqrt((6 x t_{event} x t_{event})/p)) x 0.001 mg/µg x 0.001 l/cm^3 (eq 2)

If t_{event}>t*, then DA_{event} =

FA x K_p x CW x (t_{event}/(1+B) + 2 x t_{event} x ((1 + 3xB + 3xB^2)/(1+B)^2) x 0.001 mg/µg x 0.001 l/cm^3 (eq 3)

Notes:

[1]Lag time and B calculated on Table 7.1.RME Supplement B

NA - Not applicable

Permeability constants from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final).* EPA/540/R/99/005. The permeability constant for cobalt was obtained from the Risk Assessment Information System (ORNL, 2011), http://rais.ornl.gov/cgi-bin/tools/TOX_search.

B - Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

t* - Time to reach steady-state

[1]Lag time and B calculated on Table 7.5b.RME Supplement.

* Permeability constants calculated using Equation 3.8 (log K_p = 2.80 + 0.66 log K_{ow} - 0.0056 MW, where r^2 = 0.66) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final*, . EPA/540/R/99/005.

B calculated using Equation A.1 (B = K_p * $MW^{1/2}$/2.6) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

t_{event} calculated using Equation A.4 (t_{event} = $l_{sc}^{2/6D}{}_{sc}$ = 0.105 × 10^[0.0056 MW]) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

Since B ≤ 0.6, then t* calculated using Equation A.4 (t* = 2.4 t_{event}) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

APPENDIX E-2

TABLE 7.2.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations[2]				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	5.1E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	3.1E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	3.1E-06	mg/kg/day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	4.0E-06	mg/kg/day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	4.7E-05	mg/kg/day	3.0E-03	mg/kg/day	1.6E-02
				Chromium (VI), estimated	8.4E-01	mg/L	N/A		N/A		N/A	3.6E-05	mg/kg/day	3.0E-03	mg/kg/day	1.2E-02
				Cobalt	1.3E+00	mg/L	N/A		N/A		N/A	5.6E-05	mg/kg/day	3.0E-04	mg/kg/day	1.9E-01
				Iron	5.8E+03	mg/L	N/A		N/A		N/A	2.5E-01	mg/kg/day	7.0E-01	mg/kg/day	3.6E-01
				Manganese	9.6E+01	mg/L	N/A		N/A		N/A	4.1E-03	mg/kg/day	2.4E-02	mg/kg/day	1.7E-01
			Exp. Route Total								N/A					7.3E-01
			Dermal Absorption[1]	Benzo(a)anthracene	1.2E-01	mg/L	N/A		N/A		N/A	3.6E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(a)pyrene	7.2E-02	mg/L	N/A		N/A		N/A	3.7E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L	N/A		N/A		N/A	3.8E-05	mg/kg-day	N/A	N/A	N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L	N/A		N/A		N/A	4.5E-05	mg/kg-day	N/A	N/A	N/A
				Chromium (VI), measured	1.1E+00	mg/L	N/A		N/A		N/A	2.0E-07	mg/kg-day	7.5E-05	mg/kg/day	2.7E-03
				Chromium (VI), estimated	8.4E-01	mg/L	N/A		N/A		N/A	1.6E-07	mg/kg-day	7.5E-05	mg/kg/day	2.1E-03
				Cobalt	1.3E+00	mg/L	N/A		N/A		N/A	4.9E-08	mg/kg-day	3.0E-04	mg/kg/day	1.6E-04
				Iron	5.8E+03	mg/L	N/A		N/A		N/A	5.4E-04	mg/kg-day	7.0E-01	mg/kg/day	7.8E-04
				Manganese	9.6E+01	mg/L	N/A		N/A		N/A	8.9E-06	mg/kg-day	9.6E-04	mg/kg/day	9.3E-03
			Exp. Route Total								N/A					1.3E-02
		Exposure Point Total									N/A					7.4E-01
	Exposure Medium Total										N/A					7.4E-01
Groundwater Total											N/A					7.4E-01
											N/A					7.4E-01

Total of Receptor Risks

Total of Receptor Hazards

Notes:

1. Dermal absorption from groundwater calculated on Table 7.2.CTE Supplement A.

2. The non-cancer hazards for chromium (VI), measured are included in the hazard total. The non-cancer hazards for chromium (VI), estimated are not included in the total to avoid double counting for chromium (VI).

N/A = Not available/not applicable

APPENDIX E-2

TABLE 7.2.CTE SUPPLEMENT A

Calculation of Daevent, Resident Child - Groundwater

Site 15 ESI Report

MCB CamLej, North Carolina

Chemical of Potential Concern	Water Concentration (CW) (mg/L)	Permeability Coefficient (Kp) (cm/hr)	B (dimensionless)	Lag Time (t_{event}) (hr)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)	Duration of Event (tevent) (hr)	DAevent (mg/cm^2-event)	Eq
Benzo(a)anthracene	1.2E-01	4.7E-01	2.8E+00	2.0E+00	8.5E+00	1.0E+00	0.33	1.3E-07	2
Benzo(a)pyrene	7.2E-02	7.0E-01	4.3E+00	2.7E+00	1.2E+01	1.0E+00	0.33	1.3E-07	2
Benzo(b)fluoranthene	7.2E-02	7.0E-01	4.3E+00	2.8E+00	1.2E+01	1.0E+00	0.33	1.3E-07	2
Benzo(k)fluoranthene[1]	9.3E-02	6.6E-01	4.0E+00	2.7E+00	1.2E+01	1.0E+00	0.33	1.6E-07	2
Chromium (VI), measured	1.1E+00	2.0E-03	NA	NA	NA	NA	0.33	7.3E-10	1
Chromium (VI), estimated	8.4E-01	2.0E-03	NA	NA	NA	NA	0.33	5.5E-10	1
Cobalt	1.3E+00	4.0E-04	NA	NA	NA	NA	0.33	1.7E-10	1
Iron	5.8E+03	1.0E-03	NA	NA	NA	NA	0.33	1.9E-06	1
Manganese	9.6E+01	1.0E-03	NA	NA	NA	NA	0.33	3.2E-08	1

Inorganics: DA_{event} (mg/cm^2-event) =

K_p x CW x t_{event} x 0.001 mg/µg x 0.001 l/cm^3 (eq 1)

Organics: DA_{event} (mg/cm^2-event) =

If t_{event}<t*, then DA_{event} =

2 x FA x K_p x CW x (sqrt((6 x t_{event} x t_{event})/p)) x 0.001 mg/µg x 0.001 l/cm^3 (eq 2)

If t_{event}>t*, then DA_{event} =

FA x K_p x CW x (t_{event}/(1+B) + 2 x t_{event} x ((1 + 3xB + 3xB^2)/(1+B)^2) x 0.001 mg/µg x 0.001 l/cm^3 (eq 3)

Notes:

[1]Lag time and B calculated on Table 7.1.RME Supplement B

NA - Not applicable

Permeability constants from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final).* EPA/540/R/99/005. The permeability constant for cobalt was obtained from the Risk Assessment Information System (ORNL, 2011), http://rais.ornl.gov/cgi-bin/tools/TOX_search.

B - Dimensionless ratio of the permeability coefficient of a compound through the stratum corneum relative to its permeability coefficient across the viable epidermis (dimensionless).

t* - Time to reach steady-state

[1]Lag time and B calculated on Table 7.5b.RME Supplement.

* Permeability constants calculated using Equation 3.8 (log K_p = 2.80 + 0.66 log K_{ow} - 0.0056 MW, where r^2 = 0.66) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final)* . EPA/540/R/99/005.

B calculated using Equation A.1 (B = K_p * $MW^{1/2}$/2.6) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

t_{event} calculated using Equation A.4 (t_{event} = $I_{sc}^{2/6D_{sc}}$ = 0.105 × 10^[0.0056 MW]) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

Since B ≤ 0.6, then t* calculated using Equation A.4 (t* = 2.4 t_{event}) from EPA 2004, *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment - Final). EPA/540/R/99/005.*

APPENDIX E-2

TABLE 7.3.CTE

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations[2]					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L					2.4E-06	N/A		N/A		N/A
				Benzo(a)pyrene	7.2E-02	mg/L					1.5E-05	N/A		N/A		N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L					1.5E-06	N/A		N/A		N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L					1.9E-07	N/A		N/A		N/A
				Chromium (VI), measured	1.1E+00	mg/L					1.5E-05	N/A		N/A		N/A
				Chromium (VI), estimated	8.4E-01	mg/L					1.2E-05	N/A		N/A		N/A
				Cobalt	1.3E+00	mg/L	7.0E-06	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Iron	5.8E+03	mg/L	3.1E-02	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Manganese	9.6E+01	mg/L	5.1E-04	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
			Exp. Route Total								3.4E-05					N/A
			Dermal Absorption[1]	Benzo(a)anthracene	1.2E-01	mg/L					2.1E-05	N/A		N/A		N/A
				Benzo(a)pyrene	7.2E-02	mg/L					2.1E-04	N/A		N/A		N/A
				Benzo(b)fluoranthene	7.2E-02	mg/L					2.1E-05	N/A		N/A		N/A
				Benzo(k)fluoranthene	9.3E-02	mg/L					2.6E-06	N/A		N/A		N/A
				Chromium (VI), measured	1.1E+00	mg/L					3.0E-06	N/A		N/A		N/A
				Chromium (VI), estimated	8.4E-01	mg/L					2.3E-06	N/A		N/A		N/A
				Cobalt	1.3E+00	mg/L	7.0E-09	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Iron	5.8E+03	mg/L	7.7E-05	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
				Manganese	9.6E+01	mg/L	1.3E-06	mg/kg/day	N/A	N/A	N/A	N/A		N/A		N/A
			Exp. Route								2.6E-04					N/A
		Exposure Point Total									2.9E-04					N/A
	Exposure Medium Total										2.9E-04					N/A
Groundwater											2.9E-04					N/A
									Total of Receptor Risks		2.9E-04			Total of Receptor Hazards		N/A

Notes:

1. Dermal absorption from groundwater calculated on Tables 7.1.CTE and 7.2.CTE Supplement A.
2. See Table 7.3.CTE Supplement A for calculation of intake and cancer risk following mutagenic mode of action (MMOA) method. The cancer risks for chromium (VI), measured are included in the risk total.
   The risks for chromium (VI), estimated are not included in the risk total to avoid double counting for chromium (VI).

N/A = Not available/not applicable

APPENDIX E-2

TABLE 7.3.CTE SUPPLEMENT A

CALCULATION OF CHEMICAL CANCER RISKS FOR COPC WITH MUTAGENIC MODE OF ACTION

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations										
							Intake					CSF/Unit Risk					Cancer Risk
							Value					Value					
					Value	Units	0-2 yrs	2-6 yrs	6-16 years	16-30 yrs	Units	0-2 yrs (ADAF=10)	2-6 yrs (ADAF=3)	6-16 yrs (ADAF=3)	16-30 yrs (ADAF=1)	Units	
Groundwater	Groundwater	Tap Water	Ingestion	Benzo(a)anthracene	1.2E-01	mg/L	1.5E-07	2.9E-07	2.2E-07	3.1E-07	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	2.4E-06
				Benzo(a)pyrene	7.2E-02	mg/L	8.8E-08	1.8E-07	1.3E-07	1.8E-07	mg/kg/day	7.3E+01	2.2E+01	2.2E+01	7.3E+00	1/(mg/kg-day)	1.5E-05
				Benzo(b)fluoranthene	7.2E-02	mg/L	8.8E-08	1.8E-07	1.3E-07	1.8E-07	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	1.5E-06
				Benzo(k)fluoranthene	9.3E-02	mg/L	1.1E-07	2.3E-07	1.7E-07	2.4E-07	mg/kg/day	7.3E-01	2.2E-01	2.2E-01	7.3E-02	1/(mg/kg-day)	1.9E-07
				Chromium (VI), measured	1.1E+00	mg/L	1.3E-06	2.7E-06	2.0E-06	2.8E-06	mg/kg/day	5.0E+00	1.5E+00	1.5E+00	5.0E-01	1/(mg/kg-day)	1.5E-05
				Chromium (VI), estimated	8.4E-01	mg/L	1.0E-06	2.0E-06	1.5E-06	2.1E-06	mg/kg/day	5.0E+00	1.5E+00	1.5E+00	5.0E-01	1/(mg/kg-day)	1.2E-05
			Dermal	Benzo(a)anthracene	1.2E-01	mg/L	1.0E-06	2.1E-06	2.6E-06	3.7E-06	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	2.1E-05
				Benzo(a)pyrene	7.2E-02	mg/L	1.1E-06	2.1E-06	2.7E-06	3.8E-06	mg/kg/day	7.3E+01	2.2E+01	2.2E+01	7.3E+00	1/(mg/kg-day)	2.1E-04
				Benzo(b)fluoranthene	7.2E-02	mg/L	1.1E-06	2.2E-06	2.7E-06	3.8E-06	mg/kg/day	7.3E+00	2.2E+00	2.2E+00	7.3E-01	1/(mg/kg-day)	2.1E-05
				Benzo(k)fluoranthene	9.3E-02	mg/L	1.3E-06	2.6E-06	3.3E-06	4.6E-06	mg/kg/day	7.3E-01	2.2E-01	2.2E-01	7.3E-02	1/(mg/kg-day)	2.6E-06
				Chromium (VI), measured	1.1E+00	mg/L	5.9E-09	1.2E-08	1.3E-08	1.8E-08	mg/kg/day	2.0E+02	6.0E+01	6.0E+01	2.0E+01	1/(mg/kg-day)	3.0E-06
				Chromium (VI), estimated	8.4E-01	mg/L	4.5E-09	8.9E-09	9.9E-09	1.4E-08	mg/kg/day	2.0E+02	6.0E+01	6.0E+01	2.0E+01	1/(mg/kg-day)	2.3E-06

APPENDIX E-2

TABLE 9.1.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient[1]				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	N/A	N/A	N/A	N/A	NOE	1.0E-02	N/A	4.2E-03	1.4E-02
			Chromium (VI), estimated	N/A	N/A	N/A	N/A	NOE	1.0E-02	N/A	4.3E-03	1.5E-02
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	2.7E-01	N/A	5.7E-04	2.7E-01
			Iron	N/A	N/A	N/A	N/A	GI System	6.2E-01	N/A	3.3E-03	6.3E-01
			Manganese	N/A	N/A	N/A	N/A	CNS	2.6E-01	N/A	3.3E-02	2.9E-01
			Chemical Total	N/A	N/A	N/A	N/A		1.2E+00	N/A	4.2E-02	1.2E+00
		Exposure Point Total					N/A					1.2E+00
	Exposure Medium Total						N/A					1.2E+00
Medium Total							N/A					1.2E+00
Receptor Total							N/A					1.2E+00

Notes:

CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable
NOE = No observed effect

Total NOE HI Across All Media =	1.5E-02
Total Thyroid HI Across All Media=	2.7E-01
Total GI System HI Across All Media =	6.3E-01
Total CNS HI Across All Media =	2.9E-01

1. The non-cancer hazards for chromium (VI), estimated are included in the hazard total. The non-cancer hazards for chromium (VI), measured are not included in the total to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 9.2.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient[1]				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	N/A	N/A	N/A	N/A	NOE	2.3E-02	N/A	1.2E-02	3.6E-02
			Chromium (VI), estimated	N/A	N/A	N/A	N/A	NOE	2.4E-02	N/A	1.3E-02	3.7E-02
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	6.4E-01	N/A	1.7E-03	6.4E-01
			Iron	N/A	N/A	N/A	N/A	GI System	1.5E+00	N/A	9.6E-03	1.5E+00
			Manganese	N/A	N/A	N/A	N/A	CNS	6.0E-01	N/A	9.9E-02	7.0E-01
			Chemical Total	N/A	N/A	N/A	N/A		2.7E+00	N/A	1.2E-01	2.8E+00
		Exposure Point Total					N/A					2.8E+00
	Exposure Medium Total						N/A					2.8E+00
Medium Total							N/A					2.8E+00
Receptor Total							N/A					2.8E+00

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable
NOE = No observed effect

Total NOE HI Across All Media =	3.7E-02
Total Thyroid HI Across All Media=	6.4E-01
Total GI System HI Across All Media =	1.5E+00
Total CNS HI Across All Media =	7.0E-01

1. The non-cancer hazards for chromium (VI), estimated are included in the hazard total. The non-cancer hazards for chromium (VI), measured are not included in the total to avoid double counting for chromium (VI)

APPENDIX E-2

TABLE 9.3.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk[1]				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	4.1E-06	N/A	5.1E-05	5.5E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	2.4E-05	N/A	5.2E-04	5.4E-04	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	2.4E-06	N/A	5.3E-05	5.5E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	3.2E-07	N/A	6.3E-06	6.7E-06	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	2.6E-05	N/A	1.2E-05	3.8E-05	NOE	N/A	N/A	N/A	N/A
			Chromium (VI), estimated	2.6E-05	N/A	1.3E-05	3.9E-05	NOE	N/A	N/A	N/A	N/A
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	N/A	N/A	N/A	N/A
			Iron	N/A	N/A	N/A	N/A	GI System	N/A	N/A	N/A	N/A
			Manganese	N/A	N/A	N/A	N/A	CNS	N/A	N/A	N/A	N/A
			Chemical Total	5.7E-05	N/A	6.4E-04	7.0E-04		N/A	N/A	N/A	N/A
		Exposure Point Total					7.0E-04					N/A
	Exposure Medium Total						7.0E-04					N/A
Medium Total							7.0E-04					N/A
Receptor Total							7.0E-04					N/A

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
N/A = Not available/not applicable
NOE = No observed effect

1. The cancer risks for chromium (VI), estimated are included in the risk total. The risks for chromium (VI), measured are not included in the risk total to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 9.4.RME

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Construction Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk[1]				Non-Carcinogenic Hazard Quotient[1]				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Water in Excavation Pit	Benzo(a)anthracene	N/A	N/A	3.1E-08	3.1E-08	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	N/A	N/A	3.2E-07	3.2E-07	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	N/A	N/A	3.2E-08	3.2E-08	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	N/A	N/A	3.9E-09	3.9E-09	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	N/A	N/A	1.7E-08	1.7E-08	NOE	N/A	N/A	1.2E-04	1.2E-04
			Chromium (VI), estimated	N/A	N/A	1.7E-08	1.7E-08	NOE	N/A	N/A	1.2E-04	1.2E-04
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	N/A	N/A	1.1E-04	1.1E-04
			Iron	N/A	N/A	N/A	N/A	GI System	N/A	N/A	6.1E-04	6.1E-04
			Manganese	N/A	N/A	N/A	N/A	CNS	N/A	N/A	6.3E-03	6.3E-03
			Chemical Total	N/A	N/A	4.0E-07	4.0E-07		N/A	N/A	7.1E-03	7.1E-03
		Exposure Point Total					4.0E-07					7.1E-03
	Exposure Medium Total						4.0E-07					7.1E-03
Medium Total							4.0E-07					7.1E-03
Receptor Total							4.0E-07					7.1E-03

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable
NOE = No observed effect

Total NOE HI Across All Media =	1.2E-04
Total Thyroid HI Across All Media=	1.1E-04
Total GI System HI Across All Media =	6.1E-04
Total CNS HI Across All Media =	6.3E-03

1. The cancer risks and non-cancer hazards for chromium (VI), estimated are included in the risk/hazard totals. The risks/hazards for chromium (VI), measured are not included in the totals to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 9.1.CTE

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient[1]				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	N/A	N/A	N/A	N/A	NOE	4.7E-03	N/A	1.2E-03	5.9E-03
			Chromium (VI), estimated	N/A	N/A	N/A	N/A	NOE	3.6E-03	N/A	9.2E-04	4.5E-03
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	5.6E-02	N/A	7.2E-05	5.6E-02
			Iron	N/A	N/A	N/A	N/A	GI System	1.1E-01	N/A	3.4E-04	1.1E-01
			Manganese	N/A	N/A	N/A	N/A	CNS	5.1E-02	N/A	4.1E-03	5.5E-02
			Chemical Total	N/A	N/A	N/A	N/A		2.2E-01	N/A	5.7E-03	2.2E-01
		Exposure Point Total					N/A					2.2E-01
	Exposure Medium Total						N/A					2.2E-01
Medium Total							N/A					2.2E-01
Receptor Total							N/A					2.2E-01

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable
NOE = No observed effect

Total NOE HI Across All Media =	5.9E-03
Total Thyroid HI Across All Media=	5.6E-02
Total GI System HI Across All Media =	1.1E-01
Total CNS HI Across All Media =	5.5E-02

1. The non-cancer hazards for chromium (VI), measured are included in the hazard total. The non-cancer hazards for chromium (VI), estimated are not included in the total to avoid double counting for chromium (VI)

APPENDIX E-2

TABLE 9.2.CTE

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient[1]				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	N/A	N/A	N/A	N/A	NOE	1.6E-02	N/A	2.7E-03	1.8E-02
			Chromium (VI), estimated	N/A	N/A	N/A	N/A	NOE	1.2E-02	N/A	2.1E-03	1.4E-02
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	1.9E-01	N/A	1.6E-04	1.9E-01
			Iron	N/A	N/A	N/A	N/A	GI System	3.6E-01	N/A	7.8E-04	3.6E-01
			Manganese	N/A	N/A	N/A	N/A	CNS	1.7E-01	N/A	9.3E-03	1.8E-01
			Chemical Total	N/A	N/A	N/A	N/A		7.3E-01	N/A	1.3E-02	7.4E-01
		Exposure Point Total					N/A					7.4E-01
	Exposure Medium Total						N/A					7.4E-01
Medium Total							N/A					7.4E-01
Receptor Total							N/A					7.4E-01

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable
NOE = No observed effect

Total NOE HI Across All Media =	1.8E-02
Total Thyroid HI Across All Media=	1.9E-01
Total GI System HI Across All Media =	3.6E-01
Total CNS HI Across All Media =	1.8E-01

1. The non-cancer hazards for chromium (VI), measured are included in the hazard total. The non-cancer hazards for chromium (VI), estimated are not included in the total to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 9.3.CTE

SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk[1]				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	2.4E-06	N/A	2.1E-05	2.3E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	1.5E-05	N/A	2.1E-04	2.2E-04	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	1.5E-06	N/A	2.1E-05	2.3E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	1.9E-07	N/A	2.6E-06	2.8E-06	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	1.5E-05	N/A	3.0E-06	1.8E-05	NOE	N/A	N/A	N/A	N/A
			Chromium (VI), estimated	1.2E-05	N/A	2.3E-06	1.4E-05	NOE	N/A	N/A	N/A	N/A
			Cobalt	N/A	N/A	N/A	N/A	Thyroid	N/A	N/A	N/A	N/A
			Iron	N/A	N/A	N/A	N/A	GI System	N/A	N/A	N/A	N/A
			Manganese	N/A	N/A	N/A	N/A	CNS	N/A	N/A	N/A	N/A
			Chemical Total	3.4E-05	N/A	2.6E-04	2.9E-04		N/A	N/A	N/A	N/A
		Exposure Point Total					2.9E-04					N/A
	Exposure Medium Total						2.9E-04					N/A
Medium Total							2.9E-04					N/A
Receptor Total							2.9E-04					N/A

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
N/A = Not available/not applicable
NOE = No observed effect

1. The cancer risks for chromium (VI), measured are included in the risk total. The risks for chromium (VI), estimated are not included in the risk total to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 10.1.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Cobalt					Thyroid	2.7E-01	N/A	5.7E-04	2.7E-01
			Iron					GI System	6.2E-01	N/A	3.3E-03	6.3E-01
			Manganese					CNS	2.6E-01	N/A	3.3E-02	2.9E-01
			Chemical Total	N/A	N/A	N/A	N/A		1.2E+00	N/A	3.7E-02	1.2E+00
		Exposure Point Total					N/A					1.2E+00
	Exposure Medium Total						N/A					1.2E+00
Medium Total							N/A					1.2E+00
Receptor Total							N/A					1.2E+00

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable

Total Thyroid HI Across All Media=	2.7E-01
Total GI System HI Across All Media =	6.3E-01
Total CNS HI Across All Media =	2.9E-01

APPENDIX E-2

TABLE 10.2.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Cobalt	N/A	N/A	N/A	N/A	Thyroid	6.4E-01	N/A	1.7E-03	6.4E-01
			Iron	N/A	N/A	N/A	N/A	GI System	1.5E+00	N/A	9.6E-03	1.5E+00
			Manganese	N/A	N/A	N/A	N/A	CNS	6.0E-01	N/A	9.9E-02	7.0E-01
			Chemical Total	N/A	N/A	N/A	N/A		2.7E+00	N/A	1.1E-01	2.8E+00
		Exposure Point Total					N/A					2.8E+00
	Exposure Medium Total						N/A					2.8E+00
Medium Total							N/A					2.8E+00
Receptor Total							N/A					2.8E+00

Notes:
CNS = Central nervous system
GI System = Gastrointestinal system
HI = Hazard Index
N/A = Not available/not applicable

Total Thyroid HI Across All Media=	6.4E-01
Total GI System HI Across All Media =	**1.5E+00**
Total CNS HI Across All Media =	7.0E-01

APPENDIX E-2

TABLE 10.3.RME

RISK SUMMARY

REASONABLE MAXIMUM EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk[1]				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	4.1E-06	N/A	5.1E-05	5.5E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	2.4E-05	N/A	5.2E-04	5.4E-04	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	2.4E-06	N/A	5.3E-05	5.5E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	3.2E-07	N/A	6.3E-06	6.7E-06	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	2.6E-05	N/A	1.2E-05	3.8E-05	NOE	N/A	N/A	N/A	N/A
			Chromium (VI), estimated	2.6E-05	N/A	1.3E-05	3.9E-05	NOE	N/A	N/A	N/A	N/A
			Chemical Total	5.7E-05	N/A	6.4E-04	7.0E-04		N/A	N/A	N/A	N/A
		Exposure Point Total					7.0E-04					N/A
	Exposure Medium Total						7.0E-04					N/A
Medium Total							7.0E-04					N/A
Receptor Total							7.0E-04					N/A

Notes:
N/A = Not available/not applicable
NOE = No observed effect

1. The cancer risks for chromium (VI), estimated are included in the risk total. The risks for chromium (VI), measured are not included in the risk total to avoid double counting for chromium (VI).

APPENDIX E-2

TABLE 10.1.CTE

RISK SUMMARY

CENTRAL TENDENCY EXPOSURE

Site 15 ESI Report

MCB CamLej, North Carolina

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child/Adult

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk[1]				Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Benzo(a)anthracene	2.4E-06	N/A	2.1E-05	2.3E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(a)pyrene	1.5E-05	N/A	2.1E-04	2.2E-04	N/A	N/A	N/A	N/A	N/A
			Benzo(b)fluoranthene	1.5E-06	N/A	2.1E-05	2.3E-05	N/A	N/A	N/A	N/A	N/A
			Benzo(k)fluoranthene	1.9E-07	N/A	2.6E-06	2.8E-06	N/A	N/A	N/A	N/A	N/A
			Chromium (VI), measured	1.5E-05	N/A	3.0E-06	1.8E-05	NOE	N/A	N/A	N/A	N/A
			Chromium (VI), estimated	1.2E-05	N/A	2.3E-06	1.4E-05	NOE	N/A	N/A	N/A	N/A
			Chemical Total	3.4E-05	N/A	2.6E-04	2.9E-04		N/A	N/A	N/A	N/A
		Exposure Point Total					2.9E-04					N/A
	Exposure Medium Total						2.9E-04					N/A
Medium Total							2.9E-04					N/A
Receptor Total							2.9E-04					N/A

Notes:
N/A = Not available/not applicable
NOE = No observed effect

1. The cancer risks for chromium (VI), measured are included in the risk total. The risks for chromium (VI), estimated are not included in the risk total to avoid double counting for chromium (VI).

Appendix F
Ecological Risk Assessment

Appendix F-1
Checklist

CHECKLIST FOR ECOLOGICAL ASSESSMENTS/SAMPLING

I. SITE LOCATION

1. Site Name: United States Marine Corps Base (MCB), Camp Lejeune
   US EPA ID Number: _____
   Location: IR Site 15
   County: Onslow City: Jacksonville State: NC

2. Latitude: 34°43'38.95" N Longitude: 77°24'52.18" W

3. Attach site maps, including a topographical map, a diagram which illustrates the layout of the facility (e.g., site boundaries, structures, etc.), and maps showing all habitat areas identified in Section III of the checklist. Also, include maps which illustrate known and suspected release areas, sampling locations and any other important features, if available.
   Figure 4-2 is an aerial showing site boundaries, surface soil, subsurface soil, and groundwater sampling locations

II. SITE CHARACTERIZATION

1. Indicate the approximate area of the site (i.e., acres or sq. ft.): The site is approximately 24 acres

2. Is this the first site visit? ☐ Yes ☒ No
   If no, attach trip report of previous site visit(s), if available. No trip report is available.
   Dates(s) of previous site visit(s): CH2M HILL conducted investigations on several dates in 2009.

3. Are aerial or other site photographs available? ☒ Yes ☐ No
   If yes, please attach any available photo(s) to the site map to the report. Figure 4-2 of this report.

4. Provide an approximate breakdown of the land uses on the site:

_____% Heavy Industrial	_____% Light Industrial	_____% Urban
_____% Residential	_____% Rural	_____% Agricultural[b]
_____% Recreational[a]	80 % Undisturbed	20 % Other[c]

[a] For recreational areas, please describe the use of the area (e.g., park, playing field, etc). _____

[b] For agricultural areas, please list the crops and/or livestock which are present. _____

[c] For areas designated as "other," please describe the use of the area. Open field area

5. Provide an approximate breakdown of the land uses in the area surrounding the site. Indicate the radius (in miles) of the area described: 0.5 mile radius

_____% Heavy Industrial	20 % Light Industrial	_____% Urban
_____% Residential	_____% Rural	_____% Agricultural[b]
_____% Recreational[a]	80 % Undisturbed	_____% Other [c]

[a] For recreational areas, please describe the use of the area (e.g., park, playing field, golf course, etc). _____

[b] For agricultural areas, please list the crops and/or livestock which are present. _____

[c] For areas designated as "other," please describe the use of the area. _____

6. Has any movement of soil taken place at the site? ☒ Yes ☐ No

   If yes, indicate the likely source of the disturbance, (e.g., erosion, agricultural, mining, industrial activities, removals, etc.) degree of disturbance, and estimate when these events occurred.

   Several soil mounds/debris piles were removed from the site.

7. Do any sensitive environmental areas exist adjacent to or in proximity to the site, (e.g. Federal and State parks, National and State monuments, wetlands)? *Remember, flood plains and wetlands are not always obvious; do not answer "no" without confirming information. See Table 1 for a list of contacts.*

   No

   Please provide the source(s) of information used to identify these sensitive areas, and indicate their general location on the site map.

   United States Marine Corps (USMC). 2006. Integrated Natural Resource Management Plan (INRMP) 2007-2011, Marine Corps Base Camp Lejeune, Onslow County, North Carolina. November.

8. What type of facility is located at the site?

   ☐ Chemical ☐ Manufacturing ☐ Mixing ☐ Waste Disposal

   ☒ Other (specify)

   The site is predominately undisturbed forested land. A small open field clearing is found along the northern edge of the site.

9. Identify the contaminants of potential concern (COPCs) at the site. If known, include the maximum contaminant levels. Please indicate the source of data cited (e.g., RFI, confirmatory sampling, etc).

   VOCs, SVOCs, pesticides, PCBs, and metals were detected in the surface and subsurface soil. Metals, VOCs, and SVOCs were detected in the groundwater. Please see the ERA for concentration information.

10. Check any potential routes of off-site migration of contaminants observed at the site:

    ☐ Swales ☐ Depressions ☐ Drainage Ditches

    ☐ Runoff ☐ Windblown Particulates ☐ Vehicular Traffic

    ☒ Other (specify): Groundwater

11. Indicate the approximate depth to groundwater (in feet below ground surface [(bgs)].

    Depth to groundwater ranges from approximately 6 to 8 ft bgs.

12. Indicate the direction of groundwater flow (e.g., north, southeast, etc.)

    Water level measurement data suggests that groundwater generally flows southwest.

13. Is the direction of surface runoff apparent from site observations? ☐ Yes ☒ No

    If yes, to which of the following does the surface runoff discharge? Indicate all that apply.

    ☐ Surface water ☐ Groundwater ☐ Sewer ☐ Collection Impoundment

14. Is there a navigable water body or tributary to a navigable water body? ☐ Yes ☒ No

15. Is there a water body anywhere on or in the vicinity of the site? If yes, also complete Section III.B.1: Aquatic Habitat Checklist -- Non-Flowing Systems and/or Section III.B.2: Aquatic Habitat Checklist -- Flowing Systems.
☐ Yes ☒ No

16. Is there evidence of flooding? ☐ Yes ☒ No
Wetlands and flood plains are not always obvious. Do not answer "no" without confirming information. If yes, complete Section III.C: Wetland Habitat Checklist.

17. If a field guide was used to aid any of the identifications, please provide a reference. Also, estimate the time spent identifying fauna. (Use a blank sheet if additional space is needed for text.)

18. Are any threatened and/or endangered species (plant or animal) known to inhabit the area of the site? ☐ Yes ☒ No
If yes, you are required to verify this information with the U.S. Fish and Wildlife Service or other appropriate agencies (see Table 1 for a list of contacts). If species' identities are known, please list them next.

19. Record weather conditions at the site at the time of the site visit when information for completion of this checklist was prepared:

DATE: June 2009

Temperature (°C/°F): 80°F

Wind (direction/speed): _____

Cloud Cover: Mostly Sunny

Normal daily high temperature (°C/°F): _____

Precipitation (rain, snow): None

20. Describe reasonable and likely future land and/or water use(s) at the site.
MCB Camp Lejeune is planning a military construction (MILCON) project in the vicinity of the site.

21. Describe the historical uses of the site. Include information on chemical releases that may have occurred as a result of previous land uses. For each chemical release, provide information on the form of the chemical released (i.e., solid, liquid, vapor) and the known or suspected causes or mechanism of the release (i.e., spills, leaks, material disposal, dumping, explosion, etc.).
IR Site 15, also known as SWMU 46, is the former Montford Point Burn Dump. The site operated between 1946 and 1958 and was reportedly used to dispose sewage treatment sludge, litter, asphalt, and sand (CH2M HILL/Baker, 2005). CH2M HILL/Baker. 2005. Final SWMU 46 RCRA Facility Investigation Report, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina. August.

22. Identify the media (e.g., soil [surface or subsurface], surface water, air, groundwater) which are known or suspected to contain COCs.
Surface soil, subsurface soil, and groundwater are suspected to contain COPCs.

II.A. SUMMARY OF OBSERVATIONS AND SITE SETTING

Include information on significant source areas and migration pathways that are likely to constitute complete exposure pathways.

Soil and groundwater exposure pathways may be complete. Receptors could be exposed to contaminants in soil via direct contact, ingestion, or food chain transfer. While exposure to groundwater is unlikely, groundwater may discharge to nearby surface water bodies resulting in exposure to aquatic organisms.

Checklist Completed by: Sara Kent

Affiliation: CH2M HILL

Author Assisted by:

Date: 5/7/2010

III. HABITAT EVALUATION

III.A Terrestrial Habitat Checklist

III.A.1 Wooded

Are any wooded areas on or adjacent to the site? ☒ Yes ☐ No

If yes, indicate the wooded area on the attached site map and answer the following questions. If more than one wooded area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual wooded area. Distinguish between wooded areas by using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.A.2: Shrub/Scrub

Wooded Area Questions

☒ On-site ☐ Off-site

Name or Designation: Unknown

1. Estimate the approximate size of the wooded area. Please identify what information was used to determine the wooded area of the site (e.g., direct observation, photos, etc).
   Approximately 15 acres based on Figure 4-2 and field observations

2. Indicate the dominant type of vegetation in the wooded area. Provide photographs, if available.

   ☐ Evergreen
   ☐ Deciduous
   ☒ Mixed
   Dominant plant species, if known: Unknown

3. Estimate the vegetation density of the wooded area.
   ☐ Dense (i.e., greater than 75% vegetation)
   ☒ Moderate (i.e., 25% to 75% vegetation)
   ☐ Sparse (i.e., less than 25% vegetation)

4. Indicate the predominant size of the trees at the site. Use diameter at breast height.
   ☐ 0-6 inches
   ☐ 6-12 inches
   ☐ >12 inches
   ☒ No single size range is predominant

5. Specify type of understory present, if known. Provide a photograph, if available. Unknown

III.A.2 Shrub/Scrub

Are any shrub/scrub areas on or adjacent to the site? ☐ Yes ☒ No

If yes, indicate the shrub/scrub area on the attached site map and answer the following questions. If more than one shrub/scrub area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual shrub/scrub area. Distinguish between shrub/scrub areas, using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.A.3: Open Field

III.A.3 Open Field

Are any open field areas on or adjacent to the site? X Yes ☐ No

If yes, indicate the open field area on the attached site map and answer the following questions. If more than one open field area is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual open field area. Distinguish between open field areas, using names or other designations, and clearly identify each area on the site map.

If no, proceed to Section III.A.4: Miscellaneous

Open Field Area Questions

☒ On-site ☐ Off-site

Name or Designation: Unknown

1. Estimate the approximate size of the open field area (%) Please identify what information was used to determine the open field area of the site.
   10 acres based on field observations and Figure 4-2.

2. Indicate the dominant type of vegetation present, if known.
   Unknown

3. Estimate the vegetation density of the open field area.
   ☐ Dense (i.e., greater than 75% vegetation)
   ☐ Moderate (i.e., 25% to 75% vegetation)
   ☒ Sparse (i.e., less than 25% vegetation)

4. Indicate the approximate average height of the dominant plant:
   2-3 inches

III.A.4 Miscellaneous

Are other types of terrestrial habitats present at the site, other than woods, scrub/shrub and open field? ☐ Yes ☒ No

If yes, indicate the area on the attached site map and answer the following questions. If more than one of these areas are present on or adjacent to the site, make additional copies of the following questions and fill out for each individual area. Distinguish between areas by using names or other designations. Clearly identify each area on the site map.

If no, proceed to Section III.B: Aquatic Habitats.

III.B Aquatic Habitats

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section III.C, Wetland Habitat Checklist.

III.B.1 Non-Flowing Systems

Are any non-flowing aquatic features (such as ponds or lakes) located at or adjacent to the site? ☐ Yes ☒ No

If yes, indicate the aquatic feature on the attached site map and answer the following questions regarding the non-flowing aquatic features. If more than one non-flowing aquatic feature is present on or adjacent to the site, make additional copies of the following questions and fill out for each individual aquatic feature. Distinguish between aquatic features by using names or other designations. Clearly identify each area on the site map.

If no, proceed to Section III.B.2: Flowing Systems

III.B.2 Flowing Systems

Note: Aquatic systems are often associated with wetland habitats. Please refer to Section III.C, Wetland Habitat Checklist.

Are any flowing aquatic features (such as streams or rivers) located at or adjacent to the site? ☐ Yes ☒ No

If yes, indicate the system on the attached site map and answer the following questions regarding the flowing system. If more than one flowing system is present on or adjacent to the site, make additional copies of the following questions and complete one set for each individual aquatic feature. Distinguish between flowing systems by using names or other designation. Clearly identify each area on the site map

If no, proceed to Section III.C: Wetlands Habitats.

III.C Wetland Habitats

Are any wetland[1] areas such as marshes or swamps on or adjacent to the site? ☐ Yes ☒ No

If yes, indicate the wetland area on the attached site map and answer the following questions regarding the wetland area. If more than one wetland area is present on or adjacent to the site, make additional copies of the following questions and fill out one for each individual wetland area. Distinguish between wetland areas by using names or other designations (such as location). Clearly identify each area on the site map. Also, obtain and attach a National Wetlands Inventory Map (or maps) to illustrate each wetland area.

Identify the sources of the observations and information (e.g., National Wetland Inventory, Federal or State Agency, USGS topographic maps) used to make the determination whether or not wetland areas are present.

MCB Camp Lejeune GIS Layer for Wetlands (NWI)

If no wetland areas are present, proceed to Section III.D: Sensitive Environments and Receptors.

[1] Wetlands are defined in 40 CFR §232.2 as " Areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Examples of typical wetlands plants include: cattails, cordgrass, willows and cypress trees. National wetland inventory maps may be available at http:\\nwi.fws.gov. Additional information on wetland delineation criteria is also available from the Army Corps of Engineers.

III.D Sensitive Environments and Receptors

1. Do any other potentially sensitive environmental areas[2] exist adjacent to or within one-half mile of the site? If yes, list these areas and provide the source(s) of information used to identify sensitive areas. *Do not answer "no" without confirmation from the U.S. Fish and Wildlife Service and other appropriate agencies. See Table 1 for a list of contacts.*

   No

2. Are any areas on or near (i.e., within one-half mile) the site owned or used by local tribes? If yes, describe.

   No

3. Does the site serve or potentially serve as a habitat, foraging area or refuge by rare, threatened, endangered, candidate and/or proposed species (plants or animals), or any otherwise protected species? If yes, identify species. *This information should be obtained from the U.S. Fish and Wildlife Service and other appropriate agencies. See Table 1 for a list of contacts.*

   No

4. Is the site potentially used as a breeding, roosting or feeding area by migratory bird species? If yes, identify which species.

   Unknown

5. Is the site used by any ecologically[3], recreationally or commercially important species? If yes, explain.

   No

[3] Areas that provide unique and often protected habitat for wildlife species. These areas are typically used during critical life stages such as breeding, hatching, rearing of young and overwintering. Refer to Table 2 at the end of this document for examples of sensitive environments.

[3] Ecologically important species include populations of species which provide a critical (i.e., not replaceable) food resource for higher organisms. These species' functions would not be replaced by more tolerant species or perform a critical ecological function (such as organic matter decomposition) and will not be replaced by other species. Ecologically important species include pest and opportunistic species that populate an area if they serve as a food source for other species, but do not include domesticated animals (e.g., pets and livestock) or plants/animals whose existence is maintained by continuous human interventions (e.g., fish hatcheries, agricultural crops, etc).

IV. EXPOSURE PATHWAY EVALUATION

1. Do existing data provide sufficient information on the nature, rate and extent of contamination at the site?

   ☒ Yes
   ☐ No
   ☐ Uncertain

   Please provide an explanation for your answer.

   Data were collected from each medium across the site, providing representative samples for the area of concern.

2. Do existing data provide sufficient information on the nature, rate and extent of contamination in offsite affected areas?

   ☒ Yes
   ☐ No
   ☐ Uncertain
   ☐ No offsite contamination

   Please provide an explanation for your answer.

   See #1 of this section.

3. Do existing data address potential migration pathways of contaminants at the site?

   ☒ Yes
   ☐ No
   ☐ Uncertain

   Please provide an explanation for your answer.

   Data were collected based on potential migration pathways (i.e. overland flow, leaching, and groundwater transport).

4. Do existing data address potential migration pathways of contaminants in offsite affected areas?

   ☐ Yes
   ☐ No
   ☐ Uncertain
   ☒ No offsite contamination

   Please provide an explanation for your answer.

   The majority of contaminants are located in subsurface soils and are unlikely to be transported offsite. While leaching into groundwater could occur, concentrations of COPCs in groundwater are not expected to be high enough to cause any discernable impact in the surrounding streams or New River.

5. Are there visible indications of stressed habitats or receptors on or near (i.e., within one-half mile) the site that may be the result of a chemical release? If yes, explain. Attach photographs if available.

   No

6. Is the location of the contamination such that receptors might be reasonably expected to come into contact with it? For soil, this means contamination in the soil 0 to 1 foot below ground surface (bgs). If yes, explain.

   VOCs, SVOCs, pesticides, PCBs, and metals in soils were detected in areas where receptors may be exposed. However, the majority of contamination is in subusurface soils so receptors that burrow or eat plants and/or earthworms that likely have contact to subsurface soils would receive the most exposure.

7. Are receptors located in or using habitats where chemicals exist in air, soil, sediment or surface water? If yes, explain.

   Unknown. None were observed during the site visits.

8. Could chemicals reach receptors via groundwater? Can chemicals leach or dissolve to groundwater? Are chemicals mobile in groundwater? Does groundwater discharge into receptor habitats? If yes, explain.

Water level measurement data suggests that shallow groundwater within the vicinity of the site generally flows southwest. The New River is located approximately 0.3 miles southwest of the site. Should the low level concentrations in groundwater migrate toward the river, concentrations will likely dilute and attenuate to the extent that aquatic receptors would not be at risk.

9. Could chemicals reach receptors through runoff or erosion? Answer the following questions.

No

What is the approximate distance from the contaminated area to the nearest watercourse?

☐ 0 feet (i.e., contamination has reached a watercourse)
☐ 1-10 feet
☐ 11-20 feet
☐ 21-50 feet
☐ 51-100 feet
☐ 101-200 feet
☐ > 200 feet
☐ > 500 feet
☒ > 1000 feet

What is the slope of the ground in the contaminated area?

☒ 0-10%
☐ 10-30%
☐ > 30%

What is the approximate amount of ground and canopy vegetative cover in the contaminated area?

☐ < 25%
☒ 25-75%
☐ > 75%

Is there visible evidence of erosion (e.g., a rill or gully) in or near the contaminated area?

☐ Yes
☒ No
☐ Do not know

Do any structures, pavement or natural drainage features direct run-on flow (i.e., surface flows originating upstream or uphill from the area of concern) into the contaminated area?

☐ Yes
☐ No
☒ Do not know

Could chemicals reach receptors through the dispersion of contaminants in air (e.g., volatilization, vapors, fugitive dust)? If yes, explain.

Yes, contaminants were detected in the surface soil. When the proposed MILCON construction commences, dust may be a concern.

Could chemicals reach receptors through migration of non-aqueous phase liquids (NAPLs)? Is a NAPL present at the site that might be migrating towards receptors or habitats? Could NAPL discharge contact receptors or their habitat?

No

Appendix F-2
Tables

APPENDIX F-2

TABLE 1

Threatened and Endangered Species List for Onslow County, North Carolina

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Scientific Name	Common Name	Federal Status
Vertebrates		
Chelonia mydas	Green sea turtle	T
Caretta caretta	Loggerhead sea turtle	T
Dermochelys coriacea	Leatherback sea turtle	E
Trichechus manatus	West Indian manatee	E
Charadrius melodus	Piping plover	T
Haliaetus leucocephalus	Bald eagle	T
Puma concolor couguar	Eastern cougar	E
Picoides borealis	Red-cockaded woodpecker	E
Vascular Plants		
Thalictrum cooleyi	Cooley's meadowrue	E
Carex lutea	Golden sedge	E
Lindera melissifolia	Pondberry	E
Lysimachia asperulaefolia	Rough-leaved loosestrife	E
Amaranthus pumilus	Seabeach amaranth	T

Notes:

E - Endangered - A taxon in danger of extinction throughout all or a significant portion of its range.
T - Threatened - A taxon likely to become endangered within the foreseeable future throughout all or a significant portion of its range
T(S/A) - Threatened due to similarity of appearance: a species that is threatened due to similarity of appearance with other rare species and is listed for its protection. These species are not biologically endangered or threatened.

APPENDIX F-2

TABLE 2

Sample Locations Used in the Ecological Risk Assessment (ERA) for Site 15

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Sample ID	Sample Depth (ft bgs)	Date
Surface Soils		
SWMU46-IS01-00	0-2	1997
SWMU46-IS02-00	0-2	1997
SWMU46-IS03-00	0-2	1997
SWMU46-IS04-00	0-2	1997
SWMU46-TW02-00	0-1	2002
SWMU46-TW03-00	0-1	2002
SWMU46-TW05-00	0-1	2002
SWMU46-SB02-00	0-1	2004
SWMU46-SB03-00	0-1	2004
SWMU46-SB03-00-D	0-2	2005
SWMU46-SB04-00	0-1	2004
SWMU46-SB05-00	0-1	2004
SWMU46-SM01-0-1	0-1	2006
SWMU46-SM02-0-1	0-1	2006
SWMU46-SM03-0-1	0-1	2006
SWMU46-SM05-0-1	0-1	2006
SWMU46-SM08-0-1	0-1	2006
SWMU46-SM08D-0-1	0-1	2006
IR15-SS01-00-01-09C	0-1	2009
IR15-SS02-00-01-09C	0-1	2009
IR15-SS03-00-01-09C	0-1	2009
IR15-SS03D-00-01-09C	0-1	2009
IR15-SS04-00-01-09C	0-1	2009
IR15-SS05-00-01-09C	0-1	2009
IR15-SS06-00-01-09C	0-1	2009
IR15-SS07-00-01-09C	0-1	2009
IR15-SS08-00-01-09C	0-1	2009
IR15-SS09-00-01-09C	0-1	2009
IR15-SS10-00-01-09C	0-1	2009
IR15-SS11-10D	0-1	2010
IR15-SS12-10D	0-1	2010
IR15-SS13-10D	0-1	2010
IR15-SS20-10D	0-1	2010
IR15-SS20D-10D	0-1	2010
IR15-SS21-10D	0-1	2010
Subsurface Soils		
SWMU46-SB03-02	3-5	2004
SWMU46-SB04-02	3-5	2004
SWMU46-TT01-01	1 - 3	2004
SWMU46-TT02-01	1 - 3	2004
SWMU46-TT02-02	3 - 5	2004
SWMU46-TT03-01	1 - 3	2004
SWMU46-TT03-02	3 - 5	2004
SWMU46-TT04-01	1 - 3	2004
SWMU46-TT04-02	3 - 5	2004
SWMU46-TT05-01	1 - 3	2004
SWMU46-TT05-02	3 - 5	2004
SWMU46-TT06-01	1 - 3	2004
SWMU46-TT06-02	3 - 5	2004
SWMU46-TT07-01	1 - 3	2004
SWMU46-TT07-01 D	1 - 3	2004
SWMU46-TT07-02	3 - 5	2004

APPENDIX F-2

TABLE 2

Sample Locations Used in the Ecological Risk Assessment (ERA) for Site 15

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Sample ID	Sample Depth (ft bgs)	Date
SWMU46-TT08-01	1 - 3	2004
SWMU46-TT08-02	3 - 5	2004
IR15-SB01-4-6-09C	4-6	2009
IR15-SB02-2-7-09C	2-7	2009
IR15-SB02D-2-7-09C	2-7	2009
IR15-SB03-2-7-09C	2-7	2009
IR15-SB04-2-7-09C	2-7	2009
IR15-SB05-2-7-09C	2-7	2009
IR15-SB06-2-7-09C	2-7	2009
IR15-SB07-2-4-09C	2-4	2009
IR15-SB08-2-4-09C	2-4	2009
IR15-SB09-2-7-09C	2-7	2009
IR15-SB10-2-4-09C	2-4	2009
IR15-SB11-1-5-10D	1-5	2010
IR15-SB12-1-5-10D	1-5	2010
IR15-SB13-1-5-10D	1-5	2010
IR15-SB14-1-3-10D	1-3	2010
IR15-SB15-1-3-10D	1-3	2010
IR15-SB16-1-4-10D	1-4	2010
IR15-SB17-1-4-10D	1-4	2010
IR15-SB18-1-4-10D	1-4	2010
IR15-SB19-1-5-10D	1-5	2010
IR15-SB20-1-5-10D	1-5	2010
Subsurface Soils (cont.)		
IR15-SB20D-1-5-10D	1-5	2010
IR15-SB21-1-4-10D	1-4	2010
Groundwater		
SWMU46-TW01	NA	2002
SWMU46-TW02	NA	2002
SWMU46-TW03	NA	2002
SWMU46-TW04	NA	2002
SWMU46-TW05	NA	2002
SWMU46-MW01	NA	2004
IR15-TW01-09C	NA	2009
IR15-TW02-09C	NA	2009
IR15-TW03-09C	NA	2009
IR15-TW03D-09C	NA	2009
IR15-TW04-09C	NA	2009
IR15-GW01-10D	NA	2010
IR15-GW02-10D	NA	2010
IR15-GW02D-10D	NA	2010
IR15-GW03-10D	NA	2010
IR15-GW04-11B	NA	2011
IR15-GW04D-11B	NA	2011
IR15-GW05-11B	NA	2011
IR15-GW06-11B	NA	2011

NOTES

bgs - below ground surface

ft bgs - feet below ground surface

NA - not applicable

APPENDIX F-2

TABLE 3

Site 15 Surface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Volatile Organic Compounds (µg/kg)											
1,1,1-Trichloroethane	0.22 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
1,1,2,2-Tetrachloroethane	0.28 - 55.0	0 / 14	--	--	100	-- / --	0.55	--	--	No	HQ less than one, not detected
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon	0.22 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,1,2-Trichloroethane	0.56 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
1,1-Dichloroethane	0.22 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
1,1-Dichloroethene	0.28 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
1,2,4-Trichlorobenzene	0.56 - 28.0	0 / 14	--	--	10.0	-- / --	2.80	--	--	Yes	(2) Not detected, HQ above one
1,2-Dibromo-3-chloropropane	0.56 - 55.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2-Dibromoethane	0.56 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2-Dichlorobenzene	0.56 - 28.0	0 / 14	--	--	10.0	-- / --	2.80	--	--	Yes	(2) Not detected, HQ above one
1,2-Dichloroethane	0.22 - 28.0	0 / 14	--	--	400	-- / --	0.070	--	--	No	HQ less than one, not detected
1,2-Dichloropropane	0.28 - 28.0	0 / 14	--	--	700,000	-- / --	4.00E-05	--	--	No	HQ less than one, not detected
1,3-Dichlorobenzene	0.56 - 28.0	0 / 14	--	--	10.0	-- / --	2.80	--	--	Yes	(2) Not detected, HQ above one
1,4-Dichlorobenzene	4.20 - 28.0	1 / 14	0.34	IR15-SS21-0-0_5-10D	10.0	0 / 14	0.034	--	--	No	HQ less than one, detected
2-Butanone	8.50 - 12.0	9 / 14	40.0	IR15-SS08-00-01-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
2-Hexanone	0.56 - 55.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Methyl-2-pentanone	0.28 - 55.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Acetone	11.0 - 11.0	14 / 15	1,700	IR15-SS08-00-01-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzene	4.20 - 9.10	2 / 14	0.74	IR15-SS21-0-0_5-10D	50.0	0 / 14	0.015	--	--	No	HQ less than one, detected
Bromodichloromethane	0.22 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Bromoform	0.22 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Bromomethane	0.56 - 28.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Carbon disulfide	4.20 - 9.10	2 / 14	0.58	IR15-SS21-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Carbon tetrachloride	0.28 - 28.0	0 / 14	--	--	1,000,000	-- / --	2.80E-05	--	--	No	HQ less than one, not detected
Chlorobenzene	0.28 - 28.0	0 / 14	--	--	50.0	-- / --	0.56	--	--	No	HQ less than one, not detected
Chloroethane	0.28 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
Chloroform	0.11 - 28.0	1 / 14	5.20	IR15-SS01-00-01-09C	1.00	1 / 14	5.20	--	--	Yes	(1) HQ above one, detected
Chloromethane	0.56 - 55.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
cis-1,2-Dichloroethene	0.28 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
cis-1,3-Dichloropropene	0.22 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Cyclohexane	0.11 - 55.0	0 / 14	--	--	100	-- / --	0.55	--	--	No	HQ less than one, not detected
Dibromochloromethane	0.56 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dichlorodifluoromethane (Freon-12)	0.56 - 55.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Ethylbenzene	0.28 - 28.0	0 / 14	--	--	50.0	-- / --	0.56	--	--	No	HQ less than one, not detected
Isopropylbenzene	0.28 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Methyl acetate	1.10 - 55.0	5 / 15	2,100	IR15-SS08-00-01-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Methylcyclohexane	0.22 - 9.10	1 / 14	0.31	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Methylene chloride	2.80 - 55.0	0 / 14	--	--	2,000	-- / --	0.028	--	--	No	HQ less than one, not detected
Methyl-tert-butyl ether (MTBE)	0.22 - 55.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Styrene	0.22 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
Tetrachloroethene	0.22 - 28.0	0 / 14	--	--	10.0	-- / --	2.80	--	--	Yes	(2) Not detected, HQ above one
Toluene	4.20 - 28.0	2 / 14	10.0	IR15-SS08-00-01-09C	50.0	0 / 14	0.20	--	--	No	HQ less than one,detected
trans-1,2-Dichloroethene	0.22 - 28.0	0 / 14	--	--	100	-- / --	0.28	--	--	No	HQ less than one, not detected
trans-1,3-Dichloropropene	0.22 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Trichloroethene	0.56 - 55.0	0 / 14	--	--	1.00	-- / --	55.0	--	--	Yes	(2) Not detected, HQ above one
Trichlorofluoromethane (Freon-11)	0.11 - 28.0	0 / 14	--	--	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value

APPENDIX F-2

TABLE 3

Site 15 Surface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Vinyl chloride	0.56 - 28.0	0 / 14	--	--	10.0	-- / --	2.80	--	--	Yes	(2) Not detected, HQ above one
Xylene, total	1.10 - 83.0	0 / 14	--	--	50.0	-- / --	1.66	--	--	Yes	(2) Not detected, HQ above one
Semivolatile Organic Compounds (µg/kg)											
1,1-Biphenyl	3.70 - 400	0 / 17	--	--	60,000	-- / --	0.0067	--	--	No	HQ less than one, not detected
2,2'-Oxybis(1-chloropropane)	170 - 400	0 / 15	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4,5-Trichlorophenol	3.70 - 400	0 / 17	--	--	4,000	-- / --	0.10	--	--	No	HQ less than one, not detected
2,4,6-Trichlorophenol	18.0 - 19.0	0 / 2	--	--	10,000	-- / --	0.0019	--	--	No	HQ less than one, not detected
2,4-Dichlorophenol	9.20 - 400	0 / 17	--	--	3.00	-- / --	133	--	--	Yes	(2) Not detected, HQ above one
2,4-Dimethylphenol	170 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4-Dinitrophenol	170 - 400	0 / 17	--	--	20,000	-- / --	0.020	--	--	No	HQ less than one, not detected
2,4-Dinitrotoluene	18.0 - 1,000	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,6-Dinitrotoluene	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Chloronaphthalene	3.70 - 400	0 / 17	--	--	1,000	-- / --	0.40	--	--	No	HQ less than one, not detected
2-Chlorophenol	3.70 - 400	0 / 17	--	--	10.0	-- / --	40.0	--	--	Yes	(2) Not detected, HQ above one
2-Methylnaphthalene	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Methylphenol	3.70 - 400	0 / 17	--	--	500	-- / --	0.80	--	--	No	HQ less than one, not detected
2-Nitroaniline	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Nitrophenol	9.20 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3- and 4-Methylphenol	360 - 400	0 / 5	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3,3'-Dichlorobenzidine	37.0 - 800	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3-Nitroaniline	18.0 - 1,000	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4,6-Dinitro-2-methylphenol	18.0 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Bromophenyl-phenylether	3.70 - 1,000	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chloro-3-methylphenol	9.20 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chloroaniline	37.0 - 400	0 / 17	--	--	20,000	-- / --	0.020	--	--	No	HQ less than one, not detected
4-Chlorophenyl-phenylether	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Methylphenol	9.20 - 400	0 / 17	--	--	500	-- / --	0.80	--	--	No	HQ less than one, not detected
4-Nitroaniline	18.0 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Nitrophenol	170 - 1,000	0 / 17	--	--	7,000	-- / --	0.14	--	--	No	HQ less than one, not detected
Acenaphthene	3.70 - 400	0 / 17	--	--	20,000	-- / --	0.020	--	--	No	HQ less than one, not detected
Acenaphthylene	3.70 - 400	1 / 17	3.70	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Acetophenone	170 - 400	2 / 17	1.90	IR15-SS21-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Anthracene	3.70 - 400	1 / 17	6.70	IR15-SS20-0-0_5-10D	100	0 / 17	0.07	--	--	No	HQ less than one, detected
Atrazine	3.70 - 400	0 / 17	--	--	0.050	-- / --	8,000	--	--	Yes	(2) Not detected, HQ above one
Benzaldehyde	170 - 1,000	2 / 17	3.80	IR15-SS21-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(a)anthracene	19.0 - 400	1 / 17	32.0	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(a)pyrene	9.90 - 400	1 / 17	160	IR15-SS20-0-0_5-10D	100	1 / 17	1.60	--	--	Yes	(1) HQ above one, detected
Benzo(b)fluoranthene	35.0 - 400	2 / 17	290	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(g,h,i)perylene	9.50 - 400	2 / 17	330	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(k)fluoranthene	5.70 - 400	1 / 17	100	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
bis(2-Chloroethoxy)methane	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Chloroethyl)ether	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Chloroisopropyl)ether	3.70 - 3.70	0 / 2	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Ethylhexyl)phthalate	24.0 - 400	4 / 21	180	IR15-SS01-00-01-09C	100	2 / 21	1.8	--	--	Yes	(1) HQ above one, detected
Butylbenzylphthalate	18.0 - 400	1 / 17	190	IR15-SS01-00-01-09C	100	1 / 17	1.90	--	--	Yes	(1) HQ above one, detected
Caprolactam	18.0 - 1,000	0 / 16	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Carbazole	24.0 - 380	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value

APPENDIX F-2

TABLE 3

Site 15 Surface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Chrysene	19.0 - 380	3 / 17	80.0	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Dibenz(a,h)anthracene	35.0 - 400	3 / 17	64.0	IR15-SS03-00-01-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Dibenzofuran	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Diethylphthalate	9.20 - 400	0 / 17	--	--	100,000	-- / --	0.0040	--	--	No	HQ less than one, not detected
Dimethyl phthalate	3.70 - 400	0 / 17	--	--	200,000	-- / --	0.0020	--	--	No	HQ less than one, not detected
Di-n-butylphthalate	9.20 - 370	6 / 17	150	IR15-SS10-00-01-09C	200,000	0 / 17	7.50E-04	--	--	No	HQ less than one, detected
Di-n-octylphthalate	170 - 400	2 / 17	16.0	IR15-SS20-0-0_5-10D	100	0 / 17	0.16	--	--	No	HQ less than one, detected
Fluoranthene	3.70 - 380	0 / 17	--	--	100	-- / --	3.80	--	--	Yes	(2) Not detected, HQ above one
Fluorene	3.70 - 400	0 / 17	--	--	30,000	-- / --	0.013	--	--	No	HQ less than one, not detected
Hexachlorobenzene	3.70 - 400	0 / 17	--	--	2.50	-- / --	160	--	--	Yes	(2) Not detected, HQ above one
Hexachlorobutadiene	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Hexachlorocyclopentadiene	3.70 - 1,000	0 / 17	--	--	10,000	-- / --	0.10	--	--	No	HQ less than one, not detected
Hexachloroethane	3.70 - 400	0 / 17	--	--	100	-- / --	4.00	--	--	Yes	(2) Not detected, HQ above one
Indeno(1,2,3-cd)pyrene	7.60 - 400	2 / 17	240	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Isophorone	18.0 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Naphthalene	1.80 - 400	0 / 17	--	--	100	-- / --	4.00	--	--	Yes	(2) Not detected, HQ above one
n-Nitroso-di-n-propylamine	3.70 - 400	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
n-Nitrosodiphenylamine	3.70 - 400	0 / 17	--	--	20,000	-- / --	0.020	--	--	No	HQ less than one, not detected
Nitrobenzene	3.70 - 400	0 / 17	--	--	40,000	-- / --	0.010	--	--	No	HQ less than one, not detected
Pentachlorophenol	18.0 - 1,000	0 / 17	--	--	2,100	-- / --	0.48	--	--	No	HQ less than one, not detected
Phenanthrene	3.70 - 400	0 / 17	--	--	100	-- / --	4.00	--	--	Yes	(2) Not detected, HQ above one
Phenol	3.60 - 400	0 / 17	--	--	50.0	-- / --	8.00	--	--	Yes	(2) Not detected, HQ above one
Pyrene	19.0 - 380	1 / 17	27.0	IR15-SS20-0-0_5-10D	100	0 / 17	0.270	--	--	No	HQ less than one, detected
Pesticide/Polychlorinated Biphenyls (µg/kg)											
4,4'-DDD	0.15 - 2.10	5 / 20	7.50	IR15-SS01-00-01-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
4,4'-DDE	0.18 - 2.00	14 / 20	25.0	IR15-SS01-00-01-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
4,4'-DDT	1.80 - 2.00	14 / 20	39.0	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Aldrin	0.15 - 2.10	0 / 17	--	--	2.50	-- / --	0.84	--	--	No	HQ less than one, not detected
alpha-BHC	0.15 - 2.10	0 / 17	--	--	2.50	-- / --	0.84	--	--	No	HQ less than one, not detected
alpha-Chlordane	0.15 - 2.10	3 / 17	7.40	IR15-SS01-00-01-09C	100	0 / 17	0.074	--	--	No	HQ less than one, detected
Aroclor-1016	14.0 - 21.0	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1221	14.0 - 21.0	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1232	14.0 - 21.0	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1242	14.0 - 21.0	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1248	7.40 - 21.0	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1254	14.0 - 21.0	4 / 20	360	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Aroclor-1260	14.0 - 21.0	0 / 17	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
beta-BHC	1.50 - 2.10	0 / 17	--	--	1.00	-- / --	2.10	--	--	Yes	(2) Not detected, HQ above one
delta-BHC	0.15 - 2.10	0 / 17	--	--	100	-- / --	0.021	--	--	No	HQ less than one, not detected
Dieldrin	0.15 - 2.10	2 / 17	1.70	IR15-SS09-00-01-09C	4.90	0 / 17	0.35	--	--	No	HQ less than one, detected
Endosulfan I	0.15 - 2.10	0 / 17	--	--	100	-- / --	0.021	--	--	No	HQ less than one, not detected
Endosulfan II	0.15 - 2.10	2 / 17	1.20	SWMU46-SM08-0-1	100	0 / 17	0.012	--	--	No	HQ less than one, detected
Endosulfan sulfate	0.15 - 2.10	4 / 17	38.0	SWMU46-SM03-0-1	100	0 / 17	0.38	--	--	No	HQ less than one, detected
Endrin	0.15 - 2.10	2 / 17	1.70	SWMU46-SM01-0-1	1.00	1 / 17	1.70	--	--	Yes	(1) HQ above one, detected
Endrin aldehyde	1.40 - 2.10	0 / 17	--	--	100	-- / --	0.021	--	--	No	HQ less than one, not detected
Endrin ketone	1.40 - 2.10	4 / 17	18.0	SWMU46-SM05-0-1	100	0 / 17	0.18	--	--	No	HQ less than one, detected
gamma-BHC (Lindane)	0.15 - 2.10	0 / 17	--	--	0.050	-- / --	42.0	--	--	Yes	(2) Not detected, HQ above one

APPENDIX F-2

TABLE 3

Site 15 Surface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
gamma-Chlordane	0.15 - 2.10	3 / 17	8.60	IR15-SS01-00-01-09C	100	0 / 17	0.086	--	--	No	HQ less than one, detected
Heptachlor	0.15 - 2.10	0 / 17	--	--	100	-- / --	0.021	--	--	No	HQ less than one, not detected
Heptachlor epoxide	0.14 - 2.10	0 / 17	--	--	100	-- / --	0.021	--	--	No	HQ less than one, not detected
Methoxychlor	0.33 - 7.80	1 / 17	4.60	SWMU46-SM01-0-1	100	0 / 17	0.046	--	--	No	HQ less than one, detected
Toxaphene	35.0 - 100	0 / 17	--	--	100	-- / --	1.00	--	--	Yes	(2) Not detected, HQ above one
Dioxin/Furans (pg/g)											
1,2,3,4,6,7,8-Heptachlorodibenzofuran	17.0 - 95.0	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	38.0 - 110	1 / 3	140	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.83 - 0.83	2 / 3	3.70	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
1,2,3,4,7,8-Hexachlorodibenzofuran	6.90 - 6.90	2 / 3	10.0	IR15-SS12-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.00 - 4.80	1 / 3	1.20	IR15-SS21-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
1,2,3,6,7,8-Hexachlorodibenzofuran	1.40 - 8.70	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	4.90 - 4.90	2 / 3	6.80	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
1,2,3,7,8,9-Hexachlorodibenzofuran	0.19 - 0.84	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	1.40 - 3.70	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2,3,7,8-Pentachlorodibenzofuran	0.30 - 1.00	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.46 - 0.96	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,3,4,6,7,8-Hexachlorodibenzofuran	0.61 - 0.61	2 / 3	2.10	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
2,3,4,7,8-Pentachlorodibenzofuran	0.51 - 3.50	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,3,7,8-TCDD (dioxin)	0.15 - 0.33	0 / 3	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,3,7,8-Tetrachlorodibenzofuran	2.00 - 2.00	2 / 3	3.00	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Octachlorodibenzofuran	-- - --	3 / 3	96.0	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Octachlorodibenzo-p-dioxin	-- - --	3 / 3	2,300	IR15-SS12-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total heptachlorodibenzofuran	-- - --	3 / 3	130	IR15-SS12-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total heptachlorodibenzo-p-dioxin	-- - --	3 / 3	260	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total hexachlorodibenzofuran	-- - --	3 / 3	120	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total hexachlorodibenzo-p-dioxin	-- - --	3 / 3	58.0	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total pentachlorodibenzofuran	-- - --	3 / 3	99.0	IR15-SS12-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total pentachlorodibenzo-p-dioxin	4.40 - 8.90	1 / 3	1.40	IR15-SS12-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total tetrachlorodibenzofuran	-- - --	3 / 3	15.0	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Total tetrachlorodibenzo-p-dioxin	5.00 - 5.00	2 / 3	3.80	IR15-SS12-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
2,3,7,8-TCDD Toxic Equivalency (TEQ) [4]	-- - --	3 / 3	3.08	IR15-SS11-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Inorganics (mg/kg)											
Aluminum	-- - --	12 / 12	12,500	IR15-SS03-00-01-09C	50.0	12 / 12	250	5487	Yes	No	Within background range
Antimony	1.50 - 1.60	6 / 12	0.64	IR15-SS01-00-01-09C	0.27	6 / 12	2.37	0.45	Yes	No	Within background range
Arsenic	1.10 - 1.60	25 / 28	4.70	IR15-SS03-00-01-09C	18.0	0 / 28	0.26	0.63	Yes	No	HQ less than one, detected
Barium	21.0 - 22.3	24 / 28	34.3	IR15-SS01-00-01-09C	330.0	0 / 28	0.10	14.5	Yes	No	HQ less than one, detected
Beryllium	0.15 - 0.18	7 / 12	0.14	IR15-SS03-00-01-09C	21.0	0 / 12	0.01	0.1	Yes	No	HQ less than one, detected
Cadmium	0.011 - 1.80	15 / 28	0.61	IR15-SS01-00-01-09C	0.4	2 / 28	1.69	0.03	Yes	No	Low magnitude of exceedance
Calcium [3]	-- - --	12 / 12	36,500	IR15-SS01-00-01-09C	NSV	-- / --	NSV	6360	Yes	No	Macronutrient
Chromium	-- - --	28 / 28	17.2	IR15-SS03-00-01-09C	26.0	0 / 28	0.66	6.1	Yes	No	HQ less than one, detected
Cobalt	0.38 - 0.45	10 / 12	0.57	IR15-SS01-00-01-09C	13.0	0 / 12	0.044	0.29	Yes	No	HQ less than one, detected
Copper	-- - --	12 / 12	42.1	IR15-SS01-00-01-09C	28.0	1 / 12	1.50	4.8	Yes	No	Low magnitude of exceedance
Iron	-- - --	12 / 12	10,200	IR15-SS03-00-01-09C	200	12 / 12	51.0	3245	Yes	No	Within background range
Lead	-- - --	28 / 28	70.3	IR15-SS01-00-01-09C	11.0	17 / 28	6.39	12.3	Yes	Yes	(1) HQ above one, detected
Magnesium [3]	-- - --	12 / 12	796	IR15-SS03-00-01-09C	NSV	-- / --	NSV	238	Yes	No	Macronutrient
Manganese	-- - --	12 / 12	160	IR15-SS20-0-0_5-10D	220	0 / 12	0.73	13.7	Yes	No	HQ less than one, detected

APPENDIX F-2

TABLE 3

Site 15 Surface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Mercury	0.015 - 0.039	20 / 31	1.20	IR15-SS11-0-0_5-10D	0.1	4 / 31	12.00	0.08	Yes	Yes	(1) HQ above one, detected
Nickel	-- - --	12 / 12	2.70	IR15-SS01-00-01-09C	38.0	0 / 12	0.071	1.2	Yes	No	HQ less than one, detected
Potassium [3]	76.3 - 78.8	9 / 12	497	IR15-SS03-00-01-09C	NSV	-- / --	NSV	116.2	Yes	No	Macronutrient
Selenium	0.010 - 1.80	9 / 24	0.60	SWMU46-TW03-00	0.5	2 / 24	1.15	0.56	Yes	No	Within background range
Silver	0.010 - 1.80	5 / 28	0.17	IR15-SS05-00-01-09C	4.2	0 / 28	0.04	0.14	Yes	No	Within background range
Sodium [3]	188 - 202	7 / 12	68.7	IR15-SS03-00-01-09C	NSV	-- / --	NSV	80.9	No	No	Consistent with background, macronutrient
Thallium	2.30 - 2.70	2 / 12	0.036	IR15-SS20-0-0_5-10D	1.00	0 / 12	0.036	0.36	No	No	Consistent with background
Vanadium	-- - --	12 / 12	22.3	IR15-SS03-00-01-09C	7.80	4 / 12	2.86	8.9	Yes	No	Within background range
Zinc	3.80 - 39.0	9 / 12	170	IR15-SS01-00-01-09C	46.0	3 / 12	3.70	10.8	Yes	Yes	(1) HQ above one, detected
Other Parameters (mg/kg)											
Chromium (hexavalent)	-- - --	2 / 2	0.58	IR15-SS20-0-0_5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value

NOTES

1 - Count of detected samples exceeding or equaling Screening Value

2 - Categories are assigned to those analytes retained as Step 2 COPCs and are as follows:

Category 1 – Contaminants with a maximum detection exceeding the ESV

Category 2– Undetected contaminants with a laboratory sample quantitation limit (SQL) exceeding the ESV

Category 3 – Detected contaminants with no ESV

Category 4 – Undetected contaminants with no ESV

3 - Macronutrient - Not considered to be a COPC

4 - Dioxin/furans evaluated based on the 2,3,7,8-TCDD Toxic Equivalency (TEQ). This value was calculated based on the methods presented by the World Health Organization (Van den Berg et al., 2006).

COPC - Contaminant of Potential Concern

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram

NSV - No Screening Value

pg/g - picograms per gram

µg/kg - micrograms per kilogram

APPENDIX F-2

TABLE 4

Site 15 Subsurface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Volatile Organic Compounds (µg/kg)											
1,1,1-Trichloroethane	0.22 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
1,1,2,2-Tetrachloroethane	0.27 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,1,2-Trichloroethane	0.55 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
1,1-Dichloroethane	0.22 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
1,1-Dichloroethene	0.27 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
1,2,4-Trichlorobenzene	0.55 - 14.0	4 / 26	2.50	IR15-SB07-2-4-09C	10.0	0 / 26	0.25	--	--	No	HQ less than one, detected
1,2-Dibromo-3-chloropropane	0.55 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2-Dibromoethane	0.55 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2-Dichlorobenzene	0.55 - 14.0	0 / 25	--	--	10.0	-- / --	1.40	--	--	Yes	(2) Not detected, HQ above one
1,2-Dichloroethane	0.22 - 14.0	0 / 25	--	--	400	-- / --	0.035	--	--	No	HQ less than one, not detected
1,2-Dichloropropane	0.27 - 14.0	0 / 25	--	--	700,000	-- / --	2.00E-05	--	--	No	HQ less than one, not detected
1,3-Dichlorobenzene	0.55 - 14.0	3 / 26	1.60	IR15-SB07-2-4-09C	10.0	0 / 26	0.16	--	--	No	HQ less than one, detected
1,4-Dichlorobenzene	0.55 - 14.0	2 / 26	1.60	IR15-SB07-2-4-09C	10.0	0 / 26	0.16	--	--	No	HQ less than one, detected
2-Butanone	1.10 - 14.0	4 / 26	21.0	IR15-SB07-2-4-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
2-Hexanone	0.55 - 14.0	2 / 26	4.10	IR15-SB07-2-4-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
4-Methyl-2-pentanone	0.27 - 14.0	1 / 26	1.70	IR15-SB09-2-7-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Acetone	3.40 - 40.0	10 / 26	180	IR15-SB09-2-7-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzene	0.11 - 14.0	6 / 26	4.00	SMWU46-TT03-02	50.0	0 / 26	0.080	--	--	No	HQ less than one, detected
Bromodichloromethane	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Bromoform	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Bromomethane	0.55 - 14.0	0 / 24	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Carbon disulfide	1.60 - 14.0	3 / 25	1.40	IR15-SB02-2-7-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Carbon tetrachloride	0.27 - 14.0	0 / 25	--	--	1,000,000	-- / --	1.40E-05	--	--	No	HQ less than one, not detected
Chlorobenzene	0.27 - 14.0	1 / 26	2.60	IR15-SB09-2-7-09C	50.0	0 / 26	0.052	--	--	No	HQ less than one, detected
Chloroethane	0.27 - 14.0	0 / 24	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
Chloroform	0.11 - 14.0	0 / 25	--	--	1.00	-- / --	14.0	--	--	Yes	(2) Not detected, HQ above one
Chloromethane	0.55 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
cis-1,2-Dichloroethene	0.27 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
cis-1,3-Dichloropropene	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Cyclohexane	0.11 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
Dibromochloromethane	0.55 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dichlorodifluoromethane (Freon-12)	0.55 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Ethylbenzene	0.27 - 14.0	0 / 25	--	--	50.0	-- / --	0.28	--	--	No	HQ less than one, not detected
Isopropylbenzene	0.27 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Methyl acetate	1.10 - 14.0	2 / 25	7.80	IR15-SB05-2-7-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Methylcyclohexane	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Methylene chloride	2.70 - 20.0	4 / 25	8.90	IR15-SB05-2-7-09C	2,000	0 / 25	0.0045	--	--	No	HQ less than one, detected
Methyl-tert-butyl ether (MTBE)	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Styrene	0.22 - 14.0	2 / 26	2.90	IR15-SB07-2-4-09C	100	0 / 26	0.029	--	--	No	HQ less than one, detected
Tetrachloroethene	0.22 - 14.0	1 / 26	1.50	IR15-SB09-2-7-09C	10.0	0 / 26	0.15	--	--	No	HQ less than one, detected
Toluene	0.56 - 14.0	6 / 26	3.00	SMWU46-TT03-02	50.0	0 / 26	0.060	--	--	No	HQ less than one, detected
trans-1,2-Dichloroethene	0.22 - 14.0	0 / 25	--	--	100	-- / --	0.14	--	--	No	HQ less than one, not detected
trans-1,3-Dichloropropene	0.22 - 14.0	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Trichloroethene	0.55 - 14.0	0 / 25	--	--	1.00	-- / --	14.0	--	--	Yes	(2) Not detected, HQ above one
Trichlorofluoromethane (Freon-11)	0.11 - 2.40	15 / 25	9.00	SMWU46-TT02-01	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Vinyl chloride	0.55 - 14.0	0 / 25	--	--	10.0	-- / --	1.40	--	--	Yes	(2) Not detected, HQ above one
Xylene, total	1.10 - 14.0	0 / 25	--	--	50.0	-- / --	0.28	--	--	No	HQ less than one, not detected

APPENDIX F-2

TABLE 4

Site 15 Subsurface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Semivolatile Organic Compounds (µg/kg)											
1,1-Biphenyl	3.70 - 440	0 / 27	--	--	60,000	-- / --	0.0073	--	--	No	HQ less than one, not detected
2,2'-Oxybis(1-chloropropane)	180 - 440	0 / 25	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4,5-Trichlorophenol	3.70 - 1,100	0 / 27	--	--	4,000	-- / --	0.28	--	--	No	HQ less than one, not detected
2,4,6-Trichlorophenol	19.0 - 440	0 / 17	--	--	10,000	-- / --	0.044	--	--	No	HQ less than one, not detected
2,4-Dichlorophenol	9.40 - 440	0 / 27	--	--	3.00	-- / --	147	--	--	Yes	(2) Not detected, HQ above one
2,4-Dimethylphenol	180 - 1,100	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4-Dinitrophenol	180 - 440	0 / 27	--	--	20,000	-- / --	0.022	--	--	No	HQ less than one, not detected
2,4-Dinitrotoluene	19.0 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,6-Dinitrotoluene	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Chloronaphthalene	3.70 - 440	0 / 27	--	--	1,000	-- / --	0.44	--	--	No	HQ less than one, not detected
2-Chlorophenol	3.70 - 440	0 / 27	--	--	10.0	-- / --	44.0	--	--	Yes	(2) Not detected, HQ above one
2-Methylnaphthalene	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Methylphenol	3.70 - 1,100	0 / 27	--	--	500	-- / --	2.20	--	--	Yes	(2) Not detected, HQ above one
2-Nitroaniline	3.70 - 420	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Nitrophenol	9.40 - 210	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3,3'-Dichlorobenzidine	38.0 - 440	0 / 26	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3-Nitroaniline	19.0 - 1,100	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4,6-Dinitro-2-methylphenol	19.0 - 1,100	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Bromophenyl-phenylether	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chloro-3-methylphenol	9.40 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chloroaniline	37.0 - 440	0 / 27	--	--	20,000	-- / --	0.022	--	--	No	HQ less than one, not detected
4-Chlorophenyl-phenylether	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Methylphenol	9.40 - 440	0 / 27	--	--	500	-- / --	0.88	--	--	No	HQ less than one, not detected
4-Nitroaniline	19.0 - 1,100	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Nitrophenol	180 - 1,100	0 / 27	--	--	7,000	-- / --	0.16	--	--	No	HQ less than one, not detected
Acenaphthene	3.70 - 440	0 / 27	--	--	20,000	-- / --	0.022	--	--	No	HQ less than one, not detected
Acenaphthylene	3.70 - 440	1 / 27	2.80	IR15-SB21-1-4-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Acetophenone	180 - 440	2 / 27	1.60	IR15-SB21-1-4-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Anthracene	3.70 - 420	2 / 27	163	SMWU46-TT01-01	100	1 / 27	1.63	--	--	Yes	(1) HQ above one, detected
Atrazine	3.70 - 440	0 / 27	--	--	0.050	-- / --	8,800	--	--	Yes	(2) Not detected, HQ above one
Benzaldehyde	3.70 - 440	1 / 18	10.0	IR15-SB21-1-4-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(a)anthracene	19.0 - 420	2 / 27	450	SMWU46-TT01-01	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(a)pyrene	3.70 - 440	1 / 27	30.0	IR15-SB21-1-4-10D	100	0 / 27	0.30	--	--	No	HQ less than one, detected
Benzo(b)fluoranthene	7.00 - 420	2 / 27	480	SMWU46-TT01-01	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(g,h,i)perylene	4.40 - 420	1 / 27	240	SMWU46-TT01-01	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(k)fluoranthene	3.70 - 440	1 / 27	26.0	IR15-SB21-1-4-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
bis(2-Chloroethoxy)methane	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Chloroethyl)ether	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Chloroisopropyl)ether	3.70 - 3.90	0 / 2	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Ethylhexyl)phthalate	20.0 - 440	3 / 27	37.0	IR15-SB01-4-6-09C	100	0 / 27	0.37	--	--	No	HQ less than one, detected
Butylbenzylphthalate	19.0 - 440	0 / 27	--	--	100	-- / --	4.40	--	--	Yes	(2) Not detected, HQ above one
Caprolactam	19.0 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Carbazole	180 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Chrysene	19.0 - 420	2 / 27	830	SMWU46-TT01-01	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Dibenz(a,h)anthracene	3.70 - 440	1 / 27	3.20	IR15-SB21-1-4-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Dibenzofuran	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Diethylphthalate	9.40 - 440	0 / 27	--	--	100,000	-- / --	0.0044	--	--	No	HQ less than one, not detected
Dimethyl phthalate	3.70 - 440	0 / 27	--	--	200,000	-- / --	0.0022	--	--	No	HQ less than one, not detected

APPENDIX F-2

TABLE 4

Site 15 Subsurface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Di-n-butylphthalate	9.40 - 440	1 / 27	18.0	IR15-SB21-1-4-10D	200,000	0 / 27	9.00E-05	--	--	No	HQ less than one, detected
Di-n-octylphthalate	3.90 - 440	1 / 27	14.0	IR15-SB20-1-5-10D	100	0 / 27	0.14	--	--	No	HQ less than one, detected
Fluoranthene	3.70 - 420	2 / 27	2,200	SMWU46-TT01-01	100	1 / 27	22.00	--	--	Yes	(1) HQ above one, detected
Fluorene	3.70 - 440	0 / 27	--	--	30,000	-- / --	0.015	--	--	No	HQ less than one, not detected
Hexachlorobenzene	3.70 - 440	0 / 27	--	--	2.50	-- / --	176	--	--	Yes	(2) Not detected, HQ above one
Hexachlorobutadiene	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Hexachlorocyclopentadiene	3.70 - 440	0 / 26	--	--	10,000	-- / --	0.044	--	--	No	HQ less than one, not detected
Hexachloroethane	3.70 - 440	0 / 27	--	--	100	-- / --	4.40	--	--	Yes	(2) Not detected, HQ above one
Indeno(1,2,3-cd)pyrene	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Isophorone	19.0 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Naphthalene	1.90 - 440	0 / 27	--	--	100	-- / --	4.40	--	--	Yes	(2) Not detected, HQ above one
n-Nitroso-di-n-propylamine	3.70 - 440	0 / 27	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
n-Nitrosodiphenylamine	3.70 - 440	0 / 27	--	--	20,000	-- / --	0.022	--	--	No	HQ less than one, not detected
Nitrobenzene	3.70 - 440	0 / 27	--	--	40,000	-- / --	0.011	--	--	No	HQ less than one, not detected
Pentachlorophenol	19.0 - 1,100	0 / 27	--	--	2,100	-- / --	0.52	--	--	No	HQ less than one, not detected
Phenanthrene	3.70 - 420	1 / 27	800	SMWU46-TT01-01	100	1 / 27	8.00	--	--	Yes	(1) HQ above one, detected
Phenol	3.70 - 440	0 / 27	--	--	50.0	-- / --	8.80	--	--	Yes	(2) Not detected, HQ above one
Pyrene	19.0 - 420	2 / 27	2,400	SMWU46-TT01-01	100	1 / 27	24.0	--	--	Yes	(1) HQ above one, detected
Pesticide/Polychlorinated Biphenyls (µg/kg)											
4,4'-DDD	0.15 - 3.90	19 / 30	2,300	SMWU46-TT05-02	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
4,4'-DDE	0.15 - 3.90	22 / 30	4,400	SMWU46-TT04-01	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
4,4'-DDT	0.15 - 3.90	20 / 30	31,000	IR15-SB19-1-5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Aldrin	0.15 - 99.0	1 / 27	2.50	SMWU46-TT01-01	2.50	1 / 27	1.00	--	--	Yes	(1) HQ above one, detected
alpha-BHC	0.15 - 99.0	1 / 27	1.70	SMWU46-TT01-01	2.50	0 / 27	0.68	--	--	No	HQ less than one, detected
alpha-Chlordane	0.15 - 99.0	10 / 27	400	SMWU46-TT05-02	100	3 / 27	4.00	--	--	Yes	(1) HQ above one, detected
Aroclor-1016	15.0 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1221	15.0 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1232	15.0 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1242	15.0 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1248	7.50 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1254	15.0 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Aroclor-1260	15.0 - 21.0	0 / 12	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
beta-BHC	1.50 - 99.0	0 / 27	--	--	1.00	-- / --	99.0	--	--	Yes	(2) Not detected, HQ above one
delta-BHC	0.15 - 99.0	0 / 27	--	--	100	-- / --	0.99	--	--	No	HQ less than one, not detected
Dieldrin	0.15 - 190	2 / 27	2.50	IR15-SB21-1-4-10D	4.90	0 / 27	0.51	--	--	No	HQ less than one, detected
Endosulfan I	0.15 - 99.0	2 / 27	9.50	SMWU46-TT05-02	100	0 / 27	0.095	--	--	No	HQ less than one, detected
Endosulfan II	0.15 - 190	0 / 27	--	--	100	-- / --	1.90	--	--	Yes	(2) Not detected, HQ above one
Endosulfan sulfate	0.15 - 190	0 / 27	--	--	100	-- / --	1.90	--	--	Yes	(2) Not detected, HQ above one
Endrin	0.15 - 190	0 / 27	--	--	1.00	-- / --	190	--	--	Yes	(2) Not detected, HQ above one
Endrin aldehyde	1.50 - 190	0 / 27	--	--	100	-- / --	1.90	--	--	Yes	(2) Not detected, HQ above one
Endrin ketone	1.50 - 190	1 / 27	3.80	IR15-SB21-1-4-10D	100	0 / 27	0.038	--	--	No	HQ less than one, detected
gamma-BHC (Lindane)	0.15 - 99.0	0 / 27	--	--	0.050	-- / --	1,980	--	--	Yes	(2) Not detected, HQ above one
gamma-Chlordane	0.15 - 99.0	8 / 27	430	SMWU46-TT05-02	100	3 / 27	4.30	--	--	Yes	(1) HQ above one, detected
Heptachlor	0.15 - 99.0	0 / 27	--	--	100	-- / --	0.99	--	--	No	HQ less than one, not detected
Heptachlor epoxide	0.15 - 99.0	0 / 27	--	--	100	-- / --	0.99	--	--	No	HQ less than one, not detected
Methoxychlor	0.34 - 990	0 / 27	--	--	100	-- / --	9.90	--	--	Yes	(2) Not detected, HQ above one
Toxaphene	36.0 - 9,900	0 / 27	--	--	100	-- / --	99.0	--	--	Yes	(2) Not detected, HQ above one
Inorganics (mg/kg)											
Aluminum	-- - --	12 / 12	6,070	IR15-SB02-2-7-09C	50.0	12 / 12	121	10,369	No	No	Consistent with background

APPENDIX F-2

TABLE 4

Site 15 Subsurface Soil Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value	Frequency of Exceedance[1]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[2]
Antimony	0.10 - 8.60	6 / 15	2.50	IR15-SB11-1-5-10D	0.27	4 / 15	9.26	0.36	Yes	Yes	(1) HQ above one, detected
Arsenic	0.48 - 1.60	25 / 29	19.0	SMWU46-TT07-01	18.0	1 / 29	1.06	2.12	Yes	No	Low frequency and magnitude of exceedance
Barium	4.10 - 21.5	25 / 29	1,410	SMWU46-TT02-02	330	2 / 29	4.27	16.6	Yes	Yes	(1) HQ above one, detected
Beryllium	0.15 - 0.18	6 / 12	0.071	IR15-SB09-2-7-09C	21.0	0 / 12	0.0034	0.165	No	No	HQ less than one, detected
Cadmium	0.040 - 0.54	21 / 29	8.40	SMWU46-TT02-02	0.36	11 / 29	23.3	0.02	Yes	Yes	(1) HQ above one, detected
Calcium [3]	76.9 - 82.1	10 / 12	20,000	IR15-SB01-4-6-09C	NSV	-- / --	NSV	441.3	Yes	No	Macronutrient
Chromium	2.40 - 2.40	28 / 29	150	SMWU46-TT02-02	26.0	6 / 29	5.77	14.49	Yes	Yes	(1) HQ above one, detected
Cobalt	0.41 - 0.41	11 / 12	9.30	IR15-SB09-2-7-09C	13.0	0 / 12	0.72	0.82	Yes	No	HQ less than one, detected
Copper	0.61 - 1.60	10 / 12	31.7	IR15-SB04-2-7-09C	28.0	1 / 12	1.13	2.56	Yes	No	Low magnitude of exceedance
Iron	3,000 - 3,000	14 / 15	179,000	IR15-SB09-2-7-09C	200	13 / 15	895	5438.6	Yes	Yes	(1) HQ above one, detected
Lead	3.00 - 3.00	34 / 35	3,010	SWMU46-SB04-02	11.0	17 / 35	274	8.49	Yes	Yes	(1) HQ above one, detected
Magnesium [3]	-- - --	12 / 12	219	IR15-SB01-4-6-09C	NSV	-- / --	NSV	362.6	No	No	Consistent with background; macronutrient
Manganese	2.00 - 2.00	11 / 12	626	IR15-SB09-2-7-09C	220	1 / 12	2.85	9.246	Yes	Yes	(1) HQ above one, detected
Mercury	0.010 - 0.037	21 / 29	0.25	SMWU46-TT04-01	0.10	7 / 29	2.50	0.07	Yes	Yes	(1) HQ above one, detected
Nickel	0.66 - 1.70	8 / 12	24.4	IR15-SB09-2-7-09C	38.0	0 / 12	0.64	2.266	Yes	No	HQ less than one, detected
Potassium [3]	-- - --	12 / 12	236	IR15-SB09-2-7-09C	NSV	-- / --	NSV	361.2	No	No	Consistent with background; macronutrient
Selenium	0.10 - 8.60	6 / 27	1.70	SMWU46-TT07-01	0.52	5 / 27	3.27	0.50	Yes	Yes	(1) HQ above one, detected
Silver	0.11 - 8.60	11 / 29	20.1	SMWU46-TT02-02	4.20	3 / 29	4.79	0.13	Yes	Yes	(1) HQ above one, detected
Sodium [3]	194 - 1,080	8 / 12	15.0	IR15-SB04-2-7-09C	NSV	-- / --	NSV	68.3	No	No	Consistent with background; macronutrient
Thallium	2.30 - 2.70	3 / 12	1.90	IR15-SB09-2-7-09C	1.00	1 / 12	1.90	0.38	Yes	No	Low magnitude of exceedance
Vanadium	4.10 - 21.5	10 / 12	10.4	IR15-SB02-2-7-09C	7.80	4 / 12	1.33	17.21	No	No	Consistent with background
Zinc	3.50 - 58.0	12 / 18	345	IR15-SB01-4-6-09C	46.0	4 / 18	7.50	6.59	Yes	Yes	(1) HQ above one, detected
Other Parameters (mg/kg)											
Chromium (hexavalent)	-- - --	2 / 2	0.37	IR15-SB20-1-5-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value

NOTES

1 - Count of detected samples exceeding or equaling Screening Value

2 - Categories are assigned to those analytes retained as Step 2 COPCs and are as follows:

Category 1 – Contaminants with a maximum detection exceeding the ESV

Category 2– Undetected contaminants with a laboratory sample quantitation limit (SQL) exceeding the ESV

Category 3 – Detected contaminants with no ESV

Category 4 – Undetected contaminants with no ESV

3 - Macronutrient - Not considered to be a COPC

COPC - Contaminant of Potential Concern

HQ - Hazard Quotient

mg/kg - Milligrams per kilogram

NSV - No Screening Value

µg/kg - micrograms per kilogram

APPENDIX F-2

TABLE 5

Site 15 Groundwater Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value[1]	Frequency of Exceedance[2]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[3]
Volatile Organic Compounds (µg/L)											
1,1,1-Trichloroethane	0.50 - 1.0	0 / 9	--	--	312	-- / --	0.0032	--	--	No	HQ less than one, not detected
1,1,2,2-Tetrachloroethane	0.25 - 2.4	0 / 9	--	--	90.2	-- / --	0.027	--	--	No	HQ less than one, not detected
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,1,2-Trichloroethane	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,1-Dichloroethane	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,1-Dichloroethene	0.50 - 1.0	0 / 9	--	--	2,240	-- / --	4.46E-04	--	--	No	HQ less than one, not detected
1,2,4-Trichlorobenzene	0.50 - 1.0	0 / 9	--	--	4.50	-- / --	0.22	--	--	No	HQ less than one, not detected
1,2-Dibromo-3-chloropropane	0.50 - 1.0	0 / 5	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2-Dibromoethane	0.25 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
1,2-Dichlorobenzene	0.50 - 1.0	0 / 9	--	--	19.7	-- / --	0.051	--	--	No	HQ less than one, not detected
1,2-Dichloroethane	0.50 - 1.0	0 / 9	--	--	1,130	-- / --	8.85E-04	--	--	No	HQ less than one, not detected
1,2-Dichloropropane	0.50 - 1.0	0 / 9	--	--	2,400	-- / --	4.17E-04	--	--	No	HQ less than one, not detected
1,3-Dichlorobenzene	0.25 - 1.0	0 / 9	--	--	28.5	-- / --	0.035	--	--	No	HQ less than one, not detected
1,4-Dichlorobenzene	0.50 - 1.0	0 / 9	--	--	19.9	-- / --	0.050	--	--	No	HQ less than one, not detected
2-Butanone	0.50 - 5.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Hexanone	0.50 - 5.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Methyl-2-pentanone	0.50 - 5.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Acetone	3.40 - 5.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Benzene	0.50 - 1.0	0 / 9	--	--	109	-- / --	0.0092	--	--	No	HQ less than one, not detected
Bromodichloromethane	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Bromoform	0.25 - 1.0	0 / 9	--	--	640	-- / --	0.0016	--	--	No	HQ less than one, not detected
Bromomethane	0.50 - 1.1	0 / 9	--	--	120	-- / --	0.0092	--	--	No	HQ less than one, not detected
Carbon disulfide	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Carbon tetrachloride	0.50 - 1.0	0 / 9	--	--	1,500	-- / --	6.67E-04	--	--	No	HQ less than one, not detected
Chlorobenzene	0.50 - 1.0	0 / 9	--	--	105	-- / --	0.0095	--	--	No	HQ less than one, not detected
Chloroethane	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Chloroform	0.50 - 1.0	0 / 9	--	--	815	-- / --	0.0012	--	--	No	HQ less than one, not detected
Chloromethane	0.50 - 1.0	0 / 9	--	--	2,700	-- / --	3.70E-04	--	--	No	HQ less than one, not detected
cis-1,2-Dichloroethene	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
cis-1,3-Dichloropropene	0.10 - 1.0	0 / 9	--	--	7.90	-- / --	0.13	--	--	No	HQ less than one, not detected
Cyclohexane	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dibromochloromethane	0.25 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dichlorodifluoromethane (Freon-12)	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Ethylbenzene	0.25 - 1.0	0 / 9	--	--	4.30	-- / --	0.23	--	--	No	HQ less than one, not detected
Isopropylbenzene	0.50 - 1.0	1 / 9	4.90	IR15-TW03-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Methyl acetate	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Methylcyclohexane	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Methylene chloride	0.50 - 1.0	0 / 9	--	--	2,560	-- / --	3.91E-04	--	--	No	HQ less than one, not detected
Methyl-tert-butyl ether (MTBE)	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Styrene	0.10 - 1.0	1 / 9	5.90	IR15-TW03-09C	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Tetrachloroethene	0.50 - 1.1	0 / 9	--	--	45.0	-- / --	0.024	--	--	No	HQ less than one, not detected
Toluene	0.10 - 1.0	1 / 9	0.060	IR15-GW04-11B	37.0	0 / 9	0.0016	--	--	No	HQ less than one, detected
trans-1,2-Dichloroethene	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
trans-1,3-Dichloropropene	0.25 - 1.0	0 / 9	--	--	7.90	-- / --	0.13	--	--	No	HQ less than one, not detected

APPENDIX F-2

TABLE 5

Site 15 Groundwater Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value[1]	Frequency of Exceedance[2]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[3]
Trichloroethene	0.25 - 5.1	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Trichlorofluoromethane (Freon-11)	0.50 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Vinyl chloride	0.25 - 1.0	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Xylene, total	0.75 - 1.2	0 / 9	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Semivolatile Organic Compounds (µg/L)											
1,1-Biphenyl	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,2'-Oxybis(1-chloropropane)	0.10 - 11	0 / 6	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4,5-Trichlorophenol	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4,6-Trichlorophenol	0.10 - 0.50	0 / 5	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4-Dichlorophenol	0.25 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4-Dimethylphenol	0.50 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,4-Dinitrophenol	1.00 - 22	0 / 8	--	--	48.5	-- / --	0.45	--	--	No	HQ less than one, not detected
2,4-Dinitrotoluene	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2,6-Dinitrotoluene	0.25 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Chloronaphthalene	0.050 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Chlorophenol	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Methylnaphthalene	0.050 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Methylphenol	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Nitroaniline	0.50 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
2-Nitrophenol	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3,3'-Dichlorobenzidine	1.00 - 22	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
3-Nitroaniline	0.50 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4,6-Dinitro-2-methylphenol	0.50 - 22	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Bromophenyl-phenylether	0.050 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chloro-3-methylphenol	0.25 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chloroaniline	0.25 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Chlorophenyl-phenylether	0.25 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Methylphenol	0.25 - 22	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Nitroaniline	0.50 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
4-Nitrophenol	1.00 - 22	0 / 8	--	--	71.7	-- / --	0.31	--	--	No	HQ less than one, not detected
Acenaphthene	0.050 - 11	0 / 8	--	--	9.70	-- / --	1.13	--	--	Yes	(2) Not detected, HQ above one
Acenaphthylene	0.050 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Acetophenone	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Anthracene	0.050 - 11	1 / 8	0.041	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Atrazine	0.10 - 22.0	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Benzaldehyde	0.50 - 0.50	0 / 5	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Benzo(a)anthracene	0.050 - 11	1 / 8	0.12	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(a)pyrene	0.050 - 11	1 / 8	0.072	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(b)fluoranthene	0.050 - 11	1 / 8	0.072	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Benzo(g,h,i)perylene	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Benzo(k)fluoranthene	0.10 - 11	1 / 8	0.093	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
bis(2-Chloroethoxy)methane	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Chloroethyl)ether	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Chloroisopropyl)ether	0.050 - 0.050	0 / 2	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
bis(2-Ethylhexyl)phthalate	0.50 - 11	2 / 8	0.33	IR15-GW06-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value

APPENDIX F-2

TABLE 5

Site 15 Groundwater Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value[1]	Frequency of Exceedance[2]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[3]
Butylbenzylphthalate	0.10 - 11	0 / 8	--	--	29.4	-- / --	0.37	--	--	No	HQ less than one, not detected
Caprolactam	0.50 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Carbazole	0.10 - 11	1 / 8	0.13	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Chrysene	0.050 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dibenz(a,h)anthracene	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dibenzofuran	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Diethylphthalate	0.25 - 11	0 / 8	--	--	759	-- / --	0.014	--	--	No	HQ less than one, not detected
Dimethyl phthalate	0.25 - 11	0 / 8	--	--	580	-- / --	0.019	--	--	No	HQ less than one, not detected
Di-n-butylphthalate	0.50 - 22	0 / 8	--	--	3.40	-- / --	6.47	--	--	Yes	(2) Not detected, HQ above one
Di-n-octylphthalate	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Fluoranthene	0.050 - 11	1 / 8	0.072	IR15-GW04-11B	1.60	0 / 8	0.045	--	--	No	HQ less than one,detected
Fluorene	0.050 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Hexachlorobenzene	0.25 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Hexachlorobutadiene	0.10 - 11	0 / 8	--	--	0.32	-- / --	34.4	--	--	Yes	(2) Not detected, HQ above one
Hexachlorocyclopentadiene	0.25 - 11	0 / 8	--	--	0.070	-- / --	157	--	--	Yes	(2) Not detected, HQ above one
Hexachloroethane	0.25 - 11	0 / 8	--	--	9.40	-- / --	1.17	--	--	Yes	(2) Not detected, HQ above one
Indeno(1,2,3-cd)pyrene	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Isophorone	0.050 - 11	0 / 8	--	--	129	-- / --	0.085	--	--	No	HQ less than one, not detected
Naphthalene	0.050 - 11	0 / 8	--	--	23.5	-- / --	0.47	--	--	No	HQ less than one, not detected
n-Nitroso-di-n-propylamine	0.10 - 11	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
n-Nitrosodiphenylamine	0.050 - 11	0 / 8	--	--	33,000	-- / --	3.33E-04	--	--	No	HQ less than one, not detected
Nitrobenzene	0.50 - 11	0 / 8	--	--	66.8	-- / --	0.16	--	--	No	HQ less than one, not detected
Pentachlorophenol	0.10 - 22	0 / 8	--	--	7.90	-- / --	2.78	--	--	No	HQ less than one, not detected
Phenanthrene	0.050 - 11	2 / 8	0.072	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Phenol	0.10 - 11	0 / 8	--	--	58.0	-- / --	0.19	--	--	No	HQ less than one, not detected
Pyrene	0.10 - 11	1 / 8	0.062	IR15-GW04-11B	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value
Pesticide/Polychlorinated Biphenyls (mg/L)											
4,4'-DDD	0.0008 - 0.053	1 / 8	0.013	IR15-GW04-11B	0.025	0 / 8	0.52	--	--	No	HQ less than one, detected
4,4'-DDE	0.0008 - 0.053	2 / 8	0.0037	IR15-GW04-11B	0.14	0 / 8	0.026	--	--	No	HQ less than one, detected
4,4'-DDT	0.0008 - 0.053	1 / 8	0.0010	IR15-GW04-11B	0.0010	1 / 8	1.00	--	--	Yes	(1) HQ above one, detected
Aldrin	0.0008 - 0.053	0 / 8	--	--	0.13	-- / --	0.41	--	--	No	HQ less than one, not detected
alpha-BHC	0.0008 - 0.053	0 / 8	--	--	1,400	-- / --	3.79E-05	--	--	No	HQ less than one, not detected
alpha-Chlordane	0.0008 - 0.053	1 / 8	0.012	IR15-GW04-11B	0.0040	1 / 8	3.00	--	--	Yes	(1) HQ above one, detected
Aroclor-1016	0.08 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
Aroclor-1221	0.08 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
Aroclor-1232	0.04 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
Aroclor-1242	0.08 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
Aroclor-1248	0.08 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
Aroclor-1254	0.08 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
Aroclor-1260	0.08 - 0.53	0 / 8	--	--	0.030	-- / --	17.7	--	--	Yes	(2) Not detected, HQ above one
beta-BHC	0.0032 - 0.053	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
delta-BHC	0.0008 - 0.053	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Dieldrin	0.0008 - 0.053	0 / 8	--	--	0.0019	-- / --	27.9	--	--	Yes	(2) Not detected, HQ above one
Endosulfan I	0.0008 - 0.053	1 / 8	4.00E-04	IR15-GW02-10D	0.0087	0 / 8	0.046	--	--	No	HQ less than one, detected
Endosulfan II	0.0008 - 0.053	0 / 8	--	--	0.0087	-- / --	6.09	--	--	Yes	(2) Not detected, HQ above one

APPENDIX F-2

TABLE 5

Site 15 Groundwater Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value[1]	Frequency of Exceedance[2]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[3]
Endosulfan sulfate	0.0008 - 0.053	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Endrin	0.0008 - 0.053	0 / 8	--	--	0.0023	-- / --	23.0	--	--	Yes	(2) Not detected, HQ above one
Endrin aldehyde	0.0032 - 0.053	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
Endrin ketone	0.0032 - 0.053	0 / 8	--	--	NSV	-- / --	NSV	--	--	Yes	(4) Not detected, no screening value
gamma-BHC (Lindane)	0.0008 - 0.053	0 / 8	--	--	0.016	-- / --	3.31	--	--	Yes	(2) Not detected, HQ above one
gamma-Chlordane	0.0008 - 0.053	1 / 8	0.0072	IR15-GW04-11B	0.0040	1 / 8	1.80	--	--	Yes	(1) HQ above one, detected
Heptachlor	0.0008 - 0.053	0 / 8	--	--	0.0036	-- / --	14.7	--	--	Yes	(2) Not detected, HQ above one
Heptachlor epoxide	0.0008 - 0.053	2 / 8	0.0039	IR15-GW04-11B	0.0036	1 / 8	1.08	--	--	Yes	(1) HQ above one, detected
Methoxychlor	0.0008 - 0.053	0 / 8	--	--	0.030	-- / --	1.77	--	--	Yes	(2) Not detected, HQ above one
Toxaphene	0.0002 - 1.10	0 / 8	--	--	0.0020	-- / --	550	--	--	Yes	(2) Not detected, HQ above one
Inorganics (mg/L)											
Aluminum	-- - --	9 / 9	2400	IR15-GW02-10D	NSV	-- / --	NSV	1886	Yes	No	Within background range
Antimony	0.50 - 20	2 / 9	2.1	IR15-GW03-10D	NSV	-- / --	NSV	3.28	No	No	Consistent with background
Arsenic	0.01 - 20	5 / 15	4.2	SWMU46-TW03	36	0 / 15	0.1	5.77	No	No	Consistent with background
Barium	-- - --	15 / 15	152	SWMU46-TW01	NSV	-- / --	NSV	86.2	Yes	No	Within background range in filtered sample
Beryllium	0.40 - 2	1 / 9	0.18	IR15-TW03-09C	NSV	-- / --	NSV	0.308	No	No	Consistent with background
Cadmium	0.10 - 6	3 / 10	0.063	IR15-GW03-10D	9	0 / 10	0.0	0.358	No	No	Consistent with background
Calcium[4]	-- - --	9 / 9	49000	IR15-GW03-10D	NSV	-- / --	NSV	69078	No	No	Consistent with background; macronutrient
Chromium	0.88 - 20	9 / 16	4.7	SWMU46-TW01	50	0 / 16	0.1	3.13	Yes	No	HQ less than one, detected
Cobalt	-- - --	9 / 9	3.9	IR15-TW01-09C	NSV	-- / --	NSV	3.4	Yes	No	Consistent background range in filtered sample
Copper	20 - 20	7 / 9	2.9	IR15-GW04-11B	3	0 / 9	0.9	2.76	Yes	No	Within background range
Iron	-- - --	9 / 9	25800	IR15-TW01-09C	NSV	-- / --	NSV	5999	Yes	No	Within background range
Lead	0.01 - 20	8 / 15	4.6	SWMU46-TW02	8.1	0 / 15	0.6	2.8	Yes	No	Consistent background range in filtered sample
Magnesium[4]	-- - --	9 / 9	6200	IR15-GW03-10D	NSV	-- / --	NSV	6363	No	No	Consistent with background; macronutrient
Manganese	-- - --	9 / 9	439	IR15-TW01-09C	NSV	-- / --	NSV	214	Yes	No	Within background range in filtered sample
Mercury	0.01 - 0.20	0 / 10	--	--	0.940	-- / --	0.2	0.1	--	No	HQ less than one, not detected
Nickel	1.10 - 10	7 / 9	30	IR15-TW01-09C	8.2	3 / 9	3.7	7.97	Yes	Yes	(1) HQ above one, detected
Potassium[4]	-- - --	9 / 9	6000	IR15-GW04-11B	NSV	-- / --	NSV	3277	Yes	No	Macronutrient
Selenium	1.00 - 20	0 / 10	--	--	71	-- / --	0.3	3.14	--	No	HQ less than one, not detected
Silver	0.10 - 20	2 / 10	0.086	IR15-GW02-10D	0.230	0 / 10	0.4	0.77	No	No	Consistent with background
Sodium[4]	-- - --	9 / 9	15000	IR15-GW02-10D	NSV	-- / --	NSV	22508	No	No	Consistent with background; macronutrient
Thallium	0.20 - 30	5 / 9	3.2	IR15-TW04-09C	21.3	0 / 9	0.2	3.78	No	No	Consistent with background
Vanadium	0.74 - 50	3 / 9	3.1	IR15-GW05-11B	NSV	-- / --	NSV	4.72	No	No	Consistent with background
Zinc	-- - --	9 / 9	14	IR15-GW04-11B	81	0 / 9	0.2	42.1	No	No	Consistent with background
Dissolved Metals (mg/L)											
Aluminum, Dissolved	100 - 1000	5 / 9	629	IR15-TW03-09C	NSV	-- / --	NSV	1886	No	No	Consistent with background
Antimony, Dissolved	0.50 - 20	1 / 9	0.28	IR15-GW04-11B	NSV	-- / --	NSV	3.28	No	No	Consistent with background
Arsenic, Dissolved	1.00 - 20	4 / 9	1.3	IR15-GW03-10D	36	0 / 9	0.0	5.77	No	No	Consistent with background
Barium, Dissolved	-- - --	9 / 9	96.8	IR15-TW03-09C	NSV	-- / --	NSV	86.2	Yes	No	Within background range
Beryllium, Dissolved	0.40 - 2	2 / 9	0.21	IR15-TW03-09C	NSV	-- / --	NSV	0.308	No	No	Consistent with background
Cadmium, Dissolved	0.10 - 6	1 / 9	0.078	IR15-GW02-10D	8.8	0 / 9	0.0	0.358	No	No	Consistent with background
Calcium, Dissolved[4]	-- - --	9 / 9	46000	IR15-GW03-10D	NSV	-- / --	NSV	69078	No	No	Consistent with background; macronutrient
Chromium, Dissolved	0.50 - 20	1 / 9	0.73	IR15-GW02-10D	50	0 / 9	0.0	3.13	No	No	Consistent with background
Cobalt, Dissolved	-- - --	9 / 9	3.1	IR15-TW01-09C	NSV	-- / --	NSV	3.4	No	No	Consistent with background
Copper, Dissolved	20 - 20	8 / 9	4.6	IR15-TW02-09C	3.1	1 / 9	1.5	2.76	Yes	No	Within background range

APPENDIX F-2

TABLE 5

Site 15 Groundwater Screen - Step 2

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Screening Value[1]	Frequency of Exceedance[2]	Maximum Hazard Quotient	2 x Mean Background	Maximum Exceeds 2 x Mean Background?	Step 2 COPC?	Rationale[3]
Iron, Dissolved	-- - --	9 / 9	20500	IR15-TW01-09C	NSV	-- / --	NSV	5999	Yes	No	Within background range
Lead, Dissolved	0.50 - 20	2 / 9	0.28	IR15-GW02-10D	8.1	0 / 9	0.0	2.8	No	No	Consistent with background
Magnesium, Dissolved [4]	-- - --	9 / 9	6200	IR15-GW03-10D	NSV	-- / --	NSV	6363	No	No	Consistent with background; macronutrient
Manganese, Dissolved	-- - --	9 / 9	236	IR15-TW01-09C	NSV	-- / --	NSV	214	Yes	No	Within background range
Mercury, Dissolved	0.10 - 0.20	0 / 9	--	--	0.940	-- / --	0.2	0.1	--	No	HQ less than one, not detected
Nickel, Dissolved	10 - 10	8 / 9	25	IR15-TW01-09C	8.2	3 / 9	3.0	7.97	Yes	Yes	(1) HQ above one, detected
Potassium, Dissolved [4]	-- - --	9 / 9	5700	IR15-GW04-11B	NSV	-- / --	NSV	3277	Yes	No	Macronutrient
Selenium, Dissolved	1 - 20	0 / 9	--	--	71	-- / --	0.3	3.14	--	No	HQ less than one, not detected
Silver, Dissolved	0.10 - 20	2 / 9	0.12	IR15-GW02-10D	0.230	0 / 9	0.5	0.77	No	No	Consistent with background
Sodium, Dissolved [4]	-- - --	9 / 9	14000	IR15-GW02-10D	NSV	-- / --	NSV	22508	No	No	Consistent with background; macronutrient
Thallium, Dissolved	0.10 - 30	3 / 9	0.086	IR15-GW02-10D	21.3	0 / 9	0.0	3.78	No	No	Consistent with background
Vanadium, Dissolved	0.20 - 50	1 / 9	0.88	IR15-GW03-10D	NSV	-- / --	NSV	4.72	No	No	Consistent with background
Zinc, Dissolved	4 - 50	5 / 9	21	IR15-GW06-11B	81	0 / 9	0.3	42.1	No	No	Consistent with background
Other Parameters (mg/L)											
Chromium (hexavalent)	1 - 1	1 / 6	1.10	IR15-GW01-10D	NSV	-- / --	NSV	--	--	Yes	(3) Detected, no screening value

NOTES

1 - Marine Screening Values

2 - Count of detected samples exceeding or equaling Screening Value

3 - Categories are assigned to those analytes retained as Step 2 COPCs and are as follows:

Category 1 – Contaminants with a maximum detection exceeding the ESV

Category 2– Undetected contaminants with a laboratory sample quantitation limit (SQL) exceeding the ESV

Category 3 – Detected contaminants with no ESV

Category 4 – Undetected contaminants with no ESV

4 - Macronutrient - Not considered to be a COPC

COPC - Contaminant of Potential Concern

HQ - Hazard Quotient

NSV - No Screening Value

µg/L - Micrograms per liter

APPENDIX F-2

TABLE 6

Analytes that Failed Step 2 and Retained for Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Media	Category 1					Category 2					Category 3						Category 4						Total
	VOCs	SVOCs	Pesticides	PCBs	Inorganics	VOCs	SVOCs	Pesticides	PCBs	Inorganics	VOCs	SVOCs	Pesticides	PCBs	Dioxin/Furans	Inorganics	VOCs	SVOCs	Pesticides	PCBs	Dioxin/Furans	Inorganics	
Surface Soil	1	3	1	--	3	7	9	3	--	--	6	10	3	1	17	1	16	24	--	6	8	--	119
Subsurface Soil	--	4	3	--	11	4	9	8	--	--	7	9	3	--	--	1	15	24	--	7	--	--	105
Groundwater	--	--	4	--	1	--	5	7	7	--	2	9	--	--	--	1	24	40	5	--	--	--	105

Notes

Category 1 – Contaminants with a maximum detection exceeding the ESV

Category 2– Undetected contaminants with a laboratory sample quantitation limit (SQL) exceeding the ESV

Category 3 – Detected contaminants with no ESV

Category 4 – Undetected contaminants with no ESV

-- - no analytes were retained

ESV - ecological screening value

PCB - polychlorinated biphenyl

SVOC - semivolatile organic compound

VOC - volatile organic compound

APPENDIX F-2

TABLE 7

Site 15 Surface Soil Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[2]	EPC Hazard Quotient	Step 3 COPC?	Rationale
Volatile Organic Compounds (µg/kg)													
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	0.22 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2,4-Trichlorobenzene	0.56 - 28.0	0 / 14	--	--	--	--	10.0	--	--	-- / --	2.80	No	Not detected
1,2-Dibromo-3-chloropropane	0.56 - 55.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dibromoethane	0.56 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dichlorobenzene	0.56 - 28.0	0 / 14	--	--	--	--	10.0	--	--	-- / --	2.80	No	Not detected
1,3-Dichlorobenzene	0.56 - 28.0	0 / 14	--	--	--	--	10.0	--	--	-- / --	2.80	No	Not detected
2-Butanone	8.50 - 12.0	9 / 14	40.0	IR15-SS08-00-01-09C	--	--	NSV	--	--	-- / --	NSV	No	Common Lab Contaminant
2-Hexanone	0.56 - 55.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Methyl-2-pentanone	0.28 - 55.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Acetone	11.0 - 11.0	14 / 15	1,700	IR15-SS08-00-01-09C	--	--	NSV	--	--	-- / --	NSV	No	Common Lab Contaminant
Bromodichloromethane	0.22 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Bromoform	0.22 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Bromomethane	0.56 - 28.0	0 / 12	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Carbon disulfide	4.20 - 9.10	2 / 14	0.58	IR15-SS21-0-0_5-10D	0.58	Maximum Result	NSV	94.1	Buchman, 2008	-- / --	0.01	No	Supplemental HQ less than one
Chloroform	0.11 - 28.0	1 / 14	5.20	IR15-SS01-00-01-09C	--	--	1.00	--	--	1 / 14	5.20	No	Common Lab Contaminant
Chloromethane	0.56 - 55.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
cis-1,2-Dichloroethene	0.28 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
cis-1,3-Dichloropropene	0.22 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dibromochloromethane	0.56 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dichlorodifluoromethane (Freon-12)	0.56 - 55.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Isopropylbenzene	0.28 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Methyl acetate	1.10 - 55.0	5 / 15	2,100	IR15-SS08-00-01-09C	--	--	NSV	--	--	-- / --	NSV	No	Uncertainty, no screening value
Methylcyclohexane	0.22 - 9.10	1 / 14	0.31	IR15-SS20-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	No	Uncertainty, no screening value
Methyl-tert-butyl ether (MTBE)	0.22 - 55.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Tetrachloroethene	0.22 - 28.0	0 / 14	--	--	--	--	10.0	--	--	-- / --	2.80	No	Not detected
trans-1,3-Dichloropropene	0.22 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Trichloroethene	0.56 - 55.0	0 / 14	--	--	--	--	1.00	--	--	-- / --	55.0	No	Not detected
Trichlorofluoromethane (Freon-11)	0.11 - 28.0	0 / 14	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Vinyl chloride	0.56 - 28.0	0 / 14	--	--	--	--	10.0	--	--	-- / --	2.80	No	Not detected
Xylene, total	1.10 - 83.0	0 / 14	--	--	--	--	50.0	--	--	-- / --	1.66	No	Not detected
Semivolatile Organic Compounds (µg/kg)													
2,2'-Oxybis(1-chloropropane)	170 - 400	0 / 15	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dichlorophenol	9.20 - 400	0 / 17	--	--	--	--	3.00	--	--	-- / --	133	No	Not detected
2,4-Dimethylphenol	170 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dinitrotoluene	18.0 - 1,000	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,6-Dinitrotoluene	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Chlorophenol	3.70 - 400	0 / 17	--	--	--	--	10.0	--	--	-- / --	40.0	No	Not detected
2-Methylnaphthalene	3.70 - 400	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Low Molecular Weight PAHs
2-Nitroaniline	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Nitrophenol	9.20 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3- and 4-Methylphenol	360 - 400	0 / 5	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3,3'-Dichlorobenzidine	37.0 - 800	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3-Nitroaniline	18.0 - 1,000	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4,6-Dinitro-2-methylphenol	18.0 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Bromophenyl-phenylether	3.70 - 1,000	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chloro-3-methylphenol	9.20 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chlorophenyl-phenylether	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Nitroaniline	18.0 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Acenaphthylene	3.70 - 400	1 / 17	3.70	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
Acetophenone	170 - 400	2 / 17	1.90	IR15-SS21-0-0_5-10D	1.9	Maximum Result	NSV	300,000	Buchman, 2008	-- / --	6.3E-06	No	Supplemental HQ less than one

APPENDIX F-2

TABLE 7

Site 15 Surface Soil Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[2]	EPC Hazard Quotient	Step 3 COPC?	Rationale
Anthracene	3.70 - 400	1 / 17	6.70	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
Atrazine	3.70 - 400	0 / 17	--	--	--	--	0.050	--	--	-- / --	8,000	No	Not detected
Benzaldehyde	170 - 1,000	2 / 17	3.80	IR15-SS21-0-0_5-10D	3.8	Maximum Result	NSV	10,000	Hagan, 1967	-- / --	3.8E-04	No	Supplemental HQ less than one
Benzo(a)anthracene	19.0 - 400	1 / 17	32.0	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(a)pyrene	9.90 - 400	1 / 17	160	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(b)fluoranthene	35.0 - 400	2 / 17	290	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(g,h,i)perylene	9.50 - 400	2 / 17	330	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(k)fluoranthene	5.70 - 400	1 / 17	100	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
bis(2-Chloroethoxy)methane	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Chloroethyl)ether	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Chloroisopropyl)ether	3.70 - 3.70	0 / 2	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Ethylhexyl)phthalate	24.0 - 400	4 / 21	180	IR15-SS01-00-01-09C	108	95% KM (t) UCL	100	--	--	2 / 21	1.08	No	Low magnitude of exceedance
Butylbenzylphthalate	18.0 - 400	1 / 17	190	IR15-SS01-00-01-09C	185	95% KM (Chebyshev) UCL	100	--	--	1 / 17	1.85	No	Low magnitude of exceedance
Caprolactam	18.0 - 1,000	0 / 16	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Carbazole	24.0 - 380	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Chrysene	19.0 - 380	3 / 17	80.0	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Dibenz(a,h)anthracene	35.0 - 400	3 / 17	64.0	IR15-SS03-00-01-09C	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Dibenzofuran	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Hexachlorobenzene	3.70 - 400	0 / 17	--	--	--	--	2.50	--	--	-- / --	160	No	Not detected
Hexachlorobutadiene	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Hexachloroethane	3.70 - 400	0 / 17	--	--	--	--	100	--	--	-- / --	4.00	No	Not detected
Indeno(1,2,3-cd)pyrene	7.60 - 400	2 / 17	240	IR15-SS20-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Isophorone	18.0 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Naphthalene	1.80 - 400	0 / 17	--	--	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
n-Nitroso-di-n-propylamine	3.70 - 400	0 / 17	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Phenanthrene	3.70 - 400	0 / 17	--	--	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
Phenol	3.60 - 400	0 / 17	--	--	--	--	50.0	--	--	-- / --	8.00	No	Not detected
Low Molecular Weight PAHs	-- --	-- --	10.3	IR15-SS20-0-0_5-10D [3]	--	--	29000	--	--	-- / --	3.55E-04	No	HQ less than one
High Molecular Weight PAHs	-- --	-- --	1318	IR15-SS20-0-0_5-10D [3]	--	--	1100	--	--	-- / --	1.20	No	See text for discussion
Pesticide/Polychlorinated Biphenyls (µg/kg)													
4,4'-DDD	0.15 - 2.10	5 / 20	7.50	IR15-SS01-00-01-09C	--	--	--	--	--	-- / --	--	--	See DDT and Metabolites
4,4'-DDE	0.18 - 2.00	14 / 20	25.0	IR15-SS01-00-01-09C	--	--	--	--	--	-- / --	--	--	See DDT and Metabolites
4,4'-DDT	1.80 - 2.00	14 / 20	39.0	IR15-SS11-0-0_5-10D	--	--	--	--	--	-- / --	--	--	See DDT and Metabolites
DDT and Metabolites	-- --	-- --	48.5	IR15-SS01-00-01-09C	--	--	21.0	--	--	-- / --	2.31	No	See text for discussion
Aroclor-1016	14.0 - 21.0	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Total PCBs
Aroclor-1221	14.0 - 21.0	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Total PCBs
Aroclor-1232	14.0 - 21.0	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Total PCBs
Aroclor-1242	14.0 - 21.0	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Total PCBs
Aroclor-1248	7.40 - 21.0	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Total PCBs
Aroclor-1254	14.0 - 21.0	4 / 20	360	IR15-SS11-0-0_5-10D	185	95% KM (t) UCL	--	--	--	-- / --	--	No	See Total PCBs
Aroclor-1260	14.0 - 21.0	0 / 17	--	--	--	--	--	--	--	-- / --	--	No	See Total PCBs
Total PCBs			360	IR15-SS11-0-0_5-10D	--	--	20	--	--	-- / --	18.00	**Yes**	See text for discussion
beta-BHC	1.50 - 2.10	0 / 17	--	--	--	--	1.00	--	--	-- / --	2.10	No	Not detected
Endrin	0.15 - 2.10	2 / 17	1.70	SWMU46-SM01-0-1	1.51	95% KM (t) UCL	1.00	--	--	1 / 17	1.51	No	Low magnitude of exceedance; no food chain effects
gamma-BHC (Lindane)	0.15 - 2.10	0 / 17	--	--	--	--	0.050	--	--	-- / --	42.0	No	Not detected
Toxaphene	35.0 - 100	0 / 17	--	--	--	--	100	--	--	-- / --	1.00	No	Not detected
Dioxin/Furans (pg/g)													
1,2,3,4,6,7,8-Heptachlorodibenzofuran	17.0 - 95.0	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	38.0 - 110	1 / 3	140	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--

APPENDIX F-2

TABLE 7

Site 15 Surface Soil Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[2]	EPC Hazard Quotient	Step 3 COPC?	Rationale
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.83 - 0.83	2 / 3	3.70	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,4,7,8-Hexachlorodibenzofuran	6.90 - 6.90	2 / 3	10.0	IR15-SS12-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	3.00 - 4.80	1 / 3	1.20	IR15-SS21-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,6,7,8-Hexachlorodibenzofuran	1.40 - 8.70	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	4.90 - 4.90	2 / 3	6.80	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,7,8,9-Hexachlorodibenzofuran	0.19 - 0.84	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	1.40 - 3.70	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,7,8-Pentachlorodibenzofuran	0.30 - 1.00	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.46 - 0.96	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
2,3,4,6,7,8-Hexachlorodibenzofuran	0.61 - 0.61	2 / 3	2.10	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
2,3,4,7,8-Pentachlorodibenzofuran	0.51 - 3.50	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
2,3,7,8-TCDD (dioxin)	0.15 - 0.33	0 / 3	--	--	--	--	NSV	--	--	-- / --	NSV	--	--
2,3,7,8-Tetrachlorodibenzofuran	2.00 - 2.00	2 / 3	3.00	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Octachlorodibenzofuran	-- - --	3 / 3	96.0	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Octachlorodibenzo-p-dioxin	-- - --	3 / 3	2,300	IR15-SS12-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total heptachlorodibenzofuran	-- - --	3 / 3	130	IR15-SS12-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total heptachlorodibenzo-p-dioxin	-- - --	3 / 3	260	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total hexachlorodibenzofuran	-- - --	3 / 3	120	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total hexachlorodibenzo-p-dioxin	-- - --	3 / 3	58.0	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total pentachlorodibenzofuran	-- - --	3 / 3	99.0	IR15-SS12-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total pentachlorodibenzo-p-dioxin	4.40 - 8.90	1 / 3	1.40	IR15-SS12-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total tetrachlorodibenzofuran	-- - --	3 / 3	15.0	IR15-SS11-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
Total tetrachlorodibenzo-p-dioxin	5.00 - 5.00	2 / 3	3.80	IR15-SS12-0-0_5-10D	--	--	NSV	--	--	-- / --	NSV	--	--
2,3,7,8-TCDD Toxic Equivalency (TEQ) [4]	-- - --	-- - --	--	--	--	--	--	--	--	-- / --	--	No	See text for discussion. No foodchain effects.
Inorganics (mg/kg)													
Lead	-- - --	28 / 28	70.3	IR15-SS01-00-01-09C	29.8	95% Approximate Gamma UCL	11.0	--	--	17 / 28	2.71	No	See text for discussion
Mercury	0.015 - 0.039	20 / 31	1.20	IR15-SS11-0-0_5-10D	0.427	97.5% KM (Chebyshev) UCL	0.10	--	--	4 / 31	4.27	No	See text for discussion. No foodchain effects.
Zinc	3.80 - 39.0	9 / 12	170	IR15-SS01-00-01-09C	113	95% KM (Chebyshev) UCL	46.0	--	--	3 / 12	2.46	No	See text for discussion
Other Parameters (mg/kg)													
Chromium (hexavalent)	-- - --	2 / 2	0.58	IR15-SS20-0-0_5-10D	0.58	Maximum Result	NSV	0.34	LANL, 2005	-- / --	1.71	No	Low magnitude of exceedance

NOTES

1 - ProUCL Version 4 does not offer a calculated UCL when there are too few unique detected results (one or sometimes more than one).
In these instances, a 95% Chebyshev UCL using a proxy value of 1/2 the detection limit for NDs is calculated. The lower of the 95 UCL and the maximum concentration is selected.

2 - Count of detected samples exceeding or equaling Screening Value

3 - All detected PAHs were summed for the sample IR15-SS20-0-0_5-10D, including those not carried forward to Step 3

4 - In this ERA, dioxin and furans are evaluated in the food chain transfer section only. Compared to vertebrates, invertebrates are relatively tolerant to dioxin exposure (Hemming et al., 2002)

COPC - Contaminant of Potential Concern

HQ - Hazard Quotient

mg/kg - milligrams per kilogram

NSV - No Screening Value

pg/g - picograms per gram

µg/kg - micrograms per kilogram

APPENDIX F-2

TABLE 8

Site 15 Subsurface Soil Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[2]	EPC Hazard Quotient	Step 3 COPC?	Rationale
Volatile Organic Compounds (µg/kg)													
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dibromo-3-chloropropane	0.55 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dibromoethane	0.55 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dichlorobenzene	0.55 - 14.0	0 / 25	--	--	--	--	10.0	--	--	-- / --	1.40	No	Not detected
2-Butanone	1.10 - 14.0	4 / 26	21.0	IR15-SB07-2-4-09C	--	--	NSV	--	--	-- / --	NSV	No	Common lab contaminant
2-Hexanone	0.55 - 14.0	2 / 26	4.10	IR15-SB07-2-4-09C	4.1	95% KM (BCA) UCL	NSV	12,600	Buchman, 2008	-- / --	3.3E-04	No	Supplemental HQ less than one
4-Methyl-2-pentanone	0.27 - 14.0	1 / 26	1.70	IR15-SB09-2-7-09C	1.7	Maximum Result	NSV	443,000	Buchman, 2008	-- / --	3.8E-06	No	Supplemental HQ less than one
Acetone	3.40 - 40.0	10 / 26	180	IR15-SB09-2-7-09C	--	--	NSV	--	--	-- / --	NSV	No	Common lab contaminant
Bromodichloromethane	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Bromoform	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Bromomethane	0.55 - 14.0	0 / 24	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Carbon disulfide	1.60 - 14.0	3 / 25	1.40	IR15-SB02-2-7-09C	1.31	95% KM (t) UCL	NSV	94.1	Buchman, 2008	-- / --	0.01	No	Supplemental HQ less than one
Chloroform	0.11 - 14.0	0 / 25	--	--	--	--	1.00	--	--	-- / --	14.0	No	Not detected
Chloromethane	0.55 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
cis-1,2-Dichloroethene	0.27 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
cis-1,3-Dichloropropene	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dibromochloromethane	0.55 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dichlorodifluoromethane (Freon-12)	0.55 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Isopropylbenzene	0.27 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Methyl acetate	1.10 - 14.0	2 / 25	7.80	IR15-SB05-2-7-09C	--	--	NSV	--	--	-- / --	NSV	No	Uncertainty, no screening value
Methylcyclohexane	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Methyl-tert-butyl ether (MTBE)	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
trans-1,3-Dichloropropene	0.22 - 14.0	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Trichloroethene	0.55 - 14.0	0 / 25	--	--	--	--	1.00	--	--	-- / --	14.0	No	Not detected
Trichlorofluoromethane (Freon-11)	0.11 - 2.40	15 / 25	9.00	SMWU46-TT02-01	2.71	95% KM (t) UCL	NSV	16,400	Buchman, 2008	-- / --	1.7E-04	No	Supplemental HQ less than one
Vinyl chloride	0.55 - 14.0	0 / 25	--	--	--	--	10.0	--	--	-- / --	1.40	No	Not detected
Semivolatile Organic Compounds (mg/kg)													
2,2'-Oxybis(1-chloropropane)	180 - 440	0 / 25	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dichlorophenol	9.40 - 440	0 / 27	--	--	--	--	3.00	--	--	-- / --	147	No	Not detected
2,4-Dimethylphenol	180 - 1,100	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dinitrotoluene	19.0 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,6-Dinitrotoluene	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Chlorophenol	3.70 - 440	0 / 27	--	--	--	--	10.0	--	--	-- / --	44.0	No	Not detected
2-Methylnaphthalene	3.70 - 440	0 / 27	--	--	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
2-Methylphenol	3.70 - 1,100	0 / 27	--	--	--	--	500	--	--	-- / --	2.20	No	Not detected
2-Nitroaniline	3.70 - 420	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Nitrophenol	9.40 - 210	0 / 12	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3,3'-Dichlorobenzidine	38.0 - 440	0 / 26	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3-Nitroaniline	19.0 - 1,100	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4,6-Dinitro-2-methylphenol	19.0 - 1,100	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Bromophenyl-phenylether	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chloro-3-methylphenol	9.40 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chlorophenyl-phenylether	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Nitroaniline	19.0 - 1,100	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Acenaphthylene	3.70 - 440	1 / 27	2.80	IR15-SB21-1-4-10D	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
Acetophenone	180 - 440	2 / 27	1.60	IR15-SB21-1-4-10D	1.6	Maximum Result	NSV	300,000	Buchman, 2008	-- / --	5.3E-06	No	Supplemental HQ less than one
Anthracene	3.70 - 420	2 / 27	163	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
Atrazine	3.70 - 440	0 / 27	--	--	--	--	0.050	--	--	-- / --	8,800	No	Not detected
Benzaldehyde	3.70 - 440	1 / 18	10.0	IR15-SB21-1-4-10D	10	Maximum Result	NSV	10,000	Hagan, 1967	-- / --	0.001	No	Supplemental HQ less than one
Benzo(a)anthracene	19.0 - 420	2 / 27	450	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(b)fluoranthene	7.00 - 420	2 / 27	480	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(g,h,i)perylene	4.40 - 420	1 / 27	240	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Benzo(k)fluoranthene	3.70 - 440	1 / 27	26.0	IR15-SB21-1-4-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
bis(2-Chloroethoxy)methane	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Chloroethyl)ether	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Chloroisopropyl)ether	3.70 - 3.90	0 / 2	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Butylbenzylphthalate	19.0 - 440	0 / 27	--	--	--	--	100	--	--	-- / --	4.40	No	Not detected
Caprolactam	19.0 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Carbazole	180 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Chrysene	19.0 - 420	2 / 27	830	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Dibenz(a,h)anthracene	3.70 - 440	1 / 27	3.20	IR15-SB21-1-4-10D	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Dibenzofuran	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Fluoranthene	3.70 - 420	2 / 27	2,200	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Hexachlorobenzene	3.70 - 440	0 / 27	--	--	--	--	2.50	--	--	-- / --	176	No	Not detected
Hexachlorobutadiene	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Hexachloroethane	3.70 - 440	0 / 27	--	--	--	--	100	--	--	-- / --	4.40	No	Not detected

APPENDIX F-2

TABLE 8

Site 15 Subsurface Soil Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[2]	EPC Hazard Quotient	Step 3 COPC?	Rationale
Indeno(1,2,3-cd)pyrene	3.70 - 440	0 / 27	--	--	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Isophorone	19.0 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Naphthalene	1.90 - 440	0 / 27	--	--	--	--	--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
n-Nitroso-di-n-propylamine	3.70 - 440	0 / 27	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Phenanthrene	3.70 - 420	1 / 27	800	SMWU46-TT01-01			--	--	--	-- / --	--	--	See Low Molecular Weight PAHs
Phenol	3.70 - 440	0 / 27	--	--	--	--	50.0	--	--	-- / --	8.80	No	Not detected
Pyrene	19.0 - 420	2 / 27	2,400	SMWU46-TT01-01	--	--	--	--	--	-- / --	--	--	See High Molecular Weight PAHs
Low Molecular Weight PAHs	-- --	-- --	963	SMWU46-TT01-01 [3]	--	--	29000	--	--	-- / --	0.03	No	HQ less than one
High Molecular Weight PAHs	-- --	-- --	6,600	SMWU46-TT01-01 [3]	--	--	1100	--	--	-- / --	6.00	No	See text for discussion
Pesticide/Polychlorinated Biphenyls (µg/kg)													
4,4'-DDD	0.15 - 3.90	19 / 30	2,300	SMWU46-TT05-02	--	--	--	--	--	-- / --	--	--	See DDT and Metabolites
4,4'-DDE	0.15 - 3.90	22 / 30	4,400	SMWU46-TT04-01	--	--	--	--	--	-- / --	--	--	See DDT and Metabolites
4,4'-DDT	0.15 - 3.90	20 / 30	31,000	IR15-SB19-1-5-10D	--	--	--	--	--	-- / --	--	--	See DDT and Metabolites
DDT and Metabolites	-- --	-- --	33,000	SMWU46-TT04-01	--	--	21.0	--	--	-- / --	1,571	**Yes**	HQ greater than one
Aldrin	0.15 - 99.0	1 / 27	2.50	SMWU46-TT01-01	2.5	Maximum Result	2.50	--	--	1 / 27	1.00	No	Low frequency and magnitude of exceedance; no food chain effects
alpha-Chlordane	0.15 - 99.0	10 / 27	400	SMWU46-TT05-02	198	99% KM (Chebyshev) UCL	100	--	--	3 / 27	1.98	No	Low magnitude of exceedance; no food chain effects
Aroclor-1016	15.0 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Aroclor-1221	15.0 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Aroclor-1232	15.0 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Aroclor-1242	15.0 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Aroclor-1248	7.50 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Aroclor-1254	15.0 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Aroclor-1260	15.0 - 21.0	0 / 12	--	--	--	--	--	--	--	-- / --	--	No	Not detected
Total PCBs	-- --	-- --	--	--	--	--	20	--	--	-- / --	--	No	Not detected
beta-BHC	1.50 - 99.0	0 / 27	--	--	--	--	1.00	--	--	-- / --	99.0	No	Not detected
Endosulfan II	0.15 - 190	0 / 27	--	--	--	--	100	--	--	-- / --	1.90	No	Not detected
Endosulfan sulfate	0.15 - 190	0 / 27	--	--	--	--	100	--	--	-- / --	1.90	No	Not detected
Endrin	0.15 - 190	0 / 27	--	--	--	--	1.00	--	--	-- / --	190	No	Not detected
Endrin aldehyde	1.50 - 190	0 / 27	--	--	--	--	100	--	--	-- / --	1.90	No	Not detected
gamma-BHC (Lindane)	0.15 - 99.0	0 / 27	--	--	--	--	0.050	--	--	-- / --	1,980	No	Not detected
gamma-Chlordane	0.15 - 99.0	8 / 27	430	SMWU46-TT05-02	64.2	95% KM (t) UCL	100	--	--	3 / 27	0.64	No	HQ less than one, detected
Methoxychlor	0.34 - 990	0 / 27	--	--	--	--	100	--	--	-- / --	9.90	No	Not detected
Toxaphene	36.0 - 9,900	0 / 27	--	--	--	--	100	--	--	-- / --	99.0	No	Not detected
Inorganics (mg/kg)													
Antimony	0.10 - 8.60	6 / 15	2.50	IR15-SB11-1-5-10D	0.818	95% KM (t) UCL	0.27	--	--	4 / 15	3.03	No	See text for discussion
Barium	4.10 - 21.5	25 / 29	1,410	SMWU46-TT02-02	607	99% KM (Chebyshev) UCL	330	--	--	2 / 29	1.84	No	Low magnitude of exceedance
Cadmium	0.040 - 0.54	21 / 29	8.40	SMWU46-TT02-02	2.98	95% KM (Chebyshev) UCL	0.36	--	--	11 / 29	8.28	No	See text for discussion. No food chain effects.
Chromium	2.40 - 2.40	28 / 29	150	SMWU46-TT02-02	55.2	97.5% KM (Chebyshev) UCL	26.0	--	--	6 / 29	2.12	No	Low magnitude of exceedance; no food chain effects
Iron	3,000 - 3,000	14 / 15	179,000	IR15-SB09-2-7-09C	135000	99% KM (Chebyshev) UCL	200	--	--	13 / 15	675	No	See text for discussion
Lead	3.00 - 3.00	34 / 35	3,010	SWMU46-SB04-02	1560	99% KM (Chebyshev) UCL	11.0	--	--	17 / 35	142	**Yes**	HQ above one; food chain effects
Manganese	2.00 - 2.00	11 / 12	626	IR15-SB09-2-7-09C	577	99% KM (Chebyshev) UCL	220	--	--	1 / 12	2.62	No	See text for discussion
Mercury	0.010 - 0.037	21 / 29	0.25	SMWU46-TT04-01	0.0759	95% KM (Percentile Bootstrap) UC	0.10	--	--	7 / 29	0.76	No	HQ less than one, detected
Selenium	0.10 - 8.60	6 / 27	1.70	SMWU46-TT07-01	0.773	95% KM (t) UCL	0.52	--	--	5 / 27	1.49	No	Low magnitude of exceedance; no food chain effects
Silver	0.11 - 8.60	11 / 29	20.1	SMWU46-TT02-02	2.79	95% KM (t) UCL	4.20	--	--	3 / 29	0.66	No	HQ less than one, detected
Zinc	3.50 - 58.0	12 / 18	345	IR15-SB01-4-6-09C	94.2	95% KM (BCA) UCL	46.0	--	--	4 / 18	2.05	No	Low magnitude of exceedance; no food chain effects
Other Parameters (mg/kg)													
Chromium (hexavalent)	-- - --	2 / 2	0.37	IR15-SB20-1-5-10D	0.37	Maximum Result	NSV	0.34	LANL, 2005	-- / --	1.09	No	Low magnitude of exceedance

NOTES

1 - ProUCL Version 4 does not offer a calculated UCL when there are too few unique detected results (one or sometimes more than one).
In these instances, a 95% Chebyshev UCL using a proxy value of 1/2 the detection limit for NDs is calculated. The lower of the 95 UCL and the maximum concentration is selected

2 - Count of detected samples exceeding or equaling Screening Value

3 - All detected PAHs were summed for the sample SMWU46-TT01-01 including, those not carried forward to Step 3

EPC - Exposure Point Concentration

HQ - Hazard Quotient

mg/kg - milligrams per kilogram

NSV - No Screening Value

µg/kg - micrograms per kilogram

APPENDIX F-2

TABLE 9

Site 15 Groundwater Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value[2]	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[3]	EPC Hazard Quotient	Step 2 COPC?	Rationale
Volatile Organic Compounds (µg/L)													
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon-113)	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,1,2-Trichloroethane	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,1-Dichloroethane	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dibromo-3-chloropropane	0.50 - 1.00	0 / 5	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
1,2-Dibromoethane	0.25 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Butanone	0.50 - 5.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Hexanone	0.50 - 5.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Methyl-2-pentanone	0.50 - 5.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Acetone	3.40 - 5.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Bromodichloromethane	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Carbon disulfide	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Chloroethane	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
cis-1,2-Dichloroethene	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Cyclohexane	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dibromochloromethane	0.25 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dichlorodifluoromethane (Freon-12)	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Isopropylbenzene	0.50 - 1.00	1 / 9	4.90	IR15-TW03-09C	3.06	95% KM (Chebyshev) UCL	NSV	255	TCEQ, 2006*	-- / --	0.012	No	Supplemental HQ less than one
Methyl acetate	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Methylcyclohexane	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Methyl-tert-butyl ether (MTBE)	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Styrene	0.10 - 1.00	1 / 9	5.90	IR15-TW03-09C	3.64	95% KM (Chebyshev) UCL	NSV	455	TCEQ, 2006	-- / --	0.008	No	Supplemental HQ less than one
trans-1,2-Dichloroethene	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Trichloroethene	0.25 - 5.10	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Trichlorofluoromethane (Freon-11)	0.50 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Vinyl chloride	0.25 - 1.00	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Xylene, total	0.75 - 1.20	0 / 9	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Semivolatile Organic Compounds (µg/L)													
1,1-Biphenyl	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,2'-Oxybis(1-chloropropane)	0.10 - 11.0	0 / 6	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4,5-Trichlorophenol	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4,6-Trichlorophenol	0.10 - 0.50	0 / 5	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dichlorophenol	0.25 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dimethylphenol	0.50 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,4-Dinitrotoluene	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2,6-Dinitrotoluene	0.25 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Chloronaphthalene	0.050 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Chlorophenol	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Methylnaphthalene	0.050 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Methylphenol	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Nitroaniline	0.50 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
2-Nitrophenol	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3,3'-Dichlorobenzidine	1.00 - 22.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
3-Nitroaniline	0.50 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4,6-Dinitro-2-methylphenol	0.50 - 22.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Bromophenyl-phenylether	0.050 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chloro-3-methylphenol	0.25 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chloroaniline	0.25 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Chlorophenyl-phenylether	0.25 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Methylphenol	0.25 - 22.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
4-Nitroaniline	0.50 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Acenaphthene	0.050 - 11.0	0 / 8	--	--	--	--	9.70	--	--	-- / --	1.13	No	Not detected
Acenaphthylene	0.050 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Acetophenone	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Anthracene	0.050 - 11.0	1 / 8	0.041	IR15-GW04-11B	0.041	Maximum Result	NSV	0.18	TCEQ, 2006	-- / --	0.23	No	Supplemental HQ less than one
Atrazine	0.10 - 22.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Benzaldehyde	0.50 - 0.50	0 / 5	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Benzo(a)anthracene	0.050 - 11.0	1 / 8	0.12	IR15-GW04-11B	0.12	Maximum Result	NSV	34.6	TCEQ, 2006*	-- / --	0.00	No	Supplemental HQ less than one
Benzo(a)pyrene	0.050 - 11.0	1 / 8	0.072	IR15-GW04-11B	0.072	Maximum Result	NSV	0.014	TCEQ, 2006*	1 / 8	5.14	No	See text for discussion.
Benzo(b)fluoranthene	0.050 - 11.0	1 / 8	0.072	IR15-GW04-11B	0.072	Maximum Result	NSV	3	Buchman, 2008[4]	-- / --	0.02	No	Supplemental HQ less than one
Benzo(g,h,i)perylene	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Benzo(k)fluoranthene	0.10 - 11.0	1 / 8	0.093	IR15-GW04-11B	0.093	Maximum Result	NSV	3	Buchman, 2008[4]	-- / --	0.03	No	Supplemental HQ less than one
bis(2-Chloroethoxy)methane	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Chloroethyl)ether	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Chloroisopropyl)ether	0.050 - 0.050	0 / 2	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
bis(2-Ethylhexyl)phthalate	0.50 - 11.0	2 / 8	0.33	IR15-GW06-11B	0.33	Maximum Result	NSV	360	Buchman, 2008	-- / --	0.001	No	Supplemental HQ less than one

APPENDIX F-2

TABLE 9

Site 15 Groundwater Screen - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Range of Non-Detect Values	Frequency of Detection	Maximum Concentration Detected	Sample ID of Maximum Detected Concentration	Exposure Point Concentration (EPC)	EPC Basis[1]	Screening Value[2]	Supplemental Screening Value	Supplemental Screening Value Source	Frequency of Exceedance[3]	EPC Hazard Quotient	Step 2 COPC?	Rationale
Caprolactam	0.50 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Carbazole	0.10 - 11.0	1 / 8	0.13	IR15-GW04-11B	--	--	NSV	--	--	-- / --	NSV	No	Uncertainty, no screening value
Chrysene	0.050 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dibenz(a,h)anthracene	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dibenzofuran	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Di-n-butylphthalate	0.50 - 22.0	0 / 8	--	--	--	--	3.40	--	--	-- / --	6.47	No	Not detected
Di-n-octylphthalate	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Fluorene	0.050 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Hexachlorobenzene	0.25 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Hexachlorobutadiene	0.10 - 11.0	0 / 8	--	--	--	--	0.32	--	--	-- / --	34.4	No	Not detected
Hexachlorocyclopentadiene	0.25 - 11.0	0 / 8	--	--	--	--	0.070	--	--	-- / --	157	No	Not detected
Hexachloroethane	0.25 - 11.0	0 / 8	--	--	--	--	9.40	--	--	-- / --	1.17	No	Not detected
Indeno(1,2,3-cd)pyrene	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
n-Nitroso-di-n-propylamine	0.10 - 11.0	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Phenanthrene	0.050 - 11.0	2 / 8	0.072	IR15-GW04-11B	0.0684	95% KM (t) UCL	NSV	4.6	TCEQ, 2006	-- / --	0.01	No	Supplemental HQ less than one
Pyrene	0.10 - 11.0	1 / 8	0.062	IR15-GW04-11B	0.062	Maximum Result	NSV	0.24	TCEQ, 2006	-- / --	0.26	No	Supplemental HQ less than one
Pesticide/Polychlorinated Biphenyls (µg/L)													
4,4'-DDT	8.00E-04 - 0.053	1 / 8	0.0010	IR15-GW04-11B	0.001	Maximum Result	0.0010	--	--	1 / 8	1.0	No	Low magnitude of exceedance
alpha-Chlordane	8.00E-04 - 0.053	1 / 8	0.012	IR15-GW04-11B	0.012	Maximum Result	0.0040	--	--	1 / 8	3.00	No	Low magnitude of exceedance
Aroclor-1016	0.080 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
Aroclor-1221	0.080 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
Aroclor-1232	0.040 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
Aroclor-1242	0.080 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
Aroclor-1248	0.080 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
Aroclor-1254	0.080 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
Aroclor-1260	0.080 - 0.53	0 / 8	--	--	--	--	0.030	--	--	-- / --	17.7	No	Not detected
beta-BHC	0.0032 - 0.053	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
delta-BHC	8.00E-04 - 0.053	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Dieldrin	8.00E-04 - 0.053	0 / 8	--	--	--	--	0.0019	--	--	-- / --	27.9	No	Not detected
Endosulfan II	8.00E-04 - 0.053	0 / 8	--	--	--	--	0.0087	--	--	-- / --	6.09	No	Not detected
Endosulfan sulfate	8.00E-04 - 0.053	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Endrin	8.00E-04 - 0.053	0 / 8	--	--	--	--	0.0023	--	--	-- / --	23.0	No	Not detected
Endrin aldehyde	0.0032 - 0.053	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
Endrin ketone	0.0032 - 0.053	0 / 8	--	--	--	--	NSV	--	--	-- / --	NSV	No	Not detected
gamma-BHC (Lindane)	8.00E-04 - 0.053	0 / 8	--	--	--	--	0.016	--	--	-- / --	3.31	No	Not detected
gamma-Chlordane	8.00E-04 - 0.053	1 / 8	0.0072	IR15-GW04-11B	0.0072	Maximum Result	0.0040	--	--	1 / 8	1.80	No	Low magnitude of exceedance
Heptachlor	8.00E-04 - 0.053	0 / 8	--	--	--	--	0.0036	--	--	-- / --	14.7	No	Not detected
Heptachlor epoxide	8.00E-04 - 0.053	2 / 8	0.0039	IR15-GW04-11B	0.0039	Maximum Result	0.0036	--	--	1 / 8	1.08	No	Low magnitude of exceedance
Methoxychlor	8.00E-04 - 0.053	0 / 8	--	--	--	--	0.030	--	--	-- / --	1.77	No	Not detected
Toxaphene	2.00E-04 - 1.10	0 / 8	--	--	--	--	0.0020	--	--	-- / --	550	No	Not detected
Inorganics (mg/L)													
Nickel	1.10 - 10.0	7 / 9	30.0	IR15-TW01-09C	23.7	95% KM (Chebyshev) UCL	8.20	--	--	3 / 10	2.89	No	Low magnitude of exceedance
Dissolved Metals (mg/L)													
Nickel, Dissolved	10.0 - 10.0	7 / 9	25.0	IR15-TW01-09C	25	Maximum Result	8.20	--	--	3 / 10	3.05	No	Low magnitude of exceedance
Other Parameters (mg/L)													
Chromium (hexavalent)	1.00 - 1.00	1 / 6	1.10	IR15-GW01-10D	1.04	95% KM (Chebyshev) UCL	NSV	49.6	TCEQ, 2006	-- / --	0.02	No	Supplemental HQ less than one

NOTES

* Freshwater screening value used when a Marine value was unavailble

1 - ProUCL Version 4 does not offer a calculated UCL when there are too few unique detected results (one or sometimes more than one).
In these instances, a 95% Chebyshev UCL using a proxy value of 1/2 the detection limit for NDs is calculated. The lower of the 95 UCL and the maximum concentration is selected

2 - Marine screening values except where noted with an *.

3 - Count of detected samples exceeding or equaling Screening Value

4 - An uncertainty factor of 100 was applied to the acute value to estimate a chronic value

EPC - Exposure Point Concentration

HQ - Hazard Quotient

NSV - No Screening Value

µg/L - Micrograms per liter

APPENDIX F-2

TABLE 10

Dioxin/Furan TEQs for Mammals and Birds

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

SampleID		SS21-10D IR15-SS21-10D			SS11-10D IR15-SS11-10D			SS12-10D IR15-SS12-10D				
SampleDate		11/9/2010			11/10/2010			11/10/2010				
DIOXIN(PG/G)	**TEF for Mammals**	**Conc.**		**TEQ**	**Conc.**		**TEQ**	**Conc.**		**TEQ**		
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01	17	U	--	95	U	--	63	U	--		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.01	38	U	--	140		1.4	110	U	--		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01	0.83	U	--	3.7		0.037	2.2	J	0.022		
1,2,3,4,7,8-Hexachlorodibenzofuran	0.1	1.2	J	0.12	6.9	U	--	10		1		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.1	1.2	J	0.12	4.8	U	--	3	U	--		
1,2,3,6,7,8-Hexachlorodibenzofuran	0.1	1.4	U	--	8.7	U	--	5.5	U	--		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.1	1.8	J	0.18	6.8		0.68	4.9	U	--		
1,2,3,7,8,9-Hexachlorodibenzofuran	0.1	0.19	U	--	0.61	U	--	0.84	U	--		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1	1.4	U	--	3.6	U	--	3.7	U	--		
1,2,3,7,8-Pentachlorodibenzofuran	0.03	0.3	U	--	1	U	--	0.58	U	--		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	0.46	U	--	0.96	U	--	0.89	U	--		
2,3,4,6,7,8-Hexachlorodibenzofuran	0.1	0.61	U	--	2.1	J	0.21	1.9	J	0.19		
2,3,4,7,8-Pentachlorodibenzofuran	0.3	0.51	U	--	3.5	U	--	0.57	U	--		
2,3,7,8-TCDD (dioxin)	1	0.15	U	--	0.15	U	--	0.33	U	--		
2,3,7,8-Tetrachlorodibenzofuran	0.1	1.1		0.11	3		0.3	2	U	--		
Octachlorodibenzofuran	0.0003	20		0.006	96		0.0288	74		0.0222		
Octachlorodibenzo-p-dioxin	0.0003	950		0.285	1400		0.42	2300		0.69	**Maximum**	**Average**
Sum (pg/g)				**0.82**			**3.08**			**1.92**	**3.08**	**1.940**
Sum (mg/kg)				**0.000000821**			**0.000003076**			**0.000001924**	**0.000003080**	**1.94033E-06**

DIOXIN(PG/G)	**TEF for Birds**	**Conc.**		**TEQ**	**Conc.**		**TEQ**	**Conc.**		**TEQ**		
1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01	17	U	--	95	U	--	63	U	--		
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	0.001	38	U	--	140		0.14	110	U	--		
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01	0.83	U	--	3.7		0.037	2.2	J	0.022		
1,2,3,4,7,8-Hexachlorodibenzofuran	0.1	1.2	J	0.12	6.9	U	--	10		1		
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.05	1.2	J	0.06	4.8	U	--	3	U	--		
1,2,3,6,7,8-Hexachlorodibenzofuran	0.1	1.4	U	--	8.7	U	--	5.5	U	--		
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.01	1.8	J	0.018	6.8		0.068	4.9	U	--		
1,2,3,7,8,9-Hexachlorodibenzofuran	0.1	0.19	U	--	0.61	U	--	0.84	U	--		
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.1	1.4	U	--	3.6	U	--	3.7	U	--		
1,2,3,7,8-Pentachlorodibenzofuran	0.01	0.3	U	--	1	U	--	0.58	U	--		
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	1	0.46	U	--	0.96	U	--	0.89	U	--		
2,3,4,6,7,8-Hexachlorodibenzofuran	0.1	0.61	U	--	2.1	J	0.21	1.9	J	0.19		
2,3,4,7,8-Pentachlorodibenzofuran	1	0.15	U	--	3.5	U	--	0.57	U	--		
2,3,7,8-TCDD (dioxin)	1	0.15	U	--	0.15	U	--	0.33	U	--		
2,3,7,8-Tetrachlorodibenzofuran	1	1.1		1.1	3		3	2	U	--		
Octachlorodibenzofuran	0.0001	20		0.002	96		0.0096	74		0.0074		
Octachlorodibenzo-p-dioxin	0.0001	950		0.095	1400		0.14	2300		0.23	**Maximum**	**Average**
Sum (pg/g)				**1.40**			**3.60**			**1.45**	**3.6**	**2.150**
Sum (mg/kg)				**0.000001395**			**0.000003605**			**0.000001449**	**0.000003600**	**2.14967E-06**

Notes
TEF - toxic equivalency factor
TEQ - toxicity equivalence

APPENDIX F-2

TABLE 11

Exposure Parameters for Upper Trophic Level Ecological Receptors - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

	Body Weight (kg)		Water Ingestion Rate (L/day)		Food Ingestion Rate (kg/day - dry)		Dietary Composition (percent)						Soil Ingestion (percent)	
Receptor	Value	Reference	Value	Reference	Value	Reference	Terr Plants	Terr Inv	Mouse	Vole	Shrew	Reference	Value	Reference
Mammals														
Meadow vole	0.043	Silva and Downing 1995	0.009	USEPA 1993	0.0021	USEPA 1993	95.6	2.0	0.0	0.0	0.0	USEPA 1993	2.4	Beyer et al. 1994
Red fox	4.06	Silva and Downing 1995	0.349	allometric equation	0.1231	Sample and Suter 1994	7.0	2.8	29.2	29.1	29.1	USEPA 1993	2.8	Beyer et al. 1994
Short-tailed shrew	0.017	USEPA 1993	0.004	USEPA 1993	0.0015	USEPA 1993	4.7	82.3	0.0	0.0	0.0	USEPA 1993; Sample and Suter 1994	13.0	Sample and Suter 1994
White-footed mouse	0.021	Silva and Downing 1995	0.006	Sample and Suter 1994	0.0005	Sample and Suter 1994	51.0	47.0	0.0	0.0	0.0	Martin et al. 1951; Sample and Suter 1994	2.0	Beyer et al. 1994
White-tailed deer	52.90	Silva and Downing 1995	3.522	allometric equation	0.2610	Sample and Suter 1994	98.0	0.0	0.0	0.0	0.0	Sample and Suter 1994	2.0	Beyer et al. 1994
Birds														
American robin	0.077	USEPA 1993	0.011	allometric equation	0.0055	Levey and Karasov 1989	51.9	43.5	0.0	0.0	0.0	Martin et al. 1951	4.6	Sample and Suter 1994
Mourning dove	0.127	Tomlinson et al. 1994	0.015	allometric equation	0.0176	allometric equation	95.0	0.0	0.0	0.0	0.0	Tomlinson et al. 1994	5.0	Assumed based on diet
Red-tailed hawk	1.13	Sample and Suter 1994	0.064	allometric equation	0.0360	Sample and Suter 1994	0.0	0.0	34.0	33.0	33.0	USEPA 1993; Sample and Suter 1994	0.0	Sample and Suter 1994

Notes
kg - kilogram
kg/day-dry - kilogram per day - dry weight
Terr - terrestrial
Inv - invertebrate

APPENDIX F-2

TABLE 12

Soil Bioaccumulation Factors For Terrestrial Plants - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Baseline Ecological Risk Assessment			Regression		
	Soil-Plant BAF (dry weight)					
	Value	Basis	Reference	B0	B1	Reference
Inorganics						
Cadmium	--	--	--	-0.476	0.546	Bechtel Jacobs 1998
Chromium	0.041	Median	Bechtel Jacobs 1998	--	--	--
Lead	--	--	--	-1.328	0.561	Bechtel Jacobs 1998
Mercury	--	--	--	-0.996	0.544	Bechtel Jacobs 1998
Selenium	--	--	--	-0.678	1.104	Bechtel Jacobs 1998
Silver	0.014	Median	Bechtel Jacobs 1998	--	--	--
Zinc	--	--	--	1.575	0.555	Bechtel Jacobs 1998
Pesticides/PCBs						
4,4'-DDD	--	--	--	-2.512	0.752	USEPA 2007e
4,4'-DDE	--	--	--	-2.512	0.752	USEPA 2007e
4,4'-DDT	--	--	--	-2.512	0.752	USEPA 2007e
Aldrin	0.139	Calculated	USEPA 2007e	--	--	--
alpha-Chlordane	0.165	Calculated	USEPA 2007e	--	--	--
Aroclor-1254	0.139	Calculated	USEPA 2007e	--	--	--
Endrin	0.535	Calculated	USEPA 2007e	--	--	--
gamma-Chlordane	0.165	Calculated	USEPA 2007e	--	--	--
Semivolatile Organics						
Acenaphthylene	--	--	--	-1.144	0.791	USEPA 2007e
Anthracene	--	--	--	-0.989	0.778	USEPA 2007e
Benzo(a)anthracene	--	--	--	-2.708	0.594	USEPA 2007e
Benzo(a)pyrene	--	--	--	-2.062	0.975	USEPA 2007e
Benzo(b)fluoranthene	0.310	Median	USEPA 2007e	--	--	--
Benzo(g,h,i)perylene	--	--	--	-0.931	1.183	USEPA 2007e
Benzo(k)fluoranthene	--	--	--	-2.158	0.860	USEPA 2007e
Chrysene	--	--	--	-2.708	0.594	USEPA 2007e
Dibenz(a,h)anthracene	0.130	Median	USEPA 2007e	--	--	--
Fluoranthene	0.500	Median	USEPA 2007e	--	--	--
Indeno(1,2,3-cd)pyrene	0.110	Median	USEPA 2007e	--	--	--
Phenanthrene	--	--	--	-0.167	0.620	USEPA 2007e
Pyrene	0.720	Median	USEPA 2007e	--	--	--
Dioxin/Furans						
2,3,7,8-TCDD TEQ - Mammal	0.135	Calculated	USEPA 2007e	--	--	--
2,3,7,8-TCDD TEQ - Bird	0.135	Calculated	USEPA 2007e	--	--	--

Notes

BAF - bioaccumulation factor

PCBs - polychlorinated biphenyls

TEQ - toxic equivalency

APPENDIX F-2

TABLE 13

Soil Bioaccumulation Factors For Soil Invertebrates - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Baseline Ecological Risk Assessment Soil-Invertebrate BAF (dry weight)			Regression		
	Value	Basis	Reference	B0	B1	Reference
Inorganics						
Cadmium	--	--	--	2.114	0.795	Sample et al. 1998a
Chromium	0.320	Geometric mean	Sample et al. 1998a	--	--	--
Lead	--	--	--	-0.218	0.807	Sample et al. 1998a
Mercury	1.186	Geometric mean	Sample et al. 1998a	--	--	--
Selenium	--	--	--	-0.075	0.733	Sample et al. 1998a
Silver	2.045	Median	Sample et al. 1998a	--	--	--
Zinc	--	--	--	4.449	0.328	Sample et al. 1998a
Pesticides/PCBs						
4,4'-DDD	--	--	--	1.161	0.698	USEPA 2007e
4,4'-DDE	--	--	--	2.477	0.880	USEPA 2007e
4,4'-DDT	--	--	--	2.125	0.869	USEPA 2007e
Aldrin	3.300	Mean	Edwards and Bohlen 1992	--	--	--
alpha-Chlordane	4.000	Mean	Edwards and Bohlen 1992	--	--	--
Aroclor-1254	--	--	--	1.410	1.361	Sample et al. 1998a
Endrin	3.600	Mean	Edwards and Bohlen 1992	--	--	--
gamma-Chlordane	4.000	Mean	Edwards and Bohlen 1992	--	--	--
Semivolatile Organics						
Acenaphthylene	0.220	Median	Beyer and Stafford 1993	--	--	--
Anthracene	0.320	Median	Beyer and Stafford 1993	--	--	--
Benzo(a)anthracene	0.270	Median	Beyer and Stafford 1993	--	--	--
Benzo(a)pyrene	0.340	Median	Beyer and Stafford 1993	--	--	--
Benzo(b)fluoranthene	0.210	Median	Beyer and Stafford 1993	--	--	--
Benzo(g,h,i)perylene	0.150	Median	Beyer and Stafford 1993	--	--	--
Benzo(k)fluoranthene	0.210	Median	Beyer and Stafford 1993	--	--	--
Chrysene	0.440	Median	Beyer and Stafford 1993	--	--	--
Dibenz(a,h)anthracene	0.490	Median	Beyer and Stafford 1993	--	--	--
Fluoranthene	0.370	Median	Beyer and Stafford 1993	--	--	--
Indeno(1,2,3-cd)pyrene	0.410	Median	Beyer and Stafford 1993	--	--	--
Phenanthrene	0.280	Median	Beyer and Stafford 1993	--	--	--
Pyrene	0.390	Median	Beyer and Stafford 1993	--	--	--
Dioxin/Furans						
2,3,7,8-TCDD TEQ - Mammal	--	--	--	3.533	1.182	Sample et al. 1998a
2,3,7,8-TCDD TEQ - Bird	--	--	--	3.533	1.182	Sample et al. 1998a

Notes
BAF - bioaccumulation factor
PCBs - polychlorinated biphenyls
TEQ - toxic equivalency

APPENDIX F-2

TABLE 14

Soil Bioaccumulation Factors For Small Mammals - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Omnivores						Herbivores						Insectivores					
	Baseline Ecological Risk Assessment			Regression			Baseline Ecological Risk Assessment			Regression			Baseline Ecological Risk Assessment			Regression		
	Soil-Mammal BAF (dry weight)						Soil-Mammal BAF (dry weight)						Soil-Mammal BAF (dry weight)					
	Value	Basis	Reference	B0	B1	Reference	Value	Basis	Reference	B0	B1	Reference	Value	Basis	Reference	B0	B1	Reference
Inorganics																		
Cadmium	--	--	--	-1.538	0.566	Sample et al. 1998b	--	--	--	-1.257	0.472	Sample et al. 1998b	--	--	--	0.815	0.964	Sample et al. 1998b
Chromium	--	--	--	-1.495	0.733	Sample et al. 1998b	--	--	--	-1.460	0.734	Sample et al. 1998b	--	--	--	-1.460	0.734	Sample et al. 1998b
Lead	--	--	--	0.076	0.442	Sample et al. 1998b	--	--	--	-0.611	0.518	Sample et al. 1998b	--	--	--	0.482	0.487	Sample et al. 1998b
Mercury	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	--	--	--	-0.416	0.376	Sample et al. 1998b	--	--	--	-0.416	0.376	Sample et al. 1998b	--	--	--	-0.416	0.376	Sample et al. 1998b
Silver	0.151	Median	Sample et al. 1998b	--	--	--	0.006	Geometric mean	Sample et al. 1998b	--	--	--	0.036	Geometric mean	Sample et al. 1998b	--	--	--
Zinc	--	--	--	4.471	0.074	Sample et al. 1998b	--	--	--	4.363	0.071	Sample et al. 1998b	--	--	--	4.248	0.132	Sample et al. 1998b
Pesticides/PCBs																		
4,4'-DDD	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
4,4'-DDE	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
4,4'-DDT	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
Aldrin	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
alpha-Chlordane	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
Aroclor-1254	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
Endrin	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
gamma-Chlordane	NA	--	--	--	--	--	NA	--	--	--	--	--	NA	--	--	--	--	--
Semivolatile Organics																		
Acenaphthylene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Anthracene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Benzo(a)anthracene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Benzo(a)pyrene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Benzo(b)fluoranthene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Benzo(g,h,i)perylene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Benzo(k)fluoranthene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Chrysene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Dibenz(a,h)anthracene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Fluoranthene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Indeno(1,2,3-cd)pyrene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Phenanthrene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Pyrene	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--	0.000	Assumed	USEPA 2007e	--	--	--
Dioxin/Furans																		
2,3,7,8-TCDD TEQ - Mammal	--	--	--	0.811	1.099	Sample et al. 1998b	--	--	--	0.811	1.099	Sample et al. 1998b	--	--	--	0.811	1.099	Sample et al. 1998b
2,3,7,8-TCDD TEQ - Bird	--	--	--	0.811	1.099	Sample et al. 1998b	--	--	--	0.811	1.099	Sample et al. 1998b	--	--	--	0.811	1.099	Sample et al. 1998b

Notes
BAF - bioaccumulation factor
PCBs - polychlorinated biphenyls
TEQ - toxic equivalency

APPENDIX F-2

TABLE 15

Ingestion Screening Values for Mammals at Site 15

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Chemical Form	Test Organism	Duration	Critical Life Stage?	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Reference
Inorganics									
Cadmium	--	rat	chronic	--	oral	--	0.77	7.70	USEPA 2005a
Chromium	Cr+3	multiple	chronic	--	oral	--	2.40	12.0	USEPA 2008
Lead	--	rat	chronic	--	oral	--	4.70	8.90	USEPA 2005b
Mercury[a]	Methyl mercury chloride	rat	3 generations	Yes	oral in diet	reproduction	0.032	0.160	Sample et al. 1996
Mercury[b]	Methyl mercury chloride	mink	93 days	No	oral in diet	survival/weight loss/ataxia	0.150	0.247	Sample et al. 1996
Selenium	Potassium selenate (SeO4)	rat	1 year	Yes	oral in water	reproduction	0.20	0.33	Sample et al. 1996
Silver	--	pig	chronic	--	oral	--	12.04	60.2	USEPA 2006
Zinc	--	multiple	chronic	--	oral	--	75.4	377	USEPA 2007a
Pesticides/PCBs									
4,4'-DDD	--	rat	chronic	--	oral	--	0.147	0.735	USEPA 2007b
4,4'-DDE	--	rat	chronic	--	oral	--	0.147	0.735	USEPA 2007b
4,4'-DDT	--	rat	chronic	--	oral	--	0.147	0.735	USEPA 2007b
Aldrin	--	rat	3 generations	Yes	oral in diet	reproduction	0.20	1.00	Sample et al. 1996
alpha-Chlordane	--	mouse	6 generations	Yes	oral in diet	reproduction	4.58	9.16	Sample et al. 1996
Aroclor-1254[a]	--	oldfield mouse	12 months	Yes	oral in diet	reproduction	0.136	0.680	Sample et al. 1996
Aroclor-1254[b]	--	mink	4.5 months	Yes	oral in diet	reproduction	0.137	0.685	Sample et al. 1996
Endrin	--	mouse	120 days	Yes	oral in diet	reproduction	0.184	0.920	Sample et al. 1996
gamma-Chlordane	--	mouse	6 generations	Yes	oral in diet	reproduction	4.58	9.16	Sample et al. 1996
Semivolatile Organics									
Acenaphthylene	--	rat	chronic	--	oral	--	65.6	146.69	USEPA 2007c
Anthracene	--	rat	chronic	--	oral	--	65.6	328.00	USEPA 2007c
Benzo(a)anthracene	--	mouse	chronic	--	oral	--	0.615	1.37	USEPA 2007c
Benzo(a)pyrene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Benzo(b)fluoranthene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Benzo(g,h,i)perylene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Benzo(k)fluoranthene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Chrysene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Dibenz(a,h)anthracene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Fluoranthene	--	rat	chronic	--	oral	--	65.6	328	USEPA 2007c
Indeno(1,2,3-cd)pyrene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Phenanthrene	--	rat	chronic	--	oral	--	65.6	328	USEPA 2007c
Pyrene	--	mouse	chronic	--	oral	--	0.615	3.07	USEPA 2007c
Dioxin/Furans									
2,3,7,8-TCDD TEQ - Mammal	--	rat	3 generations	Yes	oral in diet	reproduction	0.0000010	0.000010	Sample et al. 1996

Notes:

[a] Used for short-tailed shrew, white-footed deer mouse, and white-tailed deer only

[b] Used for red fox only

LOAEL - Lowest observable adverse effect level

MATC - maximum allowable tissue concentration

mg/kg/d - milligrams per kilogram body weight per day

NOAEL - No observable adverse effect level

PCBs - polychlorinated biphenyls

TEQ - toxic equivalency

APPENDIX F-2

TABLE 16

Ingestion Screening Values for Birds at Site 15

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Chemical Form	Test Organism	Duration	Critical Life Stage?	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Reference
Inorganics									
Cadmium	--	multiple	chronic	--	oral	--	1.47	7.35	USEPA 2005a
Chromium	Cr+3	multiple	chronic	--	oral	--	2.66	13.3	USEPA 2008
Lead	Metallic	American kestrel	7 months	Yes	oral in diet	reproduction	3.85	19.3	Sample et al. 1996
Lead[a]	--	chicken	chronic	--	oral	--	1.63	3.26	USEPA 2005b
Mercury	--	red-tailed hawk	12 weeks	Yes	oral in diet	survival/neurological	0.49	1.20	USEPA 1995b
Mercury[a]	Mercuric chloride	Japanese quail	1 year	Yes	oral in diet	reproduction	0.45	0.90	Sample et al. 1996
Selenium	Selanomethionine	screech owl	13.7 weeks	Yes	oral in diet	reproduction	0.44	1.50	Sample et al. 1996
Selenium[a]	--	chicken	chronic	--	oral	--	0.29	0.58	USEPA 2007d
Silver	--	turkey	chronic	--	oral	--	4.04	20.20	USEPA 2006 (SSL)
Zinc	--	multiple	chronic	--	oral	--	66.1	331	USEPA 2007a
Pesticides/PCBs									
4,4'-DDD	--	Japanese quail	3 generations	Yes	oral in diet	reproduction	0.50	5.00	USEPA, 1995b (DDT value)
4,4'-DDD[b]	--	barn owl	2 years	Yes	oral in diet	reproduction	0.08	0.40	Blus 1996 (DDE value)
4,4'-DDE	--	Japanese quail	3 generations	Yes	oral in diet	reproduction	0.50	5.00	USEPA, 1995b (DDT value)
4,4'-DDE[b]	--	barn owl	2 years	Yes	oral in diet	reproduction	0.08	0.40	Blus 1996
4,4'-DDT	--	Japanese quail	3 generations	Yes	oral in diet	reproduction	0.50	5.00	USEPA 1995b
4,4'-DDT[b]	--	barn owl	2 years	Yes	oral in diet	reproduction	0.08	0.40	Blus 1996 (DDE value)
Aldrin	--	ring-necked pheasant	5 days	No	oral in diet	survival	0.07	0.35	Hill et al. 1975
alpha-Chlordane	--	red-winged blackbird	84 days	Yes	oral in diet	survival	2.14	10.7	Sample et al. 1996
alpha-Chlordane[a]	--	northern bobwhite	not specified	Yes	oral in diet	reproduction	1.19	5.95	Wiemeyer 1996
Aroclor-1254[a]	--	ring-necked pheasant	17 weeks	Yes	oral	reproduction	0.36	1.80	Sample et al. 1996
Aroclor-1254	--	screech owl	2 generations	Yes	oral in diet	reproduction	0.41	2.05	Sample et al. 1996 (Aroclor-1242 value)
Endrin[a]	--	mallard	>200 days	Yes	oral in diet	reproduction	0.30	1.50	Sample et al. 1996
Endrin	--	screech owl	>83 days	Yes	oral in diet	reproduction	0.02	0.10	Sample et al. 1996
gamma-Chlordane	--	red-winged blackbird	84 days	Yes	oral in diet	survival	2.1	11	Sample et al. 1996
gamma-Chlordane[a]	--	northern bobwhite	not specified	Yes	oral in diet	reproduction	1.2	6	Wiemeyer 1996
Semivolatile Organics									
Acenaphthylene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Anthracene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Benzo(a)anthracene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Benzo(a)pyrene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Rigdon and Neal 1963
Benzo(b)fluoranthene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Benzo(g,h,i)perylene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Benzo(k)fluoranthene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Chrysene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Dibenz(a,h)anthracene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value

APPENDIX F-2

TABLE 16

Ingestion Screening Values for Birds at Site 15

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical	Chemical Form	Test Organism	Duration	Critical Life Stage?	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Reference
Fluoranthene	--	chicken	35 days	No	oral in diet	reproduction	7.10	35.5	Rigdon and Neal 1963 (Benzo(a)pyrene value)
Indeno(1,2,3-cd)pyrene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Phenanthrene	--	chicken	35 days	No	oral in diet	reproduction	7.1	36	Benzo(a)pyrene value
Pyrene	--	chicken	35 days	No	oral in diet	reproduction	7.10	35.5	Rigdon and Neal 1963 (Benzo(a)pyrene value)
Dioxin/Furans									
2,3,7,8-TCDD TEQ - Bird	--	ring-necked pheasant	10 weeks	Yes	injection	reproduction	0.000014	0.000140	Sample et al. 1996

Notes:

[a] Used for mourning dove only

[b] Used for red-tailed hawk only

LOAEL - Lowest observable adverse effect level

MATC - maximum allowable tissue concentration

mg/kg/d - milligrams per kilogram body weight per day

NOAEL - No observable adverse effect level

PCBs - polychlorinated biphenyls

TEQ - toxic equivalency

APPENDIX F-2

TABLE 17

Hazard Quotients Based on the Max for Wildlife Receptors Exposed to Bioaccumulative Surface Soil Analytes at Site 15 - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

	Hazard Quotients															
	Meadow vole		Red fox		Short-tailed shrew		White-footed mouse		White-tailed deer		American robin		Mourning dove		Red-tailed hawk[1]	
Chemical (mg/kg)	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*
Inorganics																
Lead	0.05	0.03	0.07	0.03	0.56	0.30	0.07	0.04	0.004	0.002	0.29	0.06	0.53	0.27	0.07	0.01
Mercury	0.68	0.14	0.03	0.02	**3.73**	0.75	0.68	0.14	0.07	0.01	0.13	0.05	0.14	0.07	0.005	0.002
Zinc	0.06	0.01	0.05	0.01	0.48	0.10	0.08	0.02	0.006	0.001	0.27	0.05	0.18	0.04	0.06	0.01
Pesticides/PCBs																
4,4'-DDD	0.001	2.81E-04	0.009	0.002	5.28E-02	0.01	8.27E-03	0.002	7.22E-05	1.44E-05	0.007	6.74E-04	6.43E-04	6.43E-05	0.02	0.004
4,4'-DDE	0.005	9.75E-04	0.04	0.008	2.31E-01	0.05	0.04	0.007	1.83E-04	3.66E-05	0.03	0.003	0.002	1.68E-04	0.08	0.02
4,4'-DDT	0.006	0.001	0.04	0.009	2.51E-01	0.05	0.04	0.008	2.59E-04	5.17E-05	0.03	0.003	0.002	2.41E-04	0.09	0.02
Aroclor-1254	0.03	0.006	0.10	0.02	0.58	0.12	0.09	0.02	0.002	4.09E-04	0.08	0.02	0.03	0.005	0.04	0.008
Endrin	2.74E-04	5.48E-05	5.12E-04	1.02E-04	0.003	5.10E-04	4.40E-04	8.80E-05	2.48E-05	4.96E-06	0.01	0.002	4.39E-04	8.78E-05	0.005	9.96E-04
Semivolatile Organics																
Acenaphthylene	2.7769E-06	5.5539E-07	1.811E-07	3.6224E-08	1.793E-06	3.5865E-07	8.7461E-07	1.7492E-07	2.8517E-07	5.703E-08	2.5092E-05	5.0184E-06	7.4116E-05	1.4823E-05	NA	NA
Anthracene	5.5287E-06	1.1057E-06	3.589E-07	7.1787E-08	4.035E-06	8.0696E-07	1.8275E-06	3.6549E-07	5.6718E-07	1.134E-07	5.1969E-05	1.0394E-05	1.47E-04	2.9403E-05	NA	NA
Benzo(a)anthracene	0.001	1.46E-04	8.583E-05	1.7194E-05	0.002	3.37E-04	3.55E-04	7.1095E-05	7.2901E-05	1.46E-05	9.7664E-05	1.9533E-05	1.91E-04	3.8296E-05	NA	NA
Benzo(a)pyrene	0.002	4.02E-04	3.69E-04	7.4013E-05	0.010	0.002	0.002	3.10E-04	1.93E-04	3.87E-05	4.24E-04	8.47E-05	5.53E-04	1.11E-04	NA	NA
Benzo(b)fluoranthene	0.007	0.001	0.001	1.59E-04	0.01	0.003	0.003	6.27E-04	7.53E-04	1.51E-04	8.70E-04	1.74E-04	0.002	3.91E-04	NA	NA
Benzo(g,h,i)perylene	0.009	0.002	0.001	1.78E-04	0.01	0.003	0.003	6.57E-04	8.88E-04	1.78E-04	9.24E-04	1.85E-04	0.002	4.59E-04	NA	NA
Benzo(k)fluoranthene	0.001	2.88E-04	2.22E-04	4.4494E-05	0.004	8.95E-04	7.81E-04	1.56E-04	1.42E-04	2.84E-05	2.22E-04	4.43E-05	3.95E-04	7.89E-05	NA	NA
Chrysene	0.001	2.68E-04	2.10E-04	4.2123E-05	0.006	0.001	0.001	2.01E-04	1.30E-04	2.60E-05	2.69E-04	5.38E-05	3.54E-04	7.09E-05	NA	NA
Dibenz(a,h)anthracene	8.03E-04	1.61E-04	1.60E-04	3.2117E-05	0.005	9.95E-04	7.91E-04	1.58E-04	7.5681E-05	1.516E-05	0.00021038	4.2077E-05	2.17E-04	4.3442E-05	NA	NA
Indeno(1,2,3-cd)pyrene	0.003	5.24E-04	5.58E-04	1.12E-04	0.016	0.003	0.003	5.04E-04	2.46E-04	4.93E-05	6.80E-04	1.36E-04	7.25E-04	1.45E-04	NA	NA
Dioxin/Furans																
Dioxin/furan (TEQ) - Mammal	0.03	0.003	0.06	0.006	0.80	0.08	0.12	0.01	0.002	2.32E-04	0.03	0.003	0.005	5.46E-04	0.004	4.49E-04
Dioxin/furan (TEQ) - Bird	0.04	0.004	0.08	0.008	0.96	0.10	0.15	0.01	0.003	2.71E-04	0.03	0.003	0.006	6.38E-04	0.005	5.33E-04

Notes

1 - PAH bioaccumulation for small mammals is considered negligible. Because the red-tailed hawk only consumes small mammals, an HQ for PAHs was not calculated.

Hazard quotients in **bold** exceed one

LOAEL - lowest observed adverse effect level

mg/kg - milligrams/kilogram

NA - not applicable

NOAEL - no observed adverse effect level

APPENDIX F-2

TABLE 18

Hazard Quotients Based on the Max for Wildlife Receptors Exposed to Bioaccumulative Subsurface Soil Analytes at Site 15 - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

	Hazard Quotients															
	Meadow vole		Red fox		Short-tailed shrew		White-footed mouse		White-tailed deer		American robin		Mourning dove		Red-tailed hawk	
Chemical (mg/kg)	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*
Inorganics																
Cadmium	0.19	0.02	0.28	0.03	**4.39**	0.44	0.70	0.07	0.01	0.001	**1.02**	0.20	0.22	0.04	0.14	0.03
Chromium	0.21	0.04	0.18	0.04	**2.19**	0.44	0.29	0.06	0.02	0.004	0.83	0.17	0.70	0.14	0.11	0.02
Lead	**1.09**	0.58	0.93	0.49	**15.38**	**8.12**	**1.61**	0.85	0.09	0.05	**6.96**	**1.39**	**14.74**	**7.37**	0.42	0.08
Mercury	0.27	0.05	0.01	0.01	0.79	0.16	0.17	0.03	0.03	0.01	0.03	0.01	0.05	0.03	0.001	4.19E-04
Selenium	0.23	0.14	0.13	0.08	0.62	0.37	0.14	0.08	0.02	0.01	0.19	0.05	0.46	0.23	0.06	0.02
Silver	0.01	0.001	0.01	0.001	0.27	0.05	0.04	0.01	2.78E-04	5.55E-05	0.34	0.07	0.04	0.01	0.01	0.002
Zinc	0.09	0.02	0.06	0.01	0.62	0.12	0.11	0.02	0.01	0.002	0.36	0.07	0.28	0.06	0.07	0.01
Pesticides/PCBs																
4,4'-DDD	0.10	0.02	0.54	0.11	**3.01**	0.60	0.46	0.09	0.01	0.001	0.38	0.04	0.07	0.01	**1.08**	0.22
4,4'-DDE	0.41	0.08	**3.81**	0.76	**22.09**	**4.42**	**3.40**	0.68	0.01	0.002	**2.78**	0.28	0.13	0.01	**7.84**	**1.57**
4,4'-DDT	**1.69**	0.34	**14.62**	**2.92**	**84.42**	**16.88**	**12.88**	**2.58**	0.06	0.01	**10.57**	**1.06**	0.71	0.07	**29.91**	**5.98**
Aldrin	1.36E-04	2.72E-05	5.70E-04	1.14E-04	3.16E-03	6.31E-04	4.92E-04	9.85E-05	9.65E-06	1.93E-06	0.004	0.001	0.001	1.81E-04	0.002	3.59E-04
alpha-Chlordane	0.001	0.001	0.005	0.002	0.03	0.01	0.004	0.002	7.82E-05	3.91E-05	0.02	0.005	0.01	0.002	0.01	0.002
gamma-Chlordane	0.001	0.001	0.01	0.003	0.03	0.01	0.004	0.002	8.41E-05	4.20E-05	0.03	0.005	0.01	0.002	0.01	0.002
Semivolatile Organics																
Acenaphthylene	2.2239E-06	4.4477E-07	1.4263E-07	2.8526E-08	1.3679E-06	2.7359E-07	6.9396E-07	1.3879E-07	2.2849E-07	4.5697E-08	1.9887E-05	3.9774E-06	5.9284E-05	1.1857E-05	NA	NA
Anthracene	6.8179E-05	1.3636E-05	5.7164E-06	1.1433E-06	9.2248E-05	1.845E-05	2.7069E-05	5.4137E-06	6.9269E-06	1.3854E-06	7.77E-04	1.55E-04	0.002	3.69E-04	NA	NA
Benzo(a)anthracene	0.004	0.001	0.001	1.87E-04	0.023	0.005	0.003	0.001	3.98E-04	7.9801E-05	9.57E-04	1.91E-04	0.001	2.42E-04	NA	NA
Benzo(b)fluoranthene	0.01	0.002	0.001	2.63E-04	0.022	0.004	0.005	0.001	0.001	2.50E-04	0.001	2.88E-04	0.003	6.47E-04	NA	NA
Benzo(g,h,i)perylene	0.006	0.001	0.001	1.27E-04	0.009	0.002	0.002	4.60E-04	0.001	1.22E-04	6.49E-04	1.30E-04	0.002	3.18E-04	NA	NA
Benzo(k)fluoranthene	4.39E-04	8.7936E-05	6.0734E-05	1.2167E-05	0.001	2.34E-04	2.20E-04	4.412E-05	4.3621E-05	8.7384E-06	6.2151E-05	1.243E-05	1.19E-04	2.3735E-05	NA	NA
Chrysene	0.007	0.00134031	0.00185557	0.00037172	0.059	0.01	0.01	0.002	0.001	1.21E-04	0.002	4.59E-04	0.002	3.84E-04	NA	NA
Dibenz(a,h)anthracene	4.0153E-05	8.0437E-06	8.0161E-06	1.6058E-06	2.48E-04	4.9757E-05	3.9525E-05	7.918E-06	3.7841E-06	7.5804E-07	1.0519E-05	2.1038E-06	1.0861E-05	2.1721E-06	NA	NA
Fluoranthene	0.001	0.00016679	7.4582E-05	1.4916E-05	0.001	2.72E-04	3.61E-04	7.2242E-05	8.4387E-05	1.6877E-05	0.01	0.002	0.02	0.005	NA	NA
Phenanthrene	5.42E-04	0.00010841	3.7096E-05	7.4193E-06	4.36E-04	8.7151E-05	1.82E-04	3.6374E-05	5.5539E-05	1.1108E-05	0.01	0.001	0.01	0.003	NA	NA
Pyrene	0.14	0.03	0.01	0.002	0.17	0.03	0.05	0.01	0.01	0.003	0.01	0.003	0.03	0.01	NA	NA

Notes

1 - PAH bioaccumulation for small mammals is considered negligible. Because the red-tailed hawk only consumes small mammals, an HQ for PAHs was not calculated

Hazard quotients in **bold** exceed one

LOAEL - lowest observed adverse effect level

mg/kg - milligrams/kilogram

NA - not applicable

NOAEL - no observed adverse effect level

APPENDIX F-2

TABLE 19

Hazard Quotients Based on the EPC for Wildlife Receptors Exposed to Bioaccumulative Subsurface Soil Analytes at Site 15 - Step 3

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Chemical (mg/kg)	Exposure Point Concentration (EPC) mg/kg	EPC Basis	Hazard Quotients													
			Meadow vole		Red fox		Short-tailed shrew		White-footed mouse		American robin		Mourning dove		Red-tailed hawk	
			NOAEL	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*	*NOAEL*	*LOAEL*
Inorganics																
Lead	1560	99% KM (Chebyshev) UCL	0.61	0.32	0.55	0.29	**8.54**	**4.51**	0.93	0.49	**3.94**	0.79	**7.97**	**3.99**	0.31	0.06
Pesticides/PCBs																
4,4'-DDE	0.995	95% KM (Chebyshev) UCL	0.11	0.02	**1.01**	0.20	**5.95**	**1.19**	0.92	0.18	0.75	0.07	0.04	0.004	**2.08**	0.42
4,4'-DDT	15.6	99% KM (Chebyshev) UCL	0.93	0.19	**7.92**	**1.58**	**46.37**	**9.27**	**7.09**	**1.42**	**5.81**	0.58	0.39	0.04	**16.20**	**3.24**

Notes

Hazard quotients in **bold** exceed one

EPC - Exposure Point Concentration

LOAEL - lowest observed adverse effect level

mg/kg - milligrams/kilogram

NOAEL - no observed adverse effect level

APPENDIX F-2

TABLE 20

Earthworm Survey Summary

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Sample Location	Sample ID	Date and Time	Test Pit Soil Description	Overlying Litter Type and Thickness (cm)	Number of Worms in Surface Soil	Worm Species and Length (cm) in Shallow (Excavated Test Pit) Soils[A]	Number of Worms in Subsurface Soil[B]
Onsite	IR15-TP1	10/18/2011 0840	Silty sand with trace clays, medium brown, fine to medium grained, loose, slightly moist, large rocks and clay chunks mixed in	Grass	0	-	0
	IR15-TP2	10/18/2011 0935	Silty sand, medium brown, fine grained, very dense, slightly moist; several rocks	Pine needles < 1.3	0	-	0
	IR15-TP3	10/18/2011 1055	Sandy clay, medium-dark brown, dense, slightly moist, medium plasticity	Pine needles 1.3	0	-	0
	IR15-TP4	10/18/2011 1115	Silty sand with trace clay, medium brown, fine to medium grained, slightly moist, clay at 10 cm bgs, tan/gray mottled, dense, medium plasticity	Maintained grass	0	-	0
	IR15-TP5	10/18/2011 1450	Silty sand, light brown, fine grained, loose, moist	Pine needles 1.3	2	(1) gray worm, 4 cm (1) gray worm, 3 cm	0
	IR15-TP6	10/18/2011 1145	Silty sand with trace clays, light brown-tan, medium to coarse grained, dense, slightly moist, roots present	Pine needles 2.5	2	(1) gray worm, 10 cm (1) gray worm, 14 cm	0
	IR15-TP7	10/18/2011 1505	Silty sand, dark brown, medium grained, loose, moist, clay chunks present	Pine needles 2.5	1	(1) compost worm, 12 cm	0
	IR15-TP8	10/18/2011 1355	Silty sand with trace clays, gray-light tan, fine grained, medium dense, moist; chunks with higher clay content present	Grass	10	(4) worms, < 2 cm[C] (1) tree or compost worm, 6 cm (3) thin red worms, 4 cm (1) thin red worm, 3 cm (1) bright red worm, 6 cm	0
Reference	IR15-R1	10/17/2011 1725	Silty sand with trace clays, brown, poorly sorted, loose, fine to medium grained, slightly moist	Maintained grass	0	-	0
	IR15-R2	10/17/2011 1615	Silty sand,medium brown, poorly sorted, loose, slightly moist	Maintained grass	0	-	0
	IR15-R3	10/18/2011 1545	Silty clay, dark brown, soft, moist, medium plasticity	Pine needles <1.3	0	-	0
	IR15-R4	10/18/2011 1610	Silty sand, dark brown to black, fine to medium grained, medium density, slightly moist	Pine needles 1.3	3	(1) worm, < 2cm[C] (2) worm, 2cm[C] (3) gray worm, 5 cm	0

Notes

A) All test pits were excavated to 20 cm wide, 20 cm long, and 10 cm deep

B) Mustard solution used to drive up worms from deeper (> 10 cm) soils; solution is 750 milliliters distilled water mixed with 3 teaspoons yellow mustard

C) Worms 2 cm or less in length could not be identified

bgs - below ground surface

cm - centimeters

APPENDIX F-2

TABLE 21

Small Mammal Burrow Survey Summary

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Sample Location	Sample ID[A]	Date and Time	Number of Burrows Identified	Diameter of Burrows (cm)	Other Observations (e.g., presence of scat or tracks)
Onsite	IR15-TP1	10/18/2011 1045	2	2	-
	IR15-TP2	10/18/2011 1140	0	-	-
	IR15-TP3	10/18/2011 1200	0	-	-
	IR15-TP4	10/18/2011 1100	0	-	-
	IR15-TP5	10/18/2011 1440	0	-	-
	IR15-TP6	10/18/2011 1115	0	-	-
	IR15-TP7	10/18/2011 1415	0	-	-
	IR15-TP8	10/18/2011 1230	0	-	-
Reference	IR15-R1	10/17/2011 1725	0	-	-
	IR15-R2	10/17/2011 1650	0	-	-
	IR15-R3	10/18/2011 1530	0	-	-
	IR15-R4	10/18/2011 1600	0	-	-

Notes:

A) All surveys conducted in a 30 foot radius around earthworm survey pit location
cm - centimeters

APPENDIX F-2

TABLE 22

Tree Community Survey Summary

Site 15 ESI Report

MCB CamLej, Jacksonville, North Carolina

Sample Location	Sample ID[A]	Date and Time	Trees Less than 10 cm DBH			Trees Greater than 10 cm DBH			Fallen Trees		
			Dominant Species	DBH (cm)	Observations	Dominant Species	DBH (cm)	Observations	Species	DBH (cm)	Root Ball Pit Size (feet)/ Comments
Onsite	IR15-TP1	10/18/2011 1045	Pine	9 6 7 5 5	-	Pine	22 13 19 16 -	-	No fallen trees		
	IR15-TP2	10/18/2011 1140	Pine	7 3 5 6 8	-	Pine	18 15 24 16 13	-	No fallen trees		
	IR15-TP3	10/18/2011 1200	Pine	4 6.5 3 8 2	-	Pine	15 20 18 13.5 12	-	No fallen trees		
	IR15-TP4	10/18/2011 1100	No trees present in 30 foot radius			No trees present in 30 foot radius			No fallen trees		
	IR15-TP5	10/18/2011 1440	Maple	4 3.5 4 5 4.5	-	Maple	10 11 12 10.5 11	-	Pine	20.3	root ball size not recorded
	IR15-TP6	10/18/2011 1115	Pine	8 9 6 3.5 4	-	Pine	16 15 18 12 14	-	No fallen trees		
	IR15-TP7	10/18/2011 1415	Maple	4 6 5 4 8	-	Maple	11 11.5 12 11 14	-	Pine Pine Pine	30.5 30.5 35.5	combined hole has 15 foot diameter and is 2 feet deep
	IR15-TP8	10/18/2011 1230	Pine	3 7 4 3.5 6	-	Pine	11 15 12 11.5 14	-	No fallen trees		
Reference	IR15-R1	10/17/2011 1725	No trees present in 30 foot radius			No trees present in 30 foot radius			No fallen trees		
	IR15-R2	10/17/2011 1650	Dogwood	4 4 3.6 2.4 4	Leaves speckled, red/orange color on edges of leaves, some leaves yellow-brown	No trees present in 30 foot radius			No fallen trees		
	IR15-R3	10/18/2011 1530	Pine	5 3 7 4 3.5	Adjacent to wetland	Pine	30 16 24 22 24	Adjacent to wetland	Pine Pine Maple Pine Pine	30.5 30.5 30.5 35.5 35.5	3 trees together, 11 foot diameter hole, 1 foot deep in standing water in standing water
	IR15-R4	10/18/2011 1600	Pine	3 6 4 7 9	-	Pine	12 16 13 19 20	-	Pine	30.5	1 foot deep

Notes:

A) All surveys conducted in a 30 foot radius around earthworm survey pit location

cm - centimeters

DBH - diameter at breast height

Appendix F-3
Standard Operating Procedures

STANDARD OPERATING PROCEDURE

Earthworm Survey

I. Purpose

To provide a general guideline for conducting a qualitative earthworm community survey.

II. Scope

A standard qualitative earthworm survey method is provided.

III. Equipment and Materials

- Water bottles with squirt tops (e.g., drinking water bottles)
- 2 mustard sachets/sample location or bottle of mustard
- Spade/hand trowel
- Protective gloves
- Bags or bin/bin top for soil analysis
- Hand lens
- Field guides or keys
- Site map(s) with marked sample locations
- Portable GPS
- Compass
- Field log book
- Tape measure and measuring stick
- Appropriate safety equipment
- Camera
- Site Health and Safety Plan

IV. Procedures and Guidelines

1. Conduct survey at selected locations indicated on site map.

2. Each location should be documented with a handheld GPS. Photograph sample location and immediate surrounding area prior to digging sample pit.

3. Dig one sample pit at each location and identify earthworms to the extent possible by following procedures presented in the attached "The OPAL Soil and Earthworm Survey". Supporting information presented in the accompanying workbook can be used as needed to support the analysis.

    - Note 1: Complete Steps A through E indicated in "The OPAL Soil and Earthworm Survey", with two exceptions: 1) Do not determine soil pH (Step 12, under C); and 2) Document the depth and describe the composition of organic litter and materials in the excavated soils.

- Note 2: Earthworms in the survey guide are those present in European soils. Although earthworm species in North American soils may vary, the primary objective is to determine if *Lumbricus* sp. occur in site soils. The field key is adequate to identify these species.
- Note 3: It should be clearly documented in the log book if an earthworm was captured by the initial trenching or with the mustard solution.

4. Photograph soils and each earthworm collected. Include a measuring stick in the photograph for approximate scale.

V. Attachments

1. "The OPAL Soil and Earthworm Survey"

2. "OPAL Soil and Earthworm Survey, Workbook to Accompany Fold-Out Field Guide"

VI. Key Checks and Items

- Record information as indicated in "The OPAL Soil and Earthworm Survey."

STANDARD OPERATING PROCEDURE

Small Mammal Burrow Survey

I. Purpose

To provide a general guideline for conducting a small mammal burrow survey.

II. Scope

A standard small mammal burrow survey method is provided.

III. Equipment and Materials

- Site map(s) with marked sample locations
- Portable GPS
- Compass
- Cord ($\geq$ 30 feet) for running transects from central point
- Species list, if available
- Field log book
- Tape measure and measuring stick
- Appropriate safety equipment
- Camera
- Site Health and Safety Plan

IV. Procedures and Guidelines

1. Conduct survey at selected locations indicated on site map. Each location should be documented with a handheld GPS (if different than the locations evaluated for earthworm survey).

2. Establish a sample plot at each location. For this site, a sample plot will consist of an area with a radius of 30 ft around each selected sample location.

3. Visually inspect the entire area within the 30 ft radius of the sample plot to look for burrows. To help with this process, multiple linear transects can be established, that radiate outward from the central sample location or "hub" to the outer 30 foot boundary of the circular sample area. A cord can be used when walking each transect line, to aid both in establishing the location of each transect line and in determining the appropriate distance to walk outward from the central sample point. Once the sampler reaches the outer boundary of a transect line, he can then move along the outer edge of the circular area being surveyed to establish the location of the next transect line. This process should be repeated until the entire area has been surveyed.

    - Note: The distance between each transect line will depend on the site

characteristics (e.g., density of vegetation), and may need to be adjusted to ensure that the entire area is inspected. However, it is anticipated that a distance of approximately 10 feet between transect lines (at the outer edge of the area being inspected) would be adequate to visually inspect the sample area and identify all burrow locations.

4. GPS the location and photograph each burrow observed while walking a transect line. Include the measuring stick within photographs for size reference. Document and photograph any footprints, scat, or other materials present on or around the burrows.

V. Attachments

None

VI. Key Checks and Items

None

STANDARD OPERATING PROCEDURE

Tree Community Survey

I. Purpose

To provide a general guideline for conducting a qualitative tree community survey.

II. Scope

A standard tree community survey method is provided.

III. Equipment and Materials

- Field guides or keys
- Species list, if available
- DBH (diameter at breast height) tape measure
- Site map(s) with marked sample locations
- Portable GPS
- Compass
- Field log book
- Appropriate safety equipment
- Camera
- Site Health and Safety Plan

IV. Procedures and Guidelines

1. Conduct survey at selected locations indicated on site map. Each location should be documented with a handheld GPS (if different than the locations evaluated for the earthworm survey).

2. Establish a sample plot at each location. For this site, a sample plot will consist of an area with an approximate radius of 30ft around each selected sample location.

3. Identify the dominant species in each strata or size class as follows:

   Trees - >10 cm DBH and >6 m tall.

   Saplings - <10 cm DBH and <6 m tall.

4. Identify the dominant species (based on number of trees) within each of the above size classes. Estimate the: 1) percent areal cover of the dominant species within each of the above size classes, and 2) overall percent areal cover of each size class (all species).

5. Identify the 5 largest trees (based on DBH) of the dominant species identified within each size category and measure the DBH of those trees (10 trees total).

If the dominant species is the same within each size category, then the DBH of only the 5 largest trees needs to be measured. Record size information in logbook and mark their locations on a map.

6. Record the DBH of any trees that are larger and of a different species. Identify the species of each of these larger trees and mark their locations on a map.

7. Record any signs of plant stress or other effects of possible contaminants such as wilting, discoloration, abnormal growth form or shape observed in any trees within the sample plot.

8. Photograph major plant community types and any observed signs of plant stress.

9. Identify on map and photograph any observed tree falls. Identify tree fall species. Photograph root mass and measure depth and width of hole created by root mass displacement.

V. Attachments

None

VI. Key Checks and Items

- Record signs of plant stress or other effects of possible site contaminants on vegetation.
- Have appropriate keys and field guides for plant identification.